PANAMA CANAL EXPANSION: IMPACT ON U.S. AGRICULTURE

Prepared for:

UNITED SOYBEAN BOARD
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Disclaimer

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Acronyms

ACP = Canal de Panamá
ANAM = National Environmental Authority
ARAP = Aquatic Resources Authority
BEI = European Investment Bank
BID = Inter-American Development Bank
BNSF = Burlington Northern Santa Fe
BUPCSA = Grupos Unidos por el Canal S.A.
CAF = Andean Development Corporation
CFI = International Financial Corporation
CILSA = CILSA-Minera Maria
CPI = Consumer Price Index
Cusa = Constructora Urbana, S.A.
DDGS = Distiller Dried Grains with Solubles
DOT = Department of Transportation
DWT = Deadweight Tonnage
EPA = Environmental Protection Agency
GAO = General Accounting Office
GDP = Gross Domestic Product
GPA = Georgia Ports Authority
GRT = Gross Registered Tonnage
GUPCSA = Grupos Unidos por el Canal S.A.
HDP = Harbor Deepening Project
ILC = Intermodal Logistics Center
IP = Identity Preserved
ISO = International Standard Organization
JBIC = Japan Bank for International Cooperation
KCS = Kansas City Southern
KCT = Kingston Container Terminal
KG = Kilogram
KM = Kilometers
LOA = Length Over All
Massport = Massachusetts Port Authority
MEC = Munitions and Explosions of Consideration
Meco = Constructora Meco S.A.
Million MT = Million Metric Tons
MLT = Mean Low Tide
MOU = Memorandum of Understanding
MPA = Maryland Port Administration
MT = Metric Ton
MMT = Million Metric Tons
NRT = Net Register Tonnage
NIT = Norfolk International Terminal
PAC = Pacific Access Channel
PNW = Pacific Northwest
PPPs = Public Private Partnerships
RTG = Rubber-Tired Gantries
SDW = Specified Dead Weight
STRI = Smithsonian Tropical Research Institute
SUNTRACS = Sindicato Único Nacional de Trabajadores de la Industria de la Construcción y Similares
TEU = Twenty-foot Equivalent Unit
UP = Union Pacific
WRDA = Water Resources Development Act

Unit Conversions

Bushel of corn = 56 pounds
Bushel of soybeans = 60 pounds
Bushel of wheat = 60 pounds
Metric ton of soybeans = 36.74 bushels
Metric ton of corn = 39.37 bushels
Short ton of soybeans = 33.33 bushels
Short ton of corn = 35.17 bushels
One pound = 2.2046 kilograms
Metric ton = 2,204.6 pounds
Short ton = 2,000 pounds
Long Ton = 2,240 pounds
Cargo Ton = 40 cubic feet
Metric ton = 1.2204 short tons
Acre = 0.4046 hectares
Hectare = 2.471 acres
Meters = 3.28 feet
Kilometer = 0.6214 mile
Mile = 1.6093 kilometer

I. Executive Summary

The Panama Canal is an important artery for U.S. grain and soybean exports, connecting vessels loaded in the U.S. Gulf and at East Coast ports for destinations in Central America and throughout Asia. The Panama Canal is in the midst of a $5.25 billion effort to expand its locks to meet current transit volumes, expand vessel transits supporting global trade growth, and to accommodate larger vessel sizes afloat today and in the future.

As an important artery, the Panama Canal handles three out of every ten bushels of grain and soybean exports from the U.S., more than half the exports through the Center Gulf, one-tenth of the Texas Gulf exports and nearly thirty percent of the Atlantic Coast exports. For soybeans specifically, the Panama Canal handles 44% of total U.S. exports, 63% of the soybeans through the Center Gulf, 57% through the Texas Gulf, and more than half the volume through the Atlantic Coast. The prospects of an expanded canal will offer enhanced economic and service opportunities for exports of U.S. grain and soybeans, and product exports. The opportunities will be varied, such as increased loadings per vessel, the potential for larger vessel sizes to be used, decreased canal transit time, and the potential for lower transport costs overall. These opportunities and benefits, and associated challenges and threats were identified in this report. However, the benefits while important to U.S. exports will not be limited to the U.S. alone, but also for competitors alike.

The future of grain export capabilities of the United States to meet expanding demand opportunities and requirements is an ever increasing concern. With more sustained levels of export volumes, changing export capacity dynamics, and various export prospects being discussed, there is a very real concern that even if the world demands grains and soybeans, and associated products from the U.S., the U.S. may well not be in a position to meet supply with this demand at competitive prices without more discriminating resource prioritization and investment strategies. To this end, eleven grain elevators are expanding export capabilities.

Informa Economics, Inc. was engaged to evaluate the pre-canal expansion environment with the post-canal expansion potential in terms of costs and service alternatives. The goal of this study was 1.) Develop an understanding of the impact of the Panama Canal expansion's impact on U.S. agriculture, in general, and the soybean industry, in particular; and 2.) Develop a list of recommended action steps to ensure U.S. agriculture is able to fully benefit from the Panama Canal's expansion. The key findings and summary conclusions are presented in this Executive Summary.

A. World Class Infrastructure and Engineering Project

- October 2014 will usher in new opportunities for shippers, ocean carriers, consumers and the country of Panama with the opening of the new, expanded, more

sustainable Panama Canal locks, which are expected to be on-time, according to the management, engineering and construction project schedules, and on budget.

- A projected possibility to come in under budget of $5.2 billion.
  - Eighty percent of the construction and procurement contracts having been rewarded as of July 2011.

B. Container Ocean Carrier Market/Vessel Growth is Driving Development

The new lock development will contribute additional flows and give rise to new service strings, as an outgrowth of advances in naval architecture, which in turn enabled creation of bigger, faster and more operationally fuel efficient container ships which will call at the upper echelon ports of the world

- Container vessel capacity is regularly scheduled with frequency and reasonable availability.
- Container equipment availability can shift, but is regularly and geographically, broadly accessible.
  - Port accessibility by vessels is being addressed at numerous local levels together with state and federal support.
  - The existing locks are not being expanded and will continue to be open, available to be utilized by the existing fleet of Panamax sized ships, including bulk, container and other cargo vessels, passenger and government vessels.
- The scale of vessels, and backhauls of containers to the geographic sources of manufactured consumer goods, have prompted the extension of containerization to a broader range of materials, goods and commodities for international transportation in unitized quantities.
- Relatively low priced commodities, such as grain, facilitate such an industry as agriculture and the enterprises within the sector to benefit, yet, as tertiary actors along for the ride in the course of development for the 21st Century Panama Canal expansion.

C. Defined Surplus and Deficit Areas, Nationally and Internationally

Implications of the Panama Canal expansion are predicated on sustained market factors or projected adjustments.

- Moving physical product toward a level of market equilibrium, takes into account prevailing trends over the next decade:
  - Crop yields will continue to increase from U.S. producers.
  - Soybean acres are expected to increase while corresponding corn acreage decreases.

- Farm policy and seed technology has led to crop acreage diversity especially in the western and northern, and southern growing regions, with the Central Gulf export position attracting production from the south.
- Energy policy will put a cap on how much corn will be used for ethanol starting in 2015, leading to increased corn supplies.
- Further, export opportunities arise since there would be expected soybean surplus production.
- Total U.S. grain and soybean exports are forecast to increase more than one billion bushels or 25% from 2011/12 to 5,277 million in 2020/21. By port range, exports through the Center Gulf are expected to increase 726 million bushels or 39% to 2,576 million; 3% or 14 million to 523 million through the Texas Gulf; and 11% or 140 million to 1,383 million through the PNW.
    - Of the grain and soybean volume exported from the Atlantic Coast, Center Gulf, Great Lakes and Texas Gulf port ranges, 55% is estimated to transit the Panama Canal, predominately to Asian markets.
    - Assuming these markets remain the dominate destinations for U.S. grain and soybean exports from these port ranges, the total volume of grain and soybeans transiting the Panama Canal will increase 30% or 426 million bushels (the equivalent of 11.2 million metric tons) to 1,840 million bushels (the equivalent of 48.4 million metric tons) by 2020/21 from the projected volumes for 2011/12.

Soybean export volumes are projected to increase from 1.35 billion bushels in 2011 to 2.25 billion bushels in 2020, with wheat holding roughly steady around one billion and corn export volumes forecast to be increasing, as well, from 1.65 billion to 2.14 billion bushels over the same time horizon.

D. Panama Canal Expansion Benefits U.S. Agriculture

- Contributes to improved cost competitiveness for grain and soybeans in export position at the Center Gulf, and back through the supply chain.
- Enabling the Center Gulf port range elevators to take full advantage of the destination, mainly Asian, draft capabilities.
    - Being able to take full advantage of the lower Mississippi River's draft to a 45 foot depth (approximately 14 meters) translates to approximately 35 cents per soybean bushel ($12.86 per metric ton) savings assuming the ability to maximize the loading of a small Capesize vessel by an additional 13,300 metric tons.
- Even increasing Panama Canal transit tolls 47% over the toll structure of the past 5 years (doubling the tolls since the expansion effort started in 2006) means that a 31 cent per soybean bushel advantage can be achieved by loading a vessel to a 45 foot draft (approximately 14 meters) of the lower Mississippi River, relative to the 39.5 foot load factor with existing Panamax vessels.

- Among the major takeaways from the report it is worthy of noting and is consequently emphasized how marked the potential value can be for U.S. agricultural competitiveness. The expansion of the Panama Canal extends the Center Gulf grain origination draw areas, thus increasing the prospects for Panama Canal transits and volumes to carry that additional volume. While current draw areas extend to an average of 70 miles from the Mississippi River, the increased vessel loading capability extends the average draw area by 91 miles or 130% to about 161 miles from the Mississippi River. Such substantial growth offers access to export markets through expanded freight corridors and increases potential market area through overall improved supply chain efficiencies.

E. U.S. Ports

A Memorandum of Understanding (MOU) has been established between the Autoridad del Canal de Panamá (ACP), or as it is known in English, the Panama Canal Authority, and 23 separate ports and organizations, actually continuing to grow in breadth and number. Moreover, many ports have initiated their own expansion programs (whether increased draft, more terminal space and throughput capabilities) because of the Panama Canal expansion.

- Organizations include the Soy Transportation Coalition and Tennessee-Tombigbee Waterway Authority.
- Not all U.S. ports are created equal.
    - Geographic position and hinterlands are inherently different.
    - Operating characteristics vary (draft, channel conditions and profile, terminal configurations, dredging, etc.).
    - Production, resources and industry bases and draw areas are unique.
    - Infrastructure accessibility, proximity and security factors must be considered.
- Demographics and historical settings arose from a range of circumstances.

F. International Destination Ports

1. Bulk Grain Markets

- Operational constraints and capabilities stem from product standardization, relatively high volume, low value and fluid nature of the goods, with transport and trading characteristics that only require occasional handling.
- Destination markets do have limited draft at select grain import terminals, limiting the load factor of a vessel to the local draft, or to the volume that export elevators on the Puget Sound in the Pacific Northwest (PNW) load vessels.
- In Japan, five grain terminals have indicated they will deepen berth draft and improve unload and stow capabilities to accommodate larger, deeper draft vessels using the expanded Panama Canal.

- Coal export increases driven by similar forces as soybean export increases.
- ADM has ordered three ships specifically designed to transit the expanded Panama Canal locks that by hold 80,000 metric tons on a 97,000 deadweight ton vessel.

2. Container Markets

- Improvements and developments to date include dredging, more highly efficient cranes, automated gates, applied tracking and tracing of equipment through optical character recognition and global positioning systems.
- Enhancements and competitive characteristics arise from industry consolidation, port privatizations and operations outsourcing, globalized system standards, increasing sophistication of inventory control and security requirements,

G. U.S. Grain and Soybean Export Capacity Growth

- Bulk grain and soybean export capacity is expanding 10% nationally.
- In the Pacific Northwest the increase is in the range of 30%.
- Two Greenfield facilities are under development in 2011, with one opening for the 2011 fall harvest.
- Several other expansions have taken place or are underway at existing facilities.
- Projects underway should be fully operational by the 2013/2014 marketing year.
- The grain and soybean origination system of inland terminals have been the focus of development and were financed by rail, grain and oilseed interests.
- Locating more elevator unit train capabilities.
- Increasing and improving barge loading berths.

H. Inland Infrastructure

1. Waterways

- River Locks and Dams
    - Under the current regulatory regime, the system is old and aging, with an extremely slow pace of added investment, rehabilitation, refurbishment or replacement.
    - Projects have been authorized yet funding not appropriated.
    - Even if appropriations were available, operational status would not improve for 10 to 15 years through the existing system administering and managing contracts.
- Dredging
    - Shallow Draft
    - Deep Draft
- Equipment – A Challenge
    - Greater than 18% of the covered barge fleet is 25 years old and older.

  - Nine foot draft so deeper draft Lower Mississippi River would be suboptimal.
  - Remaining fleet of 12 to 14 foot draft barges are only able to maximize utility downriver from St. Louis, MO and Cairo, IL.
- Areas for Further Investigation
  - Public Private Partnerships, (e.g., BRAC Model, Railroad Land Grants);
  - Waterway Infrastructure Funding;
  - Means of Locks Operational Optimization and Improvement;
  - Applications of Technology
    - Headhaul-backhaul matching
  - Impact on grain and oilseeds of other products moving for equipment, transport capacity, rates (e.g., coal, cement, minerals, etc.)

2. Railroads

U.S. rail infrastructure already exists and has been well developed over the past 160 years or so. The U.S. Eastern Class I rail operators and Western Class I railroads have each developed somewhat differently. The Norfolk Southern and the CSX in the east are less well developed in terms of transload operations at ports and access to bulk grain unitization facilities. The BNSF Railway and the Union Pacific operate to and from the West Coast, having more established bulk cargo service networks for transfer, yet may face congestion which provides for East Coast opportunities. The CN operates from the center of the country down to the Center Gulf, as well as to the Canadian East and West Coast ports.

- Shuttle Elevators and Unit Trains
  - This system of elevators allows for efficient loading and unloading of trains with 65 to 110 cars in less than 12 hours, to move grain and soybeans from areas of surplus to domestic feed and processing markets or to export position on the West Coast for example.
  - Efficiency payments are made available according to loading and unloading times.
  - The system includes more than 500 facilities across the Corn Belt and into prime wheat country. More facilities continue to be planned, constructed and put into operation.
- Intermodal
  - Investment strategy has been the focus in recent decades due to strong growth pattern.
  - Operating strategy likewise has been given to increasing containerization.
  - Eastern railroads have been enhancing their infrastructure through broadly planned initiatives encompassing multiple states, federal support and self-funded improvements for the overall network.

- Rail responds to road congestion as a public good, to facilitate freely flowing traffic.
    - Intermodal
    - Coal
    - Passenger
    - Agriculture is a tertiary participant, not a primary driver for the rail mode
- Short line railroads serve as an aggregator, offering service and often more flexible operating solutions to connect products to Class I rail providers.

Rail weight limits may provide opportunities for additional capacity as 286,000 "standard" pound rail increases to 315,000 pound capacity, with about half of older, short line and regional rail tracks and bridges, as well as some branch line and secondary track only capable of handling the originally designed load capacity of 263,000 pound railcars. The heavier 286,000 pound cars can often operate over the lighter capacity rails but only at significantly slower speeds. Changes may have an impact on car sizes, and thus cubic capacity of the rail cars as well, where increases from 4750 cubic feet to 5150 cubic feet and even up to 6350 cubic feet for some commodities, particularly Distillers Dried Grain with Solubles (DDGS).

II. Introduction

The Panama Canal is an important artery for U.S. grain and soybean exports, connecting vessels loaded in the U.S. Gulf and at East Coast ports for destinations in Central America and throughout Asia. The Panama Canal is in the midst of a $5.25 billion effort to expand its locks to meet current transit volumes, expand vessel transits supporting global trade growth, and to accommodate larger vessel sizes afloat today and in the future.

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The future of grain export capabilities of the United States to meet expanding demand opportunities and requirements is an ever increasing concern. With more sustained levels of export volumes, changing export capacity dynamics, and various export prospects being discussed, there is a very real concern that even if the world demands grains and soybeans, and associated products from the U.S., the U.S. may well not be in a position to meet supply with this demand at competitive prices without more discriminating resource prioritization and investment strategies. To this end, eleven grain elevators are expanding export capabilities.

Exports of grains, soybeans and related products are sustaining new levels while evolving into a different composition today than two decades ago. Additionally, the timing of exports has changed. Soybean exports are mostly exported during a compressed window from mid-September through mid-February of the crop marketing year. This dynamic requires efficient throughput capabilities at all available port ranges. Corn, wheat and product exports have to price in for throughput requirements or wait until the surge in soybeans is complete. Meanwhile the manner and time loading vessels at export elevators has changed such that loadings have progressively slowed over the past decade due to increased co-loading of grains, soybeans and other related products. The completion of the Panama Canal expansion project during 2014 will be supportive of U.S. grain and soybean export opportunities.

Informa evaluated the pre-canal expansion environment with the post-canal expansion potential in terms of costs and service alternatives (days to market, logistics alternatives

such as ports, vessel size, inland origins, etc.). Informa addresses the following points concerning the Panama Canal expansion.

1. To what extent are the nation's ports able to accommodate the larger ships the expanded Panama Canal will facilitate? Depth requirements, available labor, berths, infrastructure, bridge clearance, etc.
2. To what extent are the ports of the soybean industry's international customers able to accommodate the larger ships the Panama Canal will facilitate?
3. Will the increased volume of imports following the canal expansion gravitate toward the East Coast or Gulf ports?
4. To what extent will the increased throughput from the canal's expansion impact U.S. agriculture? Will the beneficiaries be non-agricultural industries?
5. Once the canal is expanded, will the increased throughput benefit containerized shipping or bulk shipping? Will greater opportunities for containerized shipping of soybeans emerge following the expansion? Estimate the percentage increase in container shipping to East Coast ports versus Gulf ports. Will there be enhanced opportunities for investments in transloading at East Coast ports and/or Gulf ports?
6. Impact of the Panama Canal expansion on the cost ratio of shipping via the Center Gulf and the Pacific Northwest. To what degree will additional freight gravitate toward the Center Gulf if ocean vessel rates are more economical due to the expansion? Take into account new toll structure of the Panama Canal following the expansion.
7. If more freight gravitates toward the Center Gulf, how much of that will likely be absorbed by our interior waterways versus railroads? Which mode(s) will bear the brunt of the increased demand for freight movement?
8. If ocean vessel rates are lowered from the Gulf to Asia, how will that impact the competitiveness of the U.S. soybean industry compared to Brazil and Argentina?
9. Which port region of the U.S. – West Coast, East Coast, and Center Gulf – will likely be able to achieve the most balance between imports and exports? Ocean vessel companies highly value the ability to match the volume of imports to the U.S. with exports from the U.S., thereby minimizing empty back haul movements. Some U.S. port regions show a higher likelihood of facilitating the balance between front haul and back haul movements. If a port region does not show promise in being able to facilitate this, it will be at a competitive disadvantage even if the Panama Canal expansion increases the volume it can receive and ship.
10. Profile exporters from Asia to the U.S. and soybean exporters from the U.S. to Asia. What port region (West Coast, East Coast, and Center Gulf) will be the most economical, the most reliable, offer the greatest volume and provide the most convenience?

After the points have been addressed, recommendations are made as to which segments of the soybean value chain need to be expanded to ensure the U.S. can take full advantage of the Panama Canal expansion.

III. Baseline Economic and Crop Export Outlook

This section includes Informa's baseline assumptions, upon which is built the company's long term grain and soybean supply and demand outlook. The next ten years will feature relatively higher commodity prices, increasing biodiesel mandate, a capping of the ethanol mandate and China corn imports.

Commodity prices are expected to remain at historically high levels for the next ten years. Total planted acreage has declined to about 316 million acres in 2011 from just over 366 million acres in 1982. Informa does not expect higher commodity prices to increase total land acreage, but will shift acres between competing crops.

The biodiesel mandate is for one billion gallons in 2011. The EPA is exploring the increase of the mandate by 280 million gallons in 2013, which increases demand for vegetable oils and animal fats by 2.1 billion pounds.

China's increased use of soybeans and subsequent higher levels of imports have been a major feature of U.S. agriculture the last five years. In crop year 2011, China corn imports are forecast to expand to four million metric tons (MT). Informa expects China to remain a net importer of corn over the next decade, while other forecasters expect rapidly expanding imports. This difference in opinion plays a major role in the relative crop price forecasts and ultimately what crops are planted, which impacts production.

U.S. mandated corn based ethanol production is not expanding past 2015. As yield increases expand corn production, more corn will be available for feeding and export. This situation will create an opportunity for China to import more corn without severely impacting the market.

A. Macro-Economic Outlook

1. U.S.

Informa's forecast of 1.8% GDP growth in 2011 and 2.9% growth in 2012 does not point to lower unemployment. Because retail spending accounts for 70% of U.S. gross domestic production, it is important to economic growth. Retail spending that is created by new workers entering the workforce is essential to economic growth.

Table 1: U.S. Macroeconomic Outlook

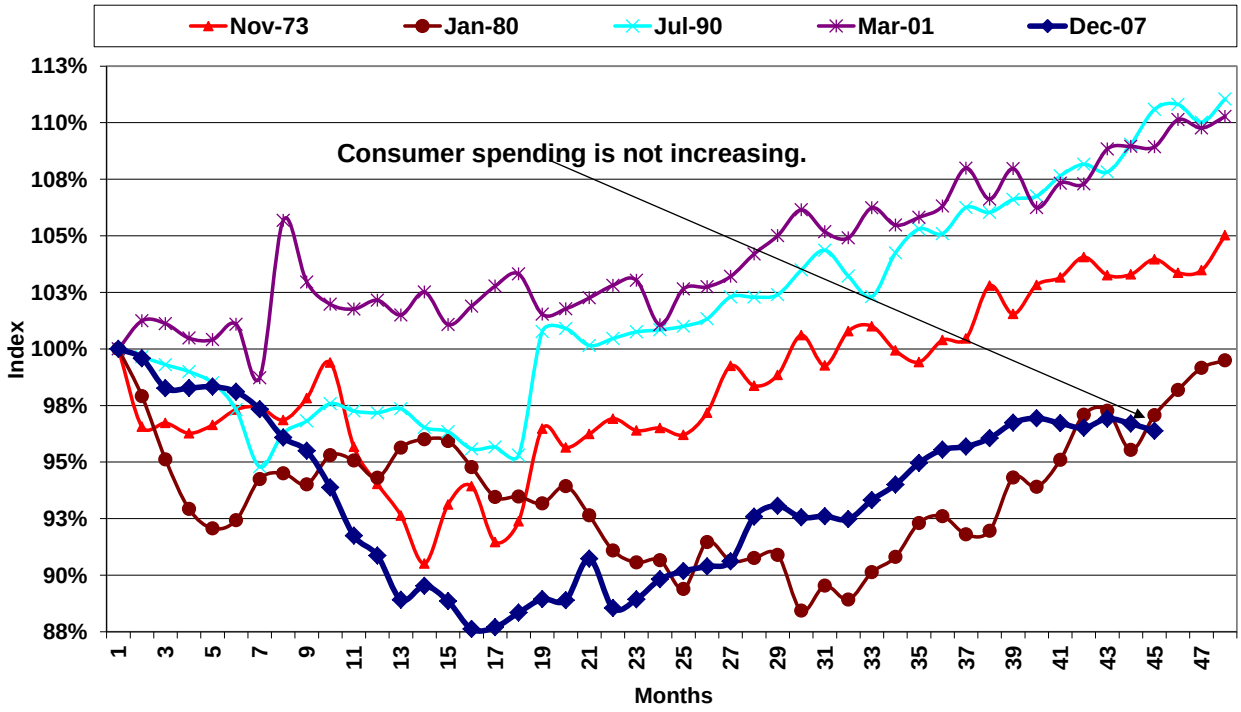
	2010:4	2011:1	2011:2	2011:3	2011:4	2012:1	2012:2	2012:3	2012:4
Economy									
Gross Domestic Product (GDP)									
Bils. Chain 2005 $'s	13,380.70	13,227.90	13,270.10	13,365.10	13,438.90	13,529.10	13,613.40	13,719.30	13,797.60
Ann. % Chg	3.10	0.40	1.30	2.90	2.20	2.70	2.50	3.10	2.30
% Chg. Yr. Over Yr.	2.80	2.20	1.60	1.70	1.70	2.30	2.60	2.70	2.70
Consumption	9,422.90	9,376.70	9,378.90	9,421.50	9,479.80	9,543.20	9,604.60	9,668.80	9,726.30
Ann. % Chg	4.00	2.10	0.10	1.80	2.50	2.70	2.60	2.70	2.40
Bus. Fixed Invest	1,413.90	1,378.90	1,400.20	1,421.10	1,447.00	1,472.40	1,496.40	1,522.00	1,546.10
Ann. % Chg.	7.70	2.10	6.30	6.10	7.50	7.20	6.70	7.00	6.50
Res. Const	325.90	321.10	324.10	327.00	330.30	335.60	336.60	340.80	347.10
Inven. Invest.	16.20	49.10	49.60	59.20	55.90	48.10	43.90	48.20	41.10
Net Exports	(397.70)	(424.40)	(405.70)	(388.30)	(402.50)	(405.50)	(404.00)	(397.60)	(399.50)
Fed. Govt.	1,093.40	1,053.30	1,059.00	1,064.30	1,068.00	1,070.60	1,066.40	1,064.10	1,060.20
Ann % Chg.	(0.30)	(9.40)	2.20	2.00	1.40	0.90	(1.60)	(0.90)	(1.40)
State and Local govt.	1,491.90	1,466.40	1,453.90	1,450.30	1,450.30	1,454.60	1,459.30	1,462.90	1,466.20
Ann % Chg.	(2.60)	(3.30)	(3.40)	(1.00)	-	1.20	1.30	1.00	0.90
Fed. Bdgt. Surpl.									
Unified (Qtry. Rate, NSA, FY)	(370.80)	(460.80)	(141.20)	(282.40)	(284.80)	(293.80)	(256.80)	(314.80)	(253.00)
Trade Bal., Gds, & Servs. - Bils. $/s	(460.40)	(563.20)	(590.10)	(501.80)	(507.80)	(507.30)	(515.80)	(528.10)	(536.50)
Vehicles, Housing, Production									
Vehicle Sales (Mils. Units)	12.30	13.00	12.10	12.30	12.30	12.50	12.70	12.90	13.10
Autos - Total (Mils. Units)	5.90	6.30	6.00	5.80	6.50	6.60	6.50	6.60	6.70
Light Trucks (Mils. Units)	6.40	6.70	6.10	6.50	5.80	5.90	6.20	6.30	6.40
Hous. Starts (Mils. Units)	0.53	0.58	0.57	0.60	0.62	0.65	0.69	0.74	0.80
Indus. Prod. (1997 =1.000)	0.92	0.93	0.93	0.94	0.95	0.96	0.97	0.99	1.00
Ann. % Chg.	3.20	4.80	1.00	5.00	3.90	4.40	4.90	5.70	5.20
Inflation and Wages									
GDP Price Defl. (% Chg.)	0.40	2.50	2.30	3.20	2.90	2.80	2.50	1.70	2.10
PCE Price Defl. (% Chg.)	1.70	3.90	3.10	3.80	3.40	3.00	1.40	0.80	2.70
PCE Core Price Defl. (% Chg.)	0.40	1.60	2.10	2.10	2.20	2.30	2.40	2.40	2.40
CPI-All Urban (% Chg.)	2.60	5.20	4.10	2.60	2.90	2.60	2.60	2.60	2.70
PPI-Fin Goods (%Chg.)	6.80	12.50	7.40	1.90	3.00	2.80	3.20	3.00	2.80
Hrly. Comp. (% Chg.)	2.00	2.50	4.20	2.60	2.80	3.00	3.00	2.80	3.00
Unemployment Rate (%)	9.60	8.90	9.10	9.10	9.00	8.80	8.60	8.50	8.30
Unit Labor Costs (% Chg.)	(0.60)	4.80	2.20	3.00	1.60	1.30	1.50	0.70	1.70
Productivity Growth (% Chg.)	2.60	(0.60)	(0.30)	1.90	1.20	1.70	1.50	2.10	1.30
Profits, Income, Saving									
Corp. Profs. Aftertax - Bils. $'s	1,369.30	1,454.80	1,652.10	1,610.80	1,486.30	1,644.90	1,857.90	1,797.90	1,634.70
% Chg. Yr. Over Yr.	11.40	2.80	12.70	13.90	11.10	13.10	12.50	11.60	10.00
Real Disp. Inc. - Bils. 2005 $'s	10,323.80	10,170.20	10,188.60	10,251.70	10,317.70	10,396.70	10,481.50	10,572.00	10,653.00
Ann % Chg.	1.80	0.70	0.70	2.50	2.60	3.10	3.30	3.50	3.10
Pers. Saving Rate (%)	5.60	4.90	5.10	5.80	5.90	5.40	5.60	5.70	5.90
Interest Rates (%)									
Fed. Funds	0.19	0.16	0.10	0.11	0.20	0.26	0.45	0.75	1.00
3-Mos Treas.	0.13	0.12	0.04	0.02	0.03	0.04	0.43	0.72	0.90
2-Year Treas	0.48	0.68	0.55	0.32	0.51	0.56	0.80	1.10	1.35
Prime	3.25	3.25	3.25	3.25	3.25	3.25	3.45	3.75	4.00
10-Yr. Treas	2.85	3.45	3.19	2.66	3.35	3.67	3.84	4.04	4.24
30-Yr. Treas	4.16	4.57	4.34	3.99	4.55	4.78	5.10	5.30	5.45

A lack of confidence in the health of the economy has people preserving their cash and paying off debt. If people could gain more confidence in their employment situation, spending would increase and unemployment would decrease. Although jobs are being created, talk of layoffs in large employment sectors, such as government employees and all employees funded by government, is delaying purchasing decisions, which reduces retail demand and ultimately demand for transportation and manufacturing.

The current economic recovery has not reached the same level of consumer spending that occurred before the recession. For sake of comparison, retail sales deflated by the Consumer Price Index (CPI) are indexed to the starting month of previous recessions as shown in Figure 1. Forty-five months into the last five recessions, consumer spending

was greater than the first month in the three milder recessions. For January 1980 and the current recession, consumer spending is well below normal.

Figure 1: Real Retail Sales Indexed to the Starting Recession Month



Source: Federal Reserve

Consumer spending is constrained by high unemployment, personal debt and high energy costs. For the economy to experience GDP growth above the 3% required to create enough jobs to account for a growing population, individuals and businesses that have capital need to have confidence in the future. The current economic environment does not instill that confidence. Without robust consumer spending U.S. imports of consumables that arrive in an ocean container are curtailed, leaving fewer containers available for backhaul moves for agricultural products to Asia.

2. World

The economic recovery remains unbalanced, with emerging countries experiencing strong economic growth and developed countries experiencing weak growth. In developed economies, GDP is below potential with high unemployment and low GDP growth, which implies low growth into the future. In many countries, especially the U.S., the housing market is depressed. The macro economic situation for the world is similar to the U.S. for developed countries as shown in Table 2.

The positive news is for industries involved with commodities in emerging countries, such as Brazil, Argentina, Russia, India, Indonesia and China experiencing GDP growth over 4%. China is experiencing GDP growth of 8% to 11%. As the wealth of individuals

expands, demand for basic commodities increases and has in turn triggered price increases. Over the last ten years, demand for iron ore, coal, petroleum, meat, clothing, oilseeds, oilseed products, grains, fruit and vegetables has greatly increased. For this reason, commodity industries are focused on developments in the Chinese markets.

Table 2: World Economic Projections

	Real Growth (1) (Percent Change)					Inflation - Consumer Prices (2) (Percent Change)				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
United States	-0.3	-3.5	3.0	1.8	2.9	3.8	-0.3	1.6	3.3	3.0
Canada	0.7	-2.8	3.2	3.2	3.0	2.4	0.3	1.8	2.5	2.2
United Kingdom	-0.1	-4.9	1.4	1.6	1.5	3.6	2.2	3.3	4.2	3.1
Europe	0.3	-4.0	1.7	1.8	1.6	3.1	0.2	1.5	3.1	2.3
Asia - Pacific	-0.5	-4.8	3.7	-1.1	1.6	2.0	-0.7	0.0	0.9	1.6
Japan	-1.2	-6.3	4.0	-2.1	1.2	1.4	-1.3	-0.7	0.3	1.2
Australia	2.4	1.4	2.5	3.2	3.3	4.4	1.8	2.8	3.1	3.3
New Zealand	-0.9	0.0	2.1	2.3	3.3	4.0	2.1	2.3	2.8	2.5
Newly Industrialized Countries	1.8	-0.7	8.4	4.6	4.0	4.6	1.3	2.4	3.9	2.7
Korea	2.3	0.3	6.2	3.8	3.8	4.7	2.8	3.0	4.4	3.3
Taiwan	0.7	-1.9	10.9	5.1	4.0	3.5	-0.9	1.0	2.0	1.5
Hong Kong (3)	2.3	-2.7	7.0	4.9	3.7	4.3	0.6	2.3	4.1	2.1
Singapore	1.5	-0.8	14.5	6.5	5.2	6.6	0.6	2.8	5.1	3.2
Latin America	4.2	-2.2	6.1	4.3	3.6	8.4	7.2	7.4	7.8	7.6
Argentina	6.8	0.9	9.2	7.4	4.6	8.6	6.3	10.5	10.6	11.5
Brazil	5.2	-0.6	7.5	4.0	3.7	5.7	4.9	5.0	6.2	5.4
World	1.8	-1.9	4.3	3.0	3.3	4.7	1.3	2.7	3.9	3.4
OECD	0.1	-3.9	2.9	1.7	2.3	3.4	0.3	1.7	2.9	2.7
EU	0.3	-4.2	1.8	1.9	1.8	3.3	0.7	1.8	3.3	2.5
Eurozone	0.3	-4.0	1.7	1.4	1.8	3.3	0.3	1.6	2.6	1.9
Asia-NICs, Emerging	7.0	6.5	9.3	7.6	6.8	6.4	1.7	4.5	5.4	3.8
Russia	5.2	-7.8	4.0	4.3	4.5	14.1	11.8	6.9	9.7	10.1
Emerging Asia	8.1	7.9	9.5	8.2	7.4	6.7	1.8	4.9	5.8	4.0
China	9.6	9.2	10.3	9.2	8.0	5.9	-0.7	3.3	5.1	3.0
India	4.9	9.1	8.8	7.6	7.5	8.3	10.9	12.0	9.1	7.0
Indonesia	6.0	4.6	6.1	6.0	5.6	10.2	4.4	5.1	6.7	7.0
Malaysia	4.8	-1.6	7.2	4.1	4.5	5.4	0.6	1.7	3.0	2.7
Philippines	4.6	1.1	7.6	3.2	4.3	9.3	3.2	3.8	4.2	4.6
Thailand	2.5	-2.4	7.8	3.5	4.5	5.5	-0.8	3.3	3.3	2.3
Middle East	5.8	2.4	5.0	4.2	4.3	11.7	7.1	6.8	7.3	4.6
South Africa	3.6	-1.7	2.8	4.3	4.7	11.5	7.1	4.3	4.4	7.5

(1) Real GDP
(2) Annual averages
(3) Hong Kong, Composite CPI
Regional and world totals are weighted averages of countries shown
Current account totals are the sume of the countries shown

Commodity price increases are reflecting a combination of strong demand growth and any supply decreases. For emerging economies, where the consumption of food and fuel is a large share of GDP, commodity price increases are a major source of concern.

Despite these concerns, governments of developing countries are reluctant to import large quantities of grains and meats. The preferred course of action is to remain self-sufficient until inflation concerns force governments to allow their respective currency to appreciate.

B. Baseline Crop Assumptions

- Open trade policies continue that allow countries to import and export.
- For 2011 through 2013, the crude oil price averages $87 per barrel. For 2014 through 2020, the crude oil price averages $82 per barrel. This assumption anticipates a steady dollar in terms of a reasonable degree of stability in exchange rates with other major convertible currencies.
- No major changes in the U.S. renewable fuels policy.
- China will be successful in its long-term policy of self-sufficiency.
    - Self-sufficiency means China can import corn if necessary.
    - China will not be held hostage to foreign government policy goals.
- U.S. available acreage is already in production as shown in Table 3.
- Southern Africa has social issues that will prevent the expansion of corn production within the next five years.
- Argentina and Brazil have available crop acreage that is not in production.
- Argentina and Brazilian farmers force crop production out of the country quickly because:
    - Lack of adequate storage;
    - Lower hedging opportunities; and
    - Political risk involving policy.

Table 3: U.S. Planted Acreage (thousand acres)

	2009	2010	2011	2012	2013	2014	2015	2020
Corn, All	86,382	88,192	91,787	95,500	90,000	87,500	87,500	84,500
Sorghum, All	6,633	5,404	5,345	5,560	5,240	5,090	5,090	4,910
Barley	3,567	2,872	2,725	2,950	2,900	2,800	2,800	2,700
Oats	3,404	3,138	2,587	2,800	2,750	2,700	2,650	2,550
All Wheat	59,168	53,603	55,183	57,500	54,500	54,500	54,000	53,000
Winter Wheat	43,346	37,335	41,108					
Other Spring Wheat	13,268	13,698	12,677					
Durum Wheat	2,554	2,570	1,398					
Rye	1,241	1,211	1,252	1,242	1,232	1,222	1,212	1,162
Rice	3,135	3,636	2,693	3,250	3,150	3,050	3,050	2,950
Soybeans	77,451	77,404	74,958	73,000	82,000	85,000	85,000	88,500
Peanuts	1,116	1,288	1,152	1,132	1,112	1,092	1,072	972
Sunflowers	2,030	1,952	1,856	1,856	1,856	1,856	1,856	1,856
Rapeseed/Canola	827	1,449	1,093	1,650	1,700	1,750	1,800	2,050
Flaxseed	317	421	229	350	350	350	350	350
Cotton, All	9,150	10,981	14,720	11,680	9,180	8,680	8,180	7,780
Cotton, Upland	9,008	10,777	14,431	11,500	9,000	8,500	8,000	7,600
Cotton, Am-Pima	141	204	289	180	180	180	180	180
Hay, All	59,775	59,862	57,605	58,500	58,500	58,500	58,500	58,500
Beans, Dry Edible	1,540	1,911	1,265	1,300	1,290	1,280	1,270	1,220
Tobacco	354	337	337	327	317	307	297	247
Sugar Beets	1,186	1,171	1,250	1,235	1,220	1,205	1,190	1,115
Gross Summation	317,275	314,833	316,036	319,831	317,296	316,881	315,816	314,361
Double-Counted Acres:								
Soybeans Double-Cropped	4,712	2,829	4,959	4,000	4,000	4,000	4,000	4,000
Spring Reseeding	300	40	200	0	0	0	0	0
Crop Total	312,263	311,964	310,877	315,831	313,296	312,881	311,816	310,361
Conservation Reserve	33,747	31,274	31,147	31,500	31,500	31,500	31,500	31,500
Prevented Planting	4,480	5,233	7,685	2,910	2,910	2,910	2,910	2,910
Grand Total	350,490	348,470	349,709	350,241	347,706	347,291	346,226	344,771
Grand Total (without Hay)	290,715	288,608	292,104	291,741	289,206	288,791	287,726	286,271

Shaded area represents Informa forecast.

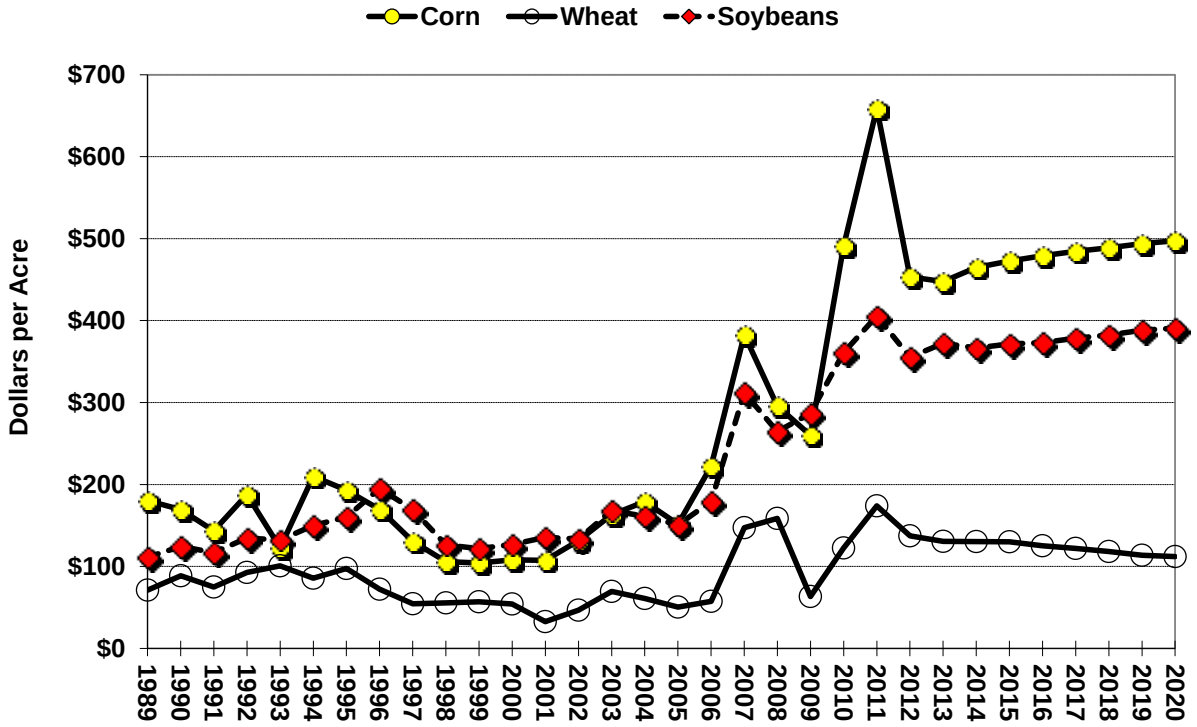
Source: USDA and Informa

C. Informa Crop Balance Sheets

Informa's crop balance sheets are derived from a data set that includes individual countries' supply and demand situation for each individual crop, and relative net returns to the farmer as shown in Figure 2. Trade is based on production surplus or deficit for a particular crop. For example, if the relative crop prices encourage the farmer to plant more corn in Argentina, then Argentina will have more corn to export or build ending stocks. Ultimately, prices will reach a level to either increase consumption/decrease production or decrease consumption/increase production. The advantage of this methodology is that it provides constraints to the forecasts and establishes a methodology that continuously adjusts the market projections toward a state of equilibrium.

Throughout the forecast farmers in the U.S. will be rewarded to plant corn and soybeans over planting wheat.

Figure 2: U.S. Major Crop Aggregate Net Revenue



Source: USDA and Informa

1. CORN

- U.S. planted corn acreage is expected to decline to 84.5 million acres as shown in Table 4.
- By the 2020 crop year, U.S. corn yields are expected to reach 189 bushels per acre.
- U.S. corn production is expected to average 14.1 billion bushels over the forecasted period.
- Feed use is expected to increase by 770 million bushels over the forecast ten year period while ethanol consumption increases 335 million bushels, capping at 5.35 billion in 2015/16.
- Over the next ten years, U.S. corn exports are expected to increase 305 million bushels.

Table 4: U.S. Corn Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Planted Area (million acres)	93.5	86.0	86.4	88.2	91.8	95.5	90.0	87.5	87.5	84.5
Harvested Area	86.5	78.6	79.5	81.4	83.7	88.5	83.0	80.5	80.5	77.5
Harvested Yield (bu/acre)	150.7	153.8	164.7	152.8	150.6	166.5	169.2	171.9	174.6	189.0
Beginning Stocks (million bu)	1,304	1,624	1,673	1,708	1,080	792	1,982	2,217	2,097	2,087
Production	13,038	12,092	13,092	12,447	12,608	14,740	14,040	13,840	14,060	14,650
Imports	20	14	8	30	20	20	10	10	10	10
Total Supply	14,362	13,730	14,773	14,185	13,707	15,552	16,032	16,067	16,167	16,747
Feed Use/Residual	5,858	5,182	5,141	4,850	4,750	5,100	5,160	5,210	5,270	5,620
Food/Seed/Ind	4,442	5,025	5,938	6,420	6,515	6,570	6,630	6,710	6,790	6,840
(of which Fuel Alcohol)	3,049	3,709	4,568	5,015	5,100	5,145	5,200	5,275	5,350	5,350
Total Domestic Disappearance	10,300	10,208	11,079	11,270	11,265	11,670	11,790	11,920	12,060	12,460
Exports	2,437	1,849	1,987	1,835	1,650	1,900	2,025	2,050	2,070	2,140
Total Disappearance	12,738	12,057	13,066	13,105	12,915	13,570	13,815	13,970	14,130	14,600
Ending Stocks	1,624	1,673	1,708	1,080	792	1,982	2,217	2,097	2,037	2,147

Source: USDA and Informa

2. ETHANOL

- U.S. ethanol mandate for corn based ethanol peaks at a level of 15 billion gallons in 2015 (or the equivalent of 5.4 billion bushels of corn).
- The vast majority of ethanol imports are produced from sugarcane in Brazil.
- However, recent ethanol export volumes portray future potential for discretionary volumes in excess of the corn for ethanol mandate.

Table 5: U.S. Ethanol Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Beginning Inventories	442	597	697	754	**781**	**790**	**790**	**813**	**837**	**837**
Production	9,309	10,938	13,298	13,864	**14,080**	**14,157**	**14,578**	**15,000**	**15,000**	**15,000**
Imports	556	198	350	600	**800**	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**
Total Supply	10,308	11,733	14,345	15,217	**15,660**	**15,946**	**16,368**	**16,813**	**16,837**	**16,837**
Domestic Usage	9,552	10,923	13,188	13,691	**14,180**	**14,657**	**15,055**	**15,476**	**15,287**	**15,287**
Exports	158	113	403	746	**691**	**500**	**500**	**500**	**500**	**500**
Total Disappearance	9,710	11,036	13,591	14,437	**14,871**	**15,157**	**15,555**	**15,976**	**15,787**	**15,787**
Ending Inventories	597	697	754	781	**790**	**790**	**813**	**837**	**1,050**	**1,050**

Source: USDA and Informa

3. DISTILLERS DRIED GRAIN SOLUBLES (DDGS)

- DDGS is a co-product of the ethanol manufacturing process. It is a highly valued component of the livestock feed ration.
- DDGS is a co-product at the ethanol manufacturing process. It is a highly valued component of livestock feed rations.
- U.S. DDGS production is expected to reach 46.5 million tons in 2015.

- Although Chinese imports of corn has been limited, U.S. DDGS exports to China are increasing for feed.
- After 2015, DDGS production is expected to remain steady, consistent with corn consumed for ethanol production being capped.

Table 6: U.S. Distillers Dried Grains Supply and Demand Balance Sheet

	2007	2008	2009	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2020**
Production (thousand tons)	23,472	29,125	36,789	40,726	**41,271**	**41,700**	**42,080**	**43,910**	**46,480**	**46,480**
Imports	160	277	450	496	**551**	**551**	**551**	**551**	**551**	**551**
Total Supply	23,632	29,401	37,239	41,222	**41,822**	**42,251**	**42,631**	**44,461**	**47,031**	**47,031**
Domestic Disappearance	19,311	23,924	28,091	32,404	**32,728**	**33,157**	**33,537**	**35,367**	**37,937**	**37,937**
Exports	4,322	5,477	9,148	8,818	**9,094**	**9,174**	**9,258**	**9,660**	**10,226**	**10,226**
Total Disappearance	23,632	29,401	37,239	41,222	**41,822**	**42,251**	**42,631**	**44,461**	**47,031**	**47,031**

Source: USDA and Informa

4. WHEAT

- U.S. wheat acreage is expected to remain in a tight range, with little incentive to expand. Any increase is in response to shortages throughout the world.
- U.S. wheat yields are not increasing as much as other crops. Wheat is grown continuously on marginal land.
    - As a result, U.S. wheat production is likely to decrease over the forecast period.
- Over the next ten years, U.S. wheat exports are expected to decrease on the order of 245 million bushels.

Table 7: U.S. Wheat Supply and Demand Balance Sheet

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2020**
Planted Area (million acres)	60.5	63.2	59.2	53.6	55.2	57.5	54.5	54.5	54.0	53.0
Harvested Area	51.0	55.7	49.9	47.6	45.9	50.0	47.0	47.0	46.5	45.5
Harvested Yield (bu/acre)	40.2	44.9	44.5	46.4	45.2	45.7	46.0	46.3	46.6	48.2
Beginning Stocks (million bu)	456	306	657	976	861	681	781	771	791	851
Production	2,051	2,499	2,218	2,208	2,077	2,290	2,160	2,180	2,170	2,190
Imports	113	127	119	97	105	100	100	100	100	100
Total Supply	2,620	2,932	2,993	3,281	3,043	3,071	3,041	3,051	3,061	3,141
Feed Use/Residual	16	255	150	135	300	200	200	180	180	150
Food/Milling and Seed	1,062	1,027	1,017	1,020	1,038	1,040	1,050	1,060	1,070	1,120
Total Domestic Disappearance	1,078	1,282	1,167	1,155	1,338	1,240	1,250	1,240	1,250	1,270
Grain Exports	1,236	993	850	1,265	1,024	1,050	1,020	1,020	1,020	1,020
Total Disappearance	2,314	2,275	2,017	2,420	2,362	2,290	2,270	2,260	2,270	2,290
Ending Stocks	306	657	976	861	681	781	771	791	791	851

Source: USDA and Informa

5. BARLEY

- U.S. barley planted acreage is expected to remain under 3 million acres and yields are expected to remain below recent peaks, at a sustained level under 73 bushels per acre.
- Barley that can be grown to malting quality returns a nice profit. The feed quality of barley is losing acreage to corn and soybeans.
- Barley required for brewing and other food processes is limited.

Table 8: U.S. Barley Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Planted Area (million acres)	4.02	4.25	3.57	2.87	2.73	2.95	2.90	2.80	2.80	2.70
Harvested Area	3.50	3.78	3.11	2.47	2.39	2.50	2.45	2.35	2.35	2.25
Harvested Yield (bu/acre)	60.0	63.6	73.0	73.13	70.38	71.90	72.62	73.35	74.08	77.86
Beginning Stocks (million bu)	69	68	89	115	89	58	58	61	58	61
Production	210	240	227	180	168	180	178	172	174	175
Imports	32	29	17	9	10	15	25	25	25	25
Total Supply	311	338	333	304	267	253	261	258	257	261
Feed Use/Residual	33	67	48	50	40	30	35	35	30	35
Food/Seed/Ind	169	169	164	159	160	160	160	160	160	160
Total Domestic Disappearance	202	236	212	208	200	190	195	195	190	195
Exports	41	13	6	8	10	5	5	5	5	5
Total Disappearance	243	249	218	216	210	195	200	200	195	200
Ending Stocks	68	89	115	89	58	58	61	58	62	61

Source: USDA and Informa

6. OATS

- U.S. oats planted acreage is expected to decline over the forecast period.
  - Oats yields have not increased as quickly as corn and soybeans.
    - Oats have become a niche market
    - Oats required for breakfast cereal is limited.

Table 9: U.S. Oats Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Planted Area (million acres)	3.76	3.25	3.40	3.14	2.59	2.80	2.75	2.70	2.65	2.55
Harvested Area	1.50	1.40	1.38	1.26	0.93	0.87	0.82	0.77	0.72	0.62
Harvested Yield (bu/acre)	60.1	63.7	67.5	64.28	61.55	65.50	65.83	66.16	66.49	68.17
Beginning Stocks (million bu)	51	67	84	80	68	41	60	61	59	62
Production	90	89	93	81	57	57	54	51	48	42
Imports	123	115	95	85	85	110	110	110	110	110
Total Supply	264	271	272	247	210	208	224	222	217	215
Feed Use/Residual	119	110	115	102	90	70	85	85	80	75
Food/Seed/Ind	75	74	75	74	76	75	75	75	75	75
Total Domestic Disappearance	194	184	190	176	166	145	160	160	155	150
Exports	3	3	2	3	3	3	3	3	3	3
Total Disappearance	197	187	192	179	169	148	163	163	158	153
Ending Stocks	67	84	80	68	41	60	61	59	59	62

Source: USDA and Informa

7. SOYBEANS

- U.S. soybean planted acreage is expected to increase 11 million acres over the forecast period.
- U.S. soybean yields are expected to increase 7 bushels per acre or an increase of 17%.
- Expected soybean production increases are forecast to exceed 1.1 billion bushels over the forecast period.
- Crush and exports are expected to increase 365 million bushels and 750 million, respectively, from the baseline year of 2010 through to 2020. That translates into increases of 22% over the period for the volume crushed and 50% increase in exports. Soybean exports will be used to fulfill China's appetite to crush soybeans domestically.

Table 10: U.S. Soybean Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Planted Area (million acres)	64.7	75.7	77.5	77.4	75.0	73.0	82.0	85.0	85.0	88.5
Harvested Area	64.1	74.7	76.4	76.6	73.8	72.0	81.0	84.0	84.0	87.5
Harvested Yield (bu/acre)	41.7	39.7	44.0	43.5	41.8	44.8	46.1	47.0	47.7	50.7
Beginning Stocks (million bu)	574	205	138	151	207	188	222	332	433	463
Production	2,677	2,967	3,359	3,329	3,085	3,230	3,730	3,950	4,010	4,440
Imports	10	13	15	14	15	10	10	10	10	10
Total Supply	3,261	3,185	3,512	3,494	3,308	3,428	3,962	4,292	4,453	4,913
Crush	1,803	1,662	1,752	1,650	1,650	1,755	1,835	1,880	1,925	2,015
Food/Seed/Residual	94	106	108	137	120	126	145	154	156	173
Total Domestic Disappearance	1,897	1,768	1,860	1,787	1,770	1,881	1,980	2,034	2,081	2,188
Exports	1,159	1,279	1,501	1,500	1,350	1,325	1,650	1,825	1,925	2,250
Total Disappearance	3,056	3,047	3,361	3,287	3,120	3,206	3,630	3,859	4,006	4,438
Ending Stocks	205	138	151	207	188	222	332	433	447	475

Source: USDA and Informa

8. SOYBEAN PRODUCTS

- U.S. biodiesel mandate is driving the increase in soybean crush.
  - The mandate is expected to be increased to 1.28 billion gallons by the end of 2013. The 280 million gallon increase represents a vegetable oil and animal fat demand increase of 2.1 billion pounds.
- World demand for vegetable oil is increasing as the world population becomes wealthier. In 1974 world GDP per capita in constant U.S. dollars based on the year 2000 was $3,620 and in 2007 had risen to $6,029[1], while vegetable oil consumption rose from 6.3 kg/capita/year to 11.4 kg/capita/year as food from 1974 to 2007[2] or not quite doubling.
- The increase in crush to meet vegetable oil demand is expanding the amount of soybean meal that must be exported.
  - U.S. soybean meal exports increase from 9 million tons to 13 million.
- Oilseeds that are higher in oil content, such as canola, are benefiting from the high oil price versus meal price.

[1] World Bank, World Development Indicators, Global Development Finance, http://databank.worldbank.org/databank/download/WDIandGDF_csv.zip

[2] FAO, FAOSTAT http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor

Table 11: U.S. Soybean Products Supply and Demand Balance Sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
SOYBEAN MEAL (thousand tons)										
Beginning Stocks	343	294	235	302	311	317	347	347	347	347
Production	42,284	39,102	41,700	39,510	39,156	41,640	43,520	44,570	45,610	47,560
Imports	141	88	160	175	150	150	150	150	150	150
Total Supply	42,768	39,484	42,096	39,986	39,617	42,107	44,017	45,067	46,107	48,057
Domestic Disappearance	33,232	30,741	30,619	30,575	30,200	30,630	31,040	31,420	31,800	34,650
Exports	9,242	8,508	11,175	9,100	9,100	11,130	12,630	13,300	13,960	13,060
Total Disappearance	42,474	39,249	41,794	39,675	39,300	41,760	43,670	44,720	45,760	47,710
Ending Stocks	294	235	302	311	317	347	347	347	347	347
SOYBEAN OIL (million lbs)										
Beginning Stocks	3,085	2,485	2,861	3,406	2,613	2,344	2,754	2,764	2,764	2,734
Production	20,580	18,745	19,615	19,007	18,881	20,150	21,100	21,660	22,210	23,450
Imports	65	89	103	150	150	50	50	50	50	50
Total Supply	23,730	21,319	22,579	22,563	21,644	22,544	23,904	24,474	25,024	26,234
Domestic Disappearance	18,334	16,265	15,816	16,750	18,050	18,540	19,390	19,710	19,870	20,630
of which Biodiesel	3,245	2,021	1,680	2,500	3,750	3,730	4,270	4,400	4,400	4,400
Exports	2,911	2,193	3,357	3,200	1,250	1,250	1,750	2,000	2,400	2,900
Total Disappearance	21,245	18,458	19,173	19,950	19,300	19,790	21,140	21,710	22,270	23,530
Ending Stocks	2,485	2,861	3,406	2,613	2,344	2,754	2,764	2,764	2,754	2,704

Source: USDA and Informa

D. Commodity Pricing

The following assumptions were made when making the long-term price forecasts.

- The price forecast for the first two years of the forecast (2011/12 and 2012/13) is based on market information about the crop situations around the world.
    - Currently, U.S. ending stocks are at low levels and the size of the crop is believed to be below normal yields. As a result, crop prices are higher than historical levels.
- For year 2012 through 2020, normal weather and baseline trends are assumed. Other assumptions include:
    - Open trade policies continue that allow countries to import and export.
    - No major changes in the U.S. renewable fuels policy.
    - China will be successful in its long-term policy of grain self-sufficiency.
    - Argentina and Brazil have available crop acreage that can act as a pressure valve.

Table 12: Projected Farm Level Crop Prices

Commodity	Unit	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Corn	Dollars per Bushel	$4.20	$4.06	$3.55	$5.25	$6.75	$4.50	$4.49	$4.51	$4.52	$4.51
Barley	Dollars per Bushel	$4.02	$5.37	$4.66	$3.87	$5.40	$4.66	$4.94	$4.96	$4.97	$4.97
Oats	Dollars per Bushel	$2.63	$3.15	$2.02	$2.52	$3.55	$3.45	$3.43	$3.45	$3.46	$3.45
Soybeans	Dollars per Bushel	$10.10	$9.97	$9.59	$11.35	$13.40	$10.70	$10.90	$10.53	$10.54	$10.61
Soybean Meal	Dollars per Ton	$336	$331	$311	$347	$369	$328	$336	$322	$322	$326
Soybean Oil	Dolloars per Pound	$0.52	$0.32	$0.36	$0.53	$0.56	$0.42	$0.42	$0.42	$0.42	$0.42

Source: USDA and Informa

- Soybean basis is weaker the further the distance from the Mississippi River system as shown in Figure 3 and Figure 4.
- The option to deliver soybeans by barge creates competition for the railroads.
- Soybean basis near the river has strengthened while basis further from the river has weakened.

Figure 3: U.S. Soybean Basis (2005)

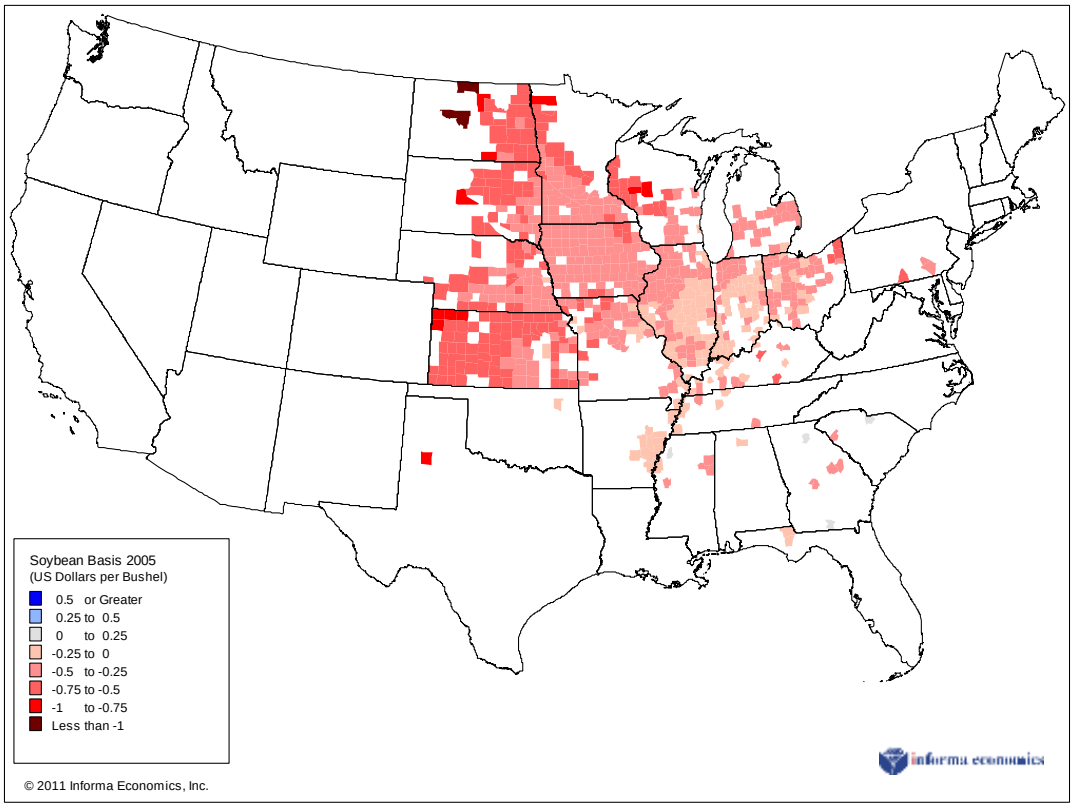
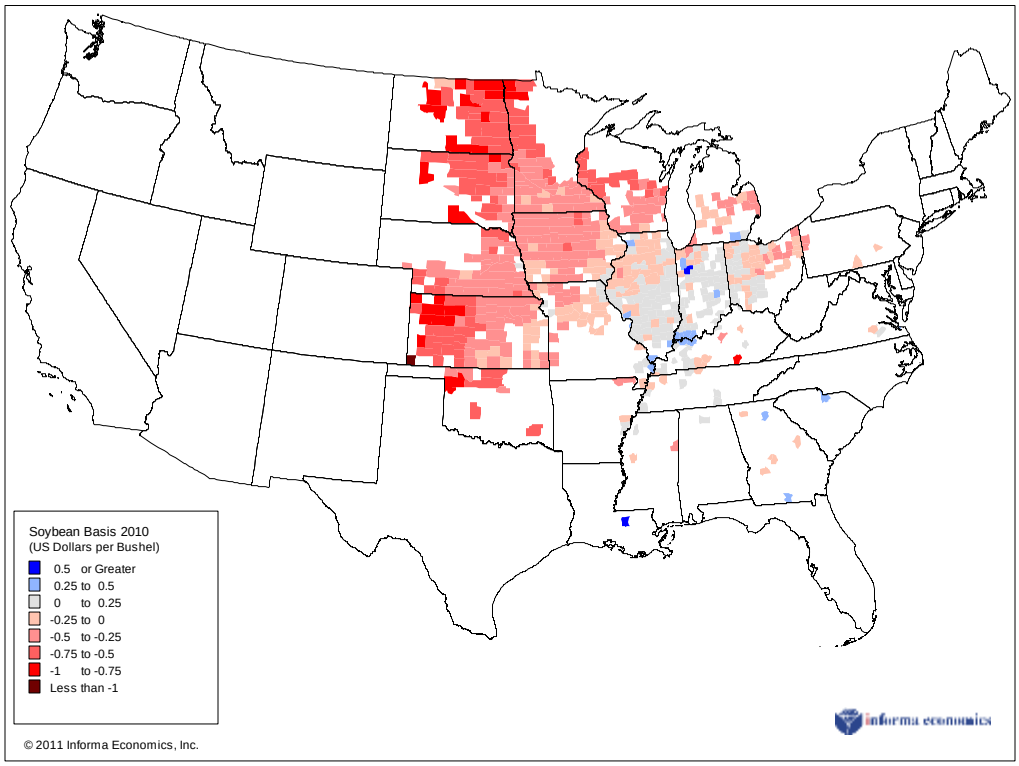


Figure 4: U.S. Soybean Basis (2010)



E. Grain and Soybean Exports by Port

The export by ports forecast was developed according to recent trends, capacity considerations, ocean freight rates, regional grain availability and inland transportation developments.

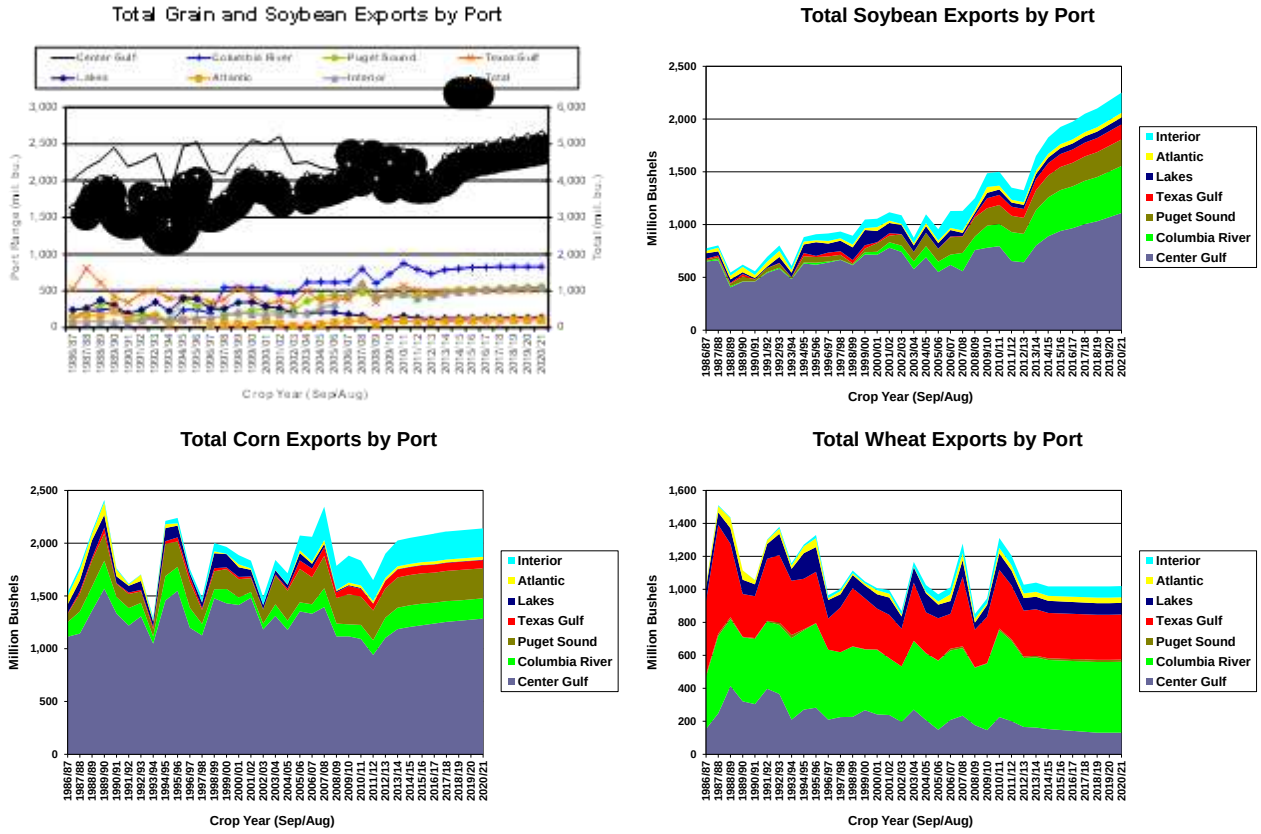
The key factors influencing exports by ports include:

- Sustained higher levels of exports have changed crop composition and timing.
- Export capacity pressured by loading dynamics for co-loading (more than one crop and product, and grade), more sub-lots being loaded.
- Increased export elevator capacity in the PNW, increasing by more than 30% next two years, and Center Gulf where new elevator to be opened next two years.
- Increased reliance on containers.
- Crop production in the western Corn Belt focused on corn and soybeans.
- Increased reliance on rail shuttle train service.
- Inland navigation developments with respect to where barge loadings are taking place, type of equipment available and impediments impacting navigation.
- Impact of Panama Canal expansion.
- Dry bulk ocean freight rates to remain stagnant over next five years on rapid fleet expansion and lower near term demand pressure.

The key factors influencing the outlook are highlighted or discussed further in this section and in VI. U.S. Transportation Infrastructure.

- In 2002, nearly 65% of U.S. grain and soybean exports moved through the Center Gulf. During 2010, the share of grain and soybean exports through the Center Gulf dropped to less than 50%.
    - The shifting dynamic of port share was brought on by an expansion of grain exports through the PNW due to the increase in demand for grain in burgeoning Asian markets, a diversion of volume to the Texas Gulf and for increased use of containers.
- The Great Lakes decreased in export volume after European markets became very selective of the grain imported from the rest of the world.
    - The increase in production in Eastern European countries over the last ten years has eased the demand for grain imports into Europe.
- Total grain and soybean exports are forecast to increase more than one billion bushels or 25% from 2011/12 to 5,277 million in 2020/21. By port range, exports through the Center Gulf are expected to increase 726 million bushels or 39% to 2,576 million; 3% or 14 million to 523 million through the Texas Gulf; and 11% or 140 million to 1,383 million through the PNW. Grain and soybean exports by port range and crop are displayed in Figure 5.
    - The Center Gulf port range is expected to achieve export volumes last seen in 2001/02 at more than 2.5 billion bushels starting 2019/20 on improved grain and soybean availability in its draw area and nearly achieving 50% of grain exports.
    - Exports out of the PNW (the Puget Sound and Columbia River port ranges) will expand on a share basis in the near term and retrace over the long term, while volume throughput will increase as its export capacity will expand nearly 30% the next two years on a new export elevator being built and capacity enhancements at other facilities. Exports through this port range will be record large in 2013/14 and thereafter, supplanting the record in 2007/08 at nearly 1.3 billion bushels and expanding further to nearly 1.4 billion by 2020/21.
        - The PNW export program will expand most greatly on higher soybean volumes.
- Of the grain and soybean volume exported from the Atlantic Coast, Center Gulf, Great Lakes and Texas Gulf port ranges, 55% is estimated to transit the Panama Canal, predominately to Asian markets. Assuming these markets remain the dominate destinations for U.S. grain and soybean exports from these port ranges, the total volume of grain and soybeans transiting the Panama Canal will increase 30% or 426 million bushels (the equivalent of 11.2 million metric tons) to 1,840 million bushels (the equivalent of 48.4 million metric tons) by 2020/21 from the projected volumes for 2011/12.

Figure 5: Grain and Soybean Exports by Port by Crop



F. Timing of Exports

- Export capacity during the first half of the crop marketing year (September through August) is largely handling soybeans, and the other crops work through as possible. By February, and when South America starts to harvest its soybeans, other grains start moving through the elevators during the second half of the marketing year.
- Grain and soybean exports through the PNW tend to be heavier during the first two quarters of the crop marketing year (Sep/Nov and Dec/Feb), when on average 54% of total exports are lifted. By crop, the seasonal variation is quite noticeable.
- For example, 46% of the corn exports through the PNW take place during the first half of the marketing year while 70% of the soybeans are elevated during the first half. Wheat exports tally up to 54% inspected during the first half. The seasonal patterns by crop are summarized in Figure 6 and Figure 7.
- The seasonal patterns reflect the demand characteristics by importing country, but also the competition the U.S. faces, especially with South America for soybeans.
    - South American soybeans begin to be harvested and sent to the export market starting in March of each year, which is the time when U.S. exports of soybeans wind down.
    - The timing of exports is important on how they influence barge loadings, carloadings and elevation capacity.

Figure 6: Seasonal Patterns of Grain and Soybean Exports through the PNW

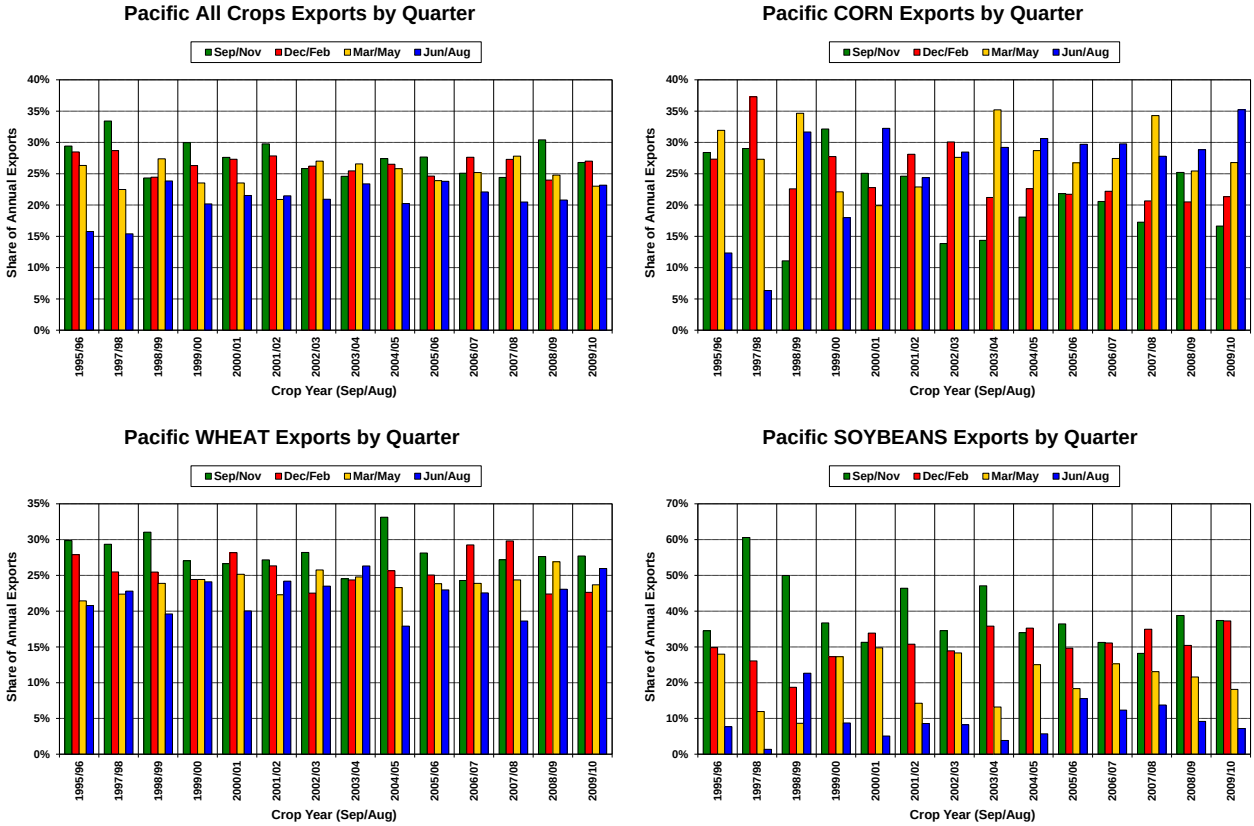
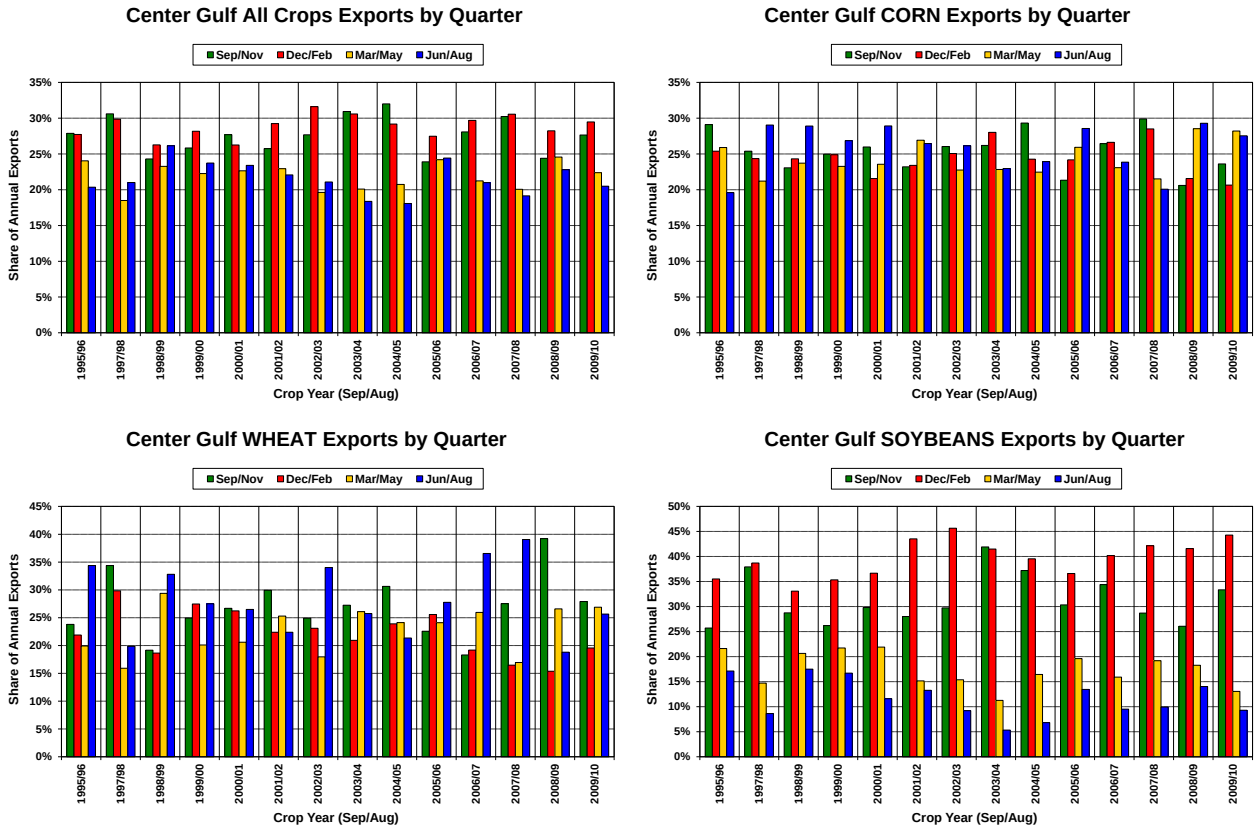


Figure 7: Seasonal Patterns of Grain and Soybean Exports through the Center Gulf



G. Major Importing Countries

- U.S. barley exports to any one country are less than 500 thousand MT.
- U.S. oat imports primarily come from the Netherlands and Canada.
- U.S. corn exports are largely shipped to Asia and Mexico.
    - The two largest importers are Japan and Mexico.
        - Japan is a developed country with a declining population.
            - Corn import levels are declining.
    - In crop year 2011, China is importing a significantly higher level of corn than in the last ten years.
        - Increasing corn imports are offsetting export declines in Japan and South Korea.
        - Corn traders are closely monitoring whether China buying corn is a one year aberration, an acceptance that a minimum level of imports are necessary, or a mirror of soybean import patterns.
        - Once China's policy allowed soybean imports, China's soybean imports exploded and changed world trading patterns.
        - Informa believes China will accept a minimum level of corn imports as a necessity, but still attempt to remain grain self-sufficient.
            - China does not want U.S. corn to become a trade negotiation tool. China still remembers the U.S. grain embargo of the former U.S.S.R in the late 1970s.
    - The South Korea, Colombian and Panamanian trade agreements will improve agricultural exports. South Korea will be able to import more pork products from the U.S.

Table 13: U.S. Corn Trade Matrix (million MT)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	**2011**
EU-27	0.2	0.0	0.0	0.1	0.0	---	0.0	0.0	0.0	0.1	1.0	**---**
Other Europe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---	---	**---**
FSU-12	0.1	0.1	0.0	0.0	0.0	0.0	---	0.0	---	---	---	**---**
China	---	0.0	---	---	0.0	0.1	0.0	0.0	0.0	1.2	1.0	**4.0**
Indonesia	0.6	0.1	---	0.2	0.0	0.9	0.1	0.0	0.0	0.0	0.5	**---**
Iran	0.2	0.1	---	0.1	---	---	---	0.5	0.1	---	0.1	**---**
Israel	0.7	0.8	0.2	1.1	0.3	0.6	0.8	1.3	0.2	0.2	0.8	**0.1**
Japan	14.5	15.0	15.2	15.3	15.9	16.5	15.6	16.0	16.1	14.7	14.1	**13.6**
Jordan	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.0	**---**
Malaysia	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.1	0.1	0.0	0.1	**---**
Philippines	0.2	0.2	0.0	---	0.0	0.1	0.0	0.0	0.0	0.0	0.0	**---**
Saudi Arabia	1.1	0.8	0.2	0.4	0.1	0.6	0.6	1.1	0.5	0.8	0.6	**0.5**
South Korea	3.2	1.4	0.3	3.8	2.1	5.5	4.1	8.7	5.2	7.5	6.2	**4.0**
Syria	0.6	0.7	0.5	0.8	1.0	0.7	1.5	1.3	0.5	0.8	1.1	**0.3**
Taiwan	5.1	5.0	4.3	4.7	4.4	4.9	4.5	3.3	3.5	3.0	2.7	**2.4**
Turkey	0.6	0.7	1.0	0.7	0.0	---	0.3	0.4	0.0	0.0	0.0	**---**
UAE	0.0	0.4	---	---	---	0.0	---	0.0	0.1	0.0	0.0	**---**
Other	0.3	0.4	0.2	0.4	0.2	0.3	0.3	0.4	0.2	0.1	0.1	**0.1**
Asia	27.0	25.8	22.0	27.9	24.4	30.4	28.2	33.4	26.6	28.4	27.3	**24.9**
Algeria	1.3	1.5	0.9	1.4	1.1	1.3	0.9	1.1	0.1	0.1	0.0	**---**
Egypt	4.5	4.7	2.9	3.2	4.3	4.3	3.5	3.3	2.3	2.9	3.3	**2.0**
Libya	0.0	---	---	0.0	---	0.2	0.2	0.2	0.0	0.0	0.0	**---**
Morocco	0.5	0.6	0.1	0.7	0.8	1.1	0.7	1.0	0.5	0.5	0.2	**---**
Tunisia	0.5	0.7	0.1	0.6	0.2	0.4	0.5	0.5	0.1	0.2	0.2	**---**
Other	0.4	0.7	0.4	0.3	0.2	0.2	0.0	0.0	0.2	0.0	0.0	**---**
Africa	7.2	8.7	4.5	6.4	6.7	7.6	5.8	6.2	3.3	3.7	3.7	**2.0**
Brazil	0.0	---	0.0	---	---	---	---	---	---	---	---	**---**
Canada	2.7	3.9	3.9	2.0	2.4	1.9	2.0	3.1	1.8	2.1	**1.0**	**2.0**
Chile	0.0	0.0	---	0.0	---	0.3	0.3	0.4	0.1	0.0	---	**---**
Colombia	1.6	1.7	1.6	1.9	2.0	2.7	3.3	3.0	1.5	1.0	0.5	**0.4**
Costa Rica	0.5	0.5	0.5	0.5	0.5	0.7	0.6	0.7	0.6	0.6	0.7	**0.8**
Cuba	---	0.2	0.3	0.5	0.4	0.6	0.6	0.7	0.7	0.6	0.4	**0.4**
Dominican Rep.	1.0	1.1	1.0	0.8	1.0	1.0	1.2	1.1	1.0	0.9	0.8	**0.8**
Ecuador	0.2	0.3	0.2	0.4	0.4	0.3	0.5	0.5	0.2	0.2	0.2	**0.2**
El Salvador	0.5	0.4	0.4	0.5	0.4	0.4	0.6	0.6	0.5	0.5	0.7	**0.8**
Guatemala	0.4	0.6	0.4	0.6	0.8	0.8	0.6	0.5	0.6	0.6	0.5	**0.6**
Honduras	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.3	0.4	0.4	0.4	**0.5**
Mexico	5.9	4.5	5.3	5.7	5.9	6.3	8.8	9.8	7.8	8.3	**7.4**	**8.0**
Panama	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	**0.3**
Peru	0.2	0.3	0.0	0.1	0.2	0.4	0.3	0.4	0.3	0.8	0.1	**0.1**
Venezuela	1.3	0.4	0.6	0.7	0.2	0.2	0.5	1.0	1.2	1.1	0.9	**0.7**
Other	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.6	**0.6**
West Hemis.	15.3	15.0	15.3	14.6	15.4	16.8	20.6	23.1	17.5	17.9	**14.4**	**16.0**
TOTAL	49.8	49.6	41.8	49.1	46.5	54.8	54.7	62.7	47.3	50.1	**46.5**	**42.9**

Bold Numbers are Informa Projections

Source: USDA and Informa

- U.S. soybean trade is dominated by China as shown in Table 14.
    - In crop year 2010, China accounted for 60% of U.S. soybean exports.
    - China is also buying South American soybeans, which creates an export surge between the U.S. and South American harvest periods.
- China's buying of soybeans is creating optimism for other agricultural products, such as corn and pork.

Table 14: U.S. Soybean Trade Matrix (thousand MT)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	**2011**
EU-27	6,866	7,943	5,567	3,469	4,651	2,125	3,631	3,915	2,300	2,841	2,841	**2,300**
Other Europe	17	---	---	---	---	---	---	---	---	---	---	**---**
FSU-12	115	134	56	---	10	0	---	23	26	98	53	**50**
China	5,695	4,569	7,626	8,229	11,796	9,694	11,456	13,538	18,690	22,389	24,566	**21,000**
Indonesia	1,363	1,327	1,300	949	963	1,169	1,309	949	1,313	1,575	1,720	**1,650**
Iran	---	---	132	55	---	---	---	18	130	297	---	**---**
Israel	509	636	461	176	244	234	257	312	237	212	236	**200**
Japan	3,386	3,587	3,580	3,142	2,936	2,929	2,968	2,590	2,128	2,213	1,783	**1,850**
Jordan	---	---	---	---	---	---	---	---	---	---	---	**---**
Malaysia	237	166	236	215	165	227	357	200	244	388	328	**300**
Philippines	313	306	222	178	194	102	85	51	47	61	57	**60**
Saudi Arabia	---	---	---	---	---	---	---	62	---	121	157	**150**
South Korea	1,171	1,181	1,189	1,025	781	487	594	473	334	724	701	**650**
Syria	37	40	30	45	90	158	249	394	376	295	191	**150**
Taiwan	2,095	2,193	1,698	1,351	1,582	1,759	1,998	1,735	1,614	1,543	1,584	**1,600**
Thailand	714	746	829	444	546	294	533	151	181	441	502	**350**
Turkey	347	516	382	261	584	652	537	424	691	986	260	**200**
Vietnam	---	---	---	---	---	2	16	77	130	111	202	**350**
Other Asia	10	277	196	89	241	126	249	49	7	11	79	**50**
Algeria	---	---	---	---	---	---	---	2	---	---	---	**---**
Egypt	125	336	59	71	453	541	769	800	1,231	961	900	**800**
Morocco	123	107	275	131	182	303	253	217	148	105	103	**75**
South Africa	13	5	---	---	---	---	---	---	---	---	---	**---**
Tunisia	---	---	---	---	---	---	---	---	146	233	249	**275**
Other Africa	---	---	6	---	---	18	---	---	---	---	0	**---**
Argentina	---	---	---	---	---	---	---	---	---	---	---	**---**
Brazil	---	---	---	---	---	---	---	---	---	---	---	**---**
Canada	342	805	653	572	389	330	238	325	337	349	**214**	**235**
Chile	---	---	---	---	---	---	8	---	---	---	---	**---**
Colombia	100	225	180	125	156	215	326	247	205	223	126	**125**
Cuba	---	57	95	119	129	149	183	117	130	103	127	**125**
Dominican Rep.	---	---	---	---	---	---	---	---	---	---	---	**---**
Mexico	3,946	4,285	4,183	2,781	3,153	3,904	4,087	3,762	3,152	3,519	3,474	**3,475**
Peru	---	---	---	---	---	3	6	27	5	32	22	**25**
Venezuela	55	96	---	8	9	45	---	5	44	111	51	**50**
Other West Hemis.	345	419	329	269	307	300	325	290	226	268	285	**294**
Total	27,920	29,957	29,285	23,704	29,562	25,767	30,435	30,756	34,073	40,208	**40,809**	**36,389**

Bold Numbers are Informa Projections

Source: USDA and Informa

- U.S. soybean meal trade is largely shipped to Canada and Mexico.

Table 15: U.S. Soybean Meal Trade Matrix (thousand MT)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	**2011**
EU-27	599	281	74	21	93	39	168	411	406	1,000	**495**	**450**
Other Europe	55	11	1	5	0	0	0	---	0	0	**---**	**---**
FSU-12	123	124	57	48	18	29	33	14	60	56	**47**	**50**
China	1	0	0	0	0	0	18	1	1	3	**1**	**1**
Indonesia	822	418	539	106	176	45	89	148	142	529	**29**	**50**
Iran	---	---	---	---	---	---	---	---	---	---	**---**	**---**
Israel	55	38	46	28	8	25	92	35	83	51	**75**	**75**
Japan	243	219	288	214	507	481	438	457	295	428	**340**	**350**
Jordan	0	21	13	0	21	29	1	8	19	22	**---**	**---**
Malaysia	52	11	0	0	10	6	20	76	22	124	**22**	**25**
Philippines	794	813	290	254	515	469	516	739	493	957	**875**	**800**
Saudi Arabia	309	279	90	34	89	133	90	276	144	110	**60**	**75**
South Korea	119	34	103	3	5	14	135	177	132	479	**177**	**225**
Syria	42	14	---	7	35	5	16	23	16	93	**21**	**25**
Taiwan	21	14	1	15	62	162	271	35	8	4	**4**	**5**
Thailand	237	248	95	2	87	2	14	24	117	204	**11**	**25**
Turkey	295	297	184	161	287	129	143	102	224	132	**114**	**100**
Vietnam	---	34	26	30	23	23	37	145	126	474	**40**	**50**
Other Asia	314	549	396	313	316	181	158	128	107	353	**105**	**100**
Algeria	144	292	200	179	106	18	34	36	20	---	**17**	**25**
Egypt	272	159	36	15	188	88	58	35	99	37	**107**	**75**
Morocco	35	63	---	---	---	70	122	153	146	380	**525**	**600**
South Africa	5	0	0	2	3	0	0	0	---	0	**0**	**---**
Tunisia	62	77	25	36	46	36	5	---	---	20	**---**	**---**
Other Africa	5	3	9	23	1	15	1	4	30	41	**9**	**10**
Argentina	0	0	1	0	0	0	0	0	0	0	**0**	**---**
Brazil	0	0	0	0	0	---	0	0	0	0	**0**	**---**
Canada	952	1,132	1,065	1,062	1,169	1,343	1,433	1,482	1,181	1,040	**1,050**	**1,050**
Chile	---	0	0	0	64	164	123	0	0	6	**0**	**---**
Colombia	44	45	60	141	207	368	300	326	101	64	**185**	**150**
Cuba	---	70	130	136	77	148	169	160	123	51	**9**	**25**
Dominican Rep.	348	387	309	192	263	378	433	414	345	365	**385**	**400**
Mexico	240	384	612	800	1,163	1,717	1,713	1,342	1,476	1,216	**1,475**	**1,450**
Peru	26	105	23	20	26	27	73	11	113	163	**49**	**50**
Venezuela	123	65	217	128	158	48	26	416	571	466	**625**	**650**
Other West Hemis	746	829	727	550	805	970	1,148	1,067	976	1,144	**1,203**	**1,228**
Total	7,083	7,017	5,617	4,531	6,525	7,163	7,876	8,245	7,576	10,013	**8,057**	**8,119**

Bold Numbers are Informa Projections

Source: USDA and Informa

- U.S. biodiesel mandate is reducing the amount of oil available for export.
    - Crop year 2011 soybean oil exports are expected to decrease 884 thousand MT or 61%.

Table 16: U.S. Soybean Oil Trade Matrix (thousand MT)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	**2011**
EU-27	13	30	10	2	2	10	7	5	9	1	**1**	**1**
Other Europe	0	1	0	0	0	0	0	0	0	0	**0**	**---**
FSU-12	7	3	5	13	7	3	3	0	0	1	**0**	**0**
Australia	---	0	0	0	0	0	0	0	0	0	**1**	**---**
Bangladesh	---	108	---	---	18	11	3	2	1	5	**1**	**1**
Burma	---	---	---	---	---	---	---	---	---	---	**---**	**---**
China	6	---	94	0	0	1	179	165	51	160	**346**	**---**
Hong Kong	11	12	0	1	10	14	22	31	6	15	**22**	**5**
India	54	89	43	15	29	23	14	0	146	162	**0**	**---**
Indonesia	0	1	1	1	2	2	5	0	0	0	**0**	**---**
Iran	---	---	---	---	---	---	---	---	---	---	**---**	**---**
Japan	0	1	27	8	12	6	7	12	8	8	**4**	**5**
Jordan	6	15	10	---	---	0	0	11	6	0	**0**	**---**
Malaysia	0	---	---	---	---	0	0	2	7	65	**0**	**---**
Pakistan	63	60	38	0	16	12	0	---	---	7	**21**	**---**
Saudi Arabia	0	1	0	0	1	0	0	2	3	4	**3**	**4**
Singapore	---	9	0	0	0	0	0	0	0	0	**0**	**---**
South Korea	50	86	44	1	14	27	68	62	41	55	**26**	**11**
Turkey	---	85	26	0	0	4	0	0	3	0	**1**	**---**
UAE	6	4	---	---	3	2	1	0	3	1	**1**	**1**
Vietnam	---	---	---	---	---	---	---	---	15	49	**0**	**---**
Other Asia	9	17	43	6	4	16	22	36	27	23	**16**	**10**
Algeria	2	---	14	---	37	15	29	97	65	45	**109**	**11**
Egypt	48	56	54	0	---	---	---	19	0	3	**---**	**---**
Morocco	---	39	27	16	7	22	60	107	110	232	**272**	**34**
South Africa	---	0	0	0	0	0	0	0	0	0	**0**	**---**
Tunisia	13	18	---	---	10	---	11	41	3	31	**---**	**---**
Other Africa	42	23	61	30	20	21	13	23	14	15	**5**	**8**
Brazil	0	0	0	0	---	0	0	0	0	0	**0**	**---**
Canada	55	87	125	96	68	76	80	90	41	41	**34**	**34**
Colombia	22	9	2	1	4	0	4	61	1	2	**82**	**2**
Dominican Republic	2	50	24	0	40	12	24	42	30	57	**78**	**36**
Mexico	72	162	189	97	163	109	152	269	173	211	**188**	**193**
Peru	61	38	20	25	15	20	6	0	37	92	**45**	**34**
Venezuela	1	1	0	0	6	0	27	82	54	53	**50**	**45**
Other West Hemis.	93	139	170	111	112	119	114	158	139	185	**145**	**132**
Total	635	1,143	1,027	425	600	523	851	1,320	995	1,523	**1,451**	**567**

Bold Numbers are Informa Projections

Source: USDA and Informa

- China corn acreage is expected to increase slightly at the expense of other crops in an attempt to remain grain self-sufficient.
- China domestic consumption is continuing to increase as the population becomes wealthier and in turn, consumes more meat, processed products, and fruits and vegetables.
    - The government is attempting to slow down the rate of economic growth to prevent inflation.
        - Increasing commodity imports will shrink inflation.
        - Pork is the main dish in China and the increasing price of pork is a major area of concern for the Chinese government.
            - China could meet domestic pork demand by increasing pork imports and in turn, reduce domestic corn consumption.
            - China could grow the domestic pork industry, which would increase demand for corn.
                - Historically, China's policy was to develop markets to create jobs. For example, import soybeans and crush domestically instead of importing soybean products.

Table 17: China Corn Supply and Demand Balance Sheet (thousand MT)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Area 000 Ha	29,478	29,864	31,200	32,500	33,150	32,960	33,060	33,180	33,300	34,320
Yield MT/Ha	5	6	5	5	5	6	6	6	6	6
Beginning Stocks	37,762	40,554	54,329	57,429	59,829	63,729	64,729	64,729	64,729	64,729
Production	152,300	165,900	164,000	172,500	180,000	185,800	189,000	192,300	195,700	216,200
Domestic Supply	190,062	206,454	218,329	229,929	239,829	249,529	253,729	257,029	260,429	280,929
Domestic Use	149,000	152,000	162,000	172,000	181,000	185,700	189,700	193,500	197,600	218,900
Feed Use	105,000	107,000	115,000	120,000	126,000	133,200	135,900	138,400	141,100	155,500
Food & Other	44,000	45,000	47,000	52,000	55,000	52,500	53,800	55,100	56,500	63,400
Exports-Imports	508	125	-1,100	-1,900	-4,900	-900	-700	-1,200	-1,900	-2,700
Ending Stocks	40,554	54,329	57,429	59,829	63,729	64,729	64,729	64,729	64,729	64,729

Source: USDA and Informa

- China soybean acreage is expected to remain steady.
- Due to China's large population, selling cooking oil locally has not been a problem. So, the level of crush is determined by soybean meal demand.
- As China domestic consumption of meat increases and animal production switches from back yard to modern animal operations, the demand for soybean meal has increased.
- The government has enacted policies that made importing the soybeans and crushing more attractive than importing soybean products.
- China soybean annual net imports have increased by 24 million MT from 2006 through 2010. From 2010 through 2020, soybean annual net imports are expected to increase an additional 54 million MT.

Table 18: China Soybean Supply and Demand Balance Sheet (thousand MT)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Area 000 Ha	8,750	9,130	9,190	8,400	8,200	8,500	8,500	8,500	8,500	8,500
Yield MT/Ha	1.60	1.70	1.63	1.81	1.76	1.77	1.77	1.77	1.77	1.77
Beginning Stocks	2,700	4,245	9,048	14,752	16,002	16,502	16,502	16,502	16,502	16,502
Production	14,000	15,540	14,980	15,200	14,400	15,050	15,050	15,050	15,050	15,050
Supply	16,700	19,785	24,028	29,952	30,402	31,552	31,552	31,552	31,552	31,552
Crush	39,518	41,035	48,830	54,900	61,500	66,600	71,100	75,800	80,700	109,300
Other Domestic	10,300	10,400	10,600	10,900	11,200	11,010	11,140	11,220	11,220	11,430
Exports-Imports	-37,363	-40,698	-50,154	-51,850	-58,800	-62,560	-67,190	-71,970	-76,870	-105,680
Ending Stocks	4,245	9,048	14,752	16,002	16,502	16,502	16,502	16,502	16,502	16,502

Source: USDA and Informa

H. Grain Exports by Port to Major End User

- The primary markets for grains and soybeans exported through PNW elevators vary by crop.
    - More than half of the wheat is destined to Japan, Philippines and South Korea, and the other half to other markets.
    - Corn exports through the PNW are mostly destined to Japan with Taiwan and South Korea displacing each other from one year to the next.
    - Soybean exports to Taiwan and other locations were the dominant market when soybean volumes first started to move through the PNW in the late 1990s.
    - In 2000/01 China became the prime market destination for soybeans exported through the PNW when about 60% of the PNW volume was destined to China. Since 2007/08, China represents 90% of the PNW soybean volume.
- Japan, Taiwan and South Korea account for more than half the export volume of the PNW, with China increasing its share in recent years with higher volumes of soybeans.
- China will continue to be the prime market destination for soybeans out of the PNW while Japan, Taiwan and South Korea will be the key destinations for corn exports. Exports by destination market and crop are shown in Figure 8 and Figure 9.

Figure 8: Grain and Soybeans Exported through the PNW to Top Destination Markets

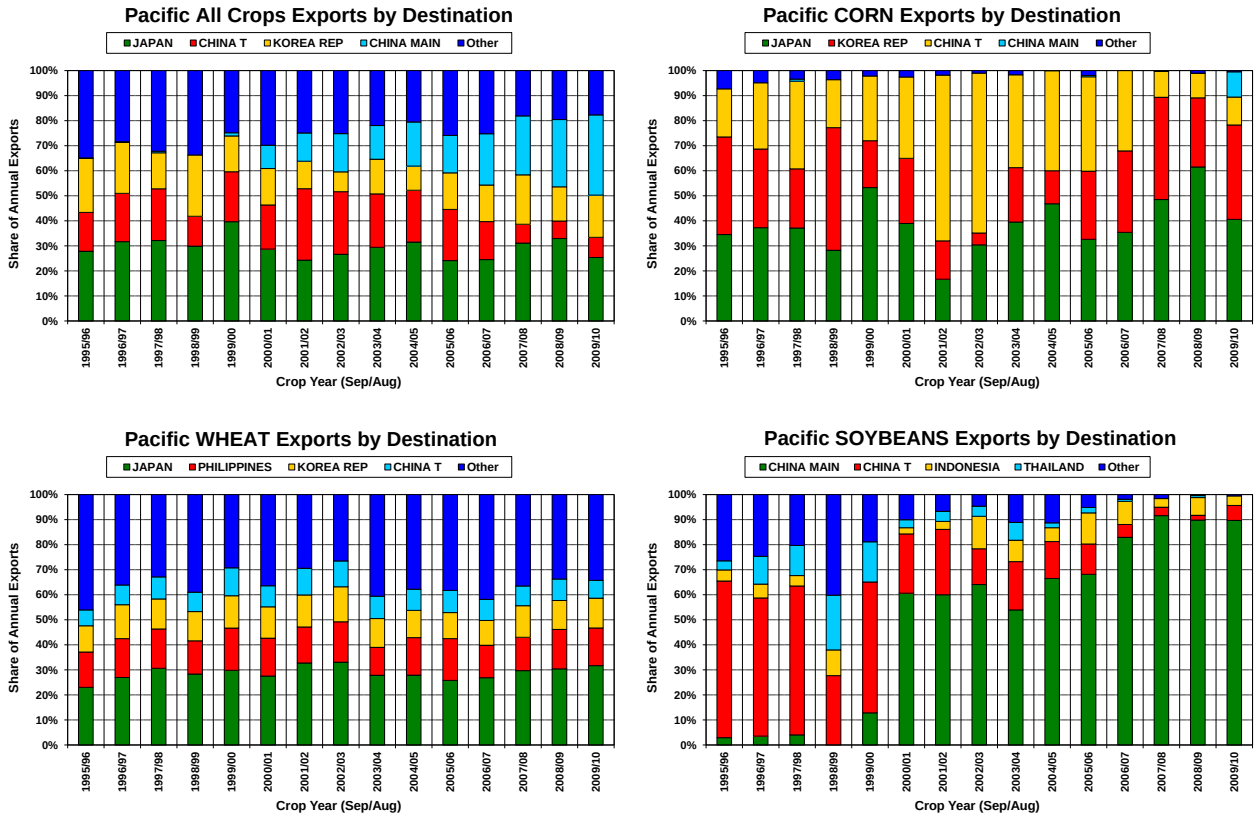
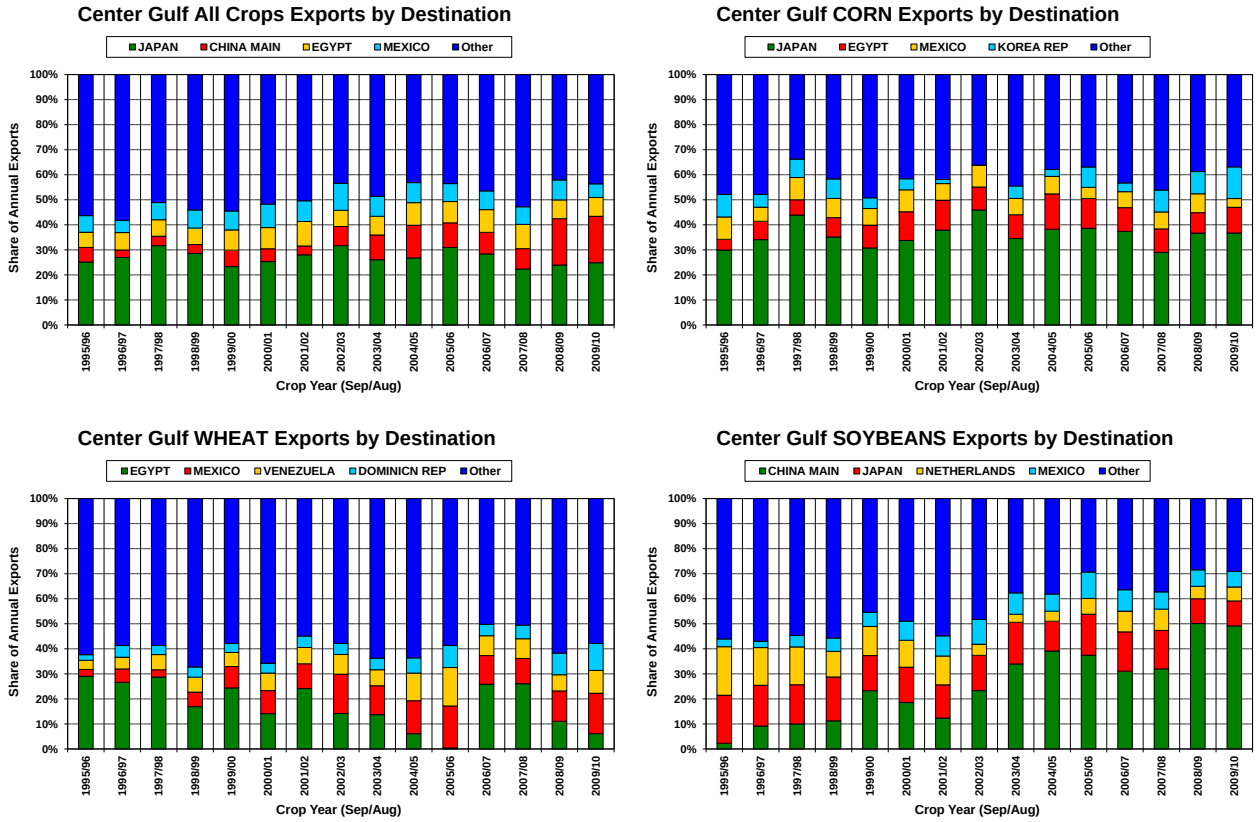


Figure 9: Grain and Soybeans Exported through the Center Gulf to Top Destination Markets



IV. Panama Canal Expansion Project

The Panama Canal is investing $5.25 billion to expand its locks to meet current transit volumes, supporting global trade growth and to accommodate larger vessel sizes. The canal has a draft of 39 feet 6 inches, or 12.4 meters, while the new locks will accommodate drafts of 50 feet, or 15.2 meters. Vessels loaded in the Center Gulf that transit the Panama Canal for Asia will in theory be able to load an additional 5 feet 5 inches, or 1.7 meters to take advantage of the 45 foot, or 13.4 meters of channel depth on the lower Mississippi River. The deeper draft equates up to an additional 11,000 metric tons of grain loaded on some "Panamax" vessels or 13,300 on small Capesize vessels. The opportunities for grain exports will be varied, such as increased loadings per vessel, the potential for larger vessel sizes to be used, decreased canal transit time and the potential for lower transport costs overall. Although, heavier loadings reduce fuel efficiency, require additional loading and unloading time.

A. Panama Canal Transit Statistics

1. General Cargo

- The U.S. consumer is driving Panama Canal container traffic.
    - The U.S. economy is in a slow growth pattern, which is reducing demand for non-essential items.
    - The container ship lines cater to the U.S. importers and if possible, find a backhaul that reduces the cost of repositioning the container back to Asia.
        - The more containers that are imported to the U.S. the greater the backhaul opportunities.
    - Container traffic through the Panama Canal is displacing shipments through the West Coast.
- The Asian consumer is driving Panama Canal bulk traffic.
    - The Chinese economy is thriving and the Chinese are becoming wealthier, which is resulting in a commodity boom.
    - Informa expects Asian demand for commodities to continue to increase.
        - Commodity shipments in containers are dependent on the availability of containers.

Table 19: Top 20 Countries for Cargo (Long Tons) Transiting the Panama Canal (2010)

Rank	Country	Origin	Destination	Intercostal	Total	Total excluding Intercostal
1	USA	86,690,042	48,577,832	1,538,984	136,806,858	135,267,874
2	China	17,724,263	25,892,962	-	43,617,225	43,617,225
3	Chile	14,731,164	12,029,930	-	26,761,094	26,761,094
4	Japan	5,062,841	17,649,833	-	22,712,675	22,712,675
5	South Korea	7,530,336	11,558,921	-	19,089,257	19,089,257
6	Ecuador	6,954,403	7,684,677	-	14,639,081	14,639,081
7	Colombia	8,587,916	4,456,156	120,718	13,164,790	13,044,072
8	Peru	5,611,206	7,311,273	-	12,922,480	12,922,480
9	Mexico	3,990,472	7,520,508	344,389	11,855,369	11,510,980
10	Panama	1,949,008	8,982,076	76,146	11,007,248	10,931,102
11	Canada	7,206,854	2,306,669	-	9,513,523	9,513,523
12	Venezuela	4,752,926	2,271,944	-	7,024,870	7,024,870
13	Taiwan	2,518,267	3,744,810	-	6,263,076	6,263,076
14	Brazil	3,294,149	1,645,565	-	4,939,713	4,939,713
15	Spain	1,305,151	3,252,302	-	4,557,453	4,557,453
16	Guatemala	1,131,385	3,221,415	31,453	4,384,253	4,352,800
17	Netherlands	1,163,980	3,062,402	-	4,226,383	4,226,383
18	Belgium	1,258,973	2,460,193	-	3,719,166	3,719,166
19	Germany	1,471,715	2,169,579	-	3,641,294	3,641,294
20	NS West Indies	2,317,331	1,120,818	-	3,438,149	3,438,149

- Container traffic is 37% of the Asia to U.S. volume but U.S. to Asia is only 24% as shown in Figure 10 and Figure 11.
    - Approximately 65% of container traffic transiting the Panama Canal has a backhaul.
- Petroleum, petroleum products and chemicals account for 15% of Panama Canal's Pacific to Atlantic traffic and 30% of the Atlanta to Pacific traffic.
    - The growing economies of Asia are requiring more energy and chemicals for manufacturing processes.
- Grains account for 3% of Panama Canal's Pacific to Atlantic traffic and 25% of the Atlantic to Pacific traffic.
    - China is driving grain imports.

Figure 10: Major Commodity Groups from Pacific to Atlantic Traffic Transiting the Panama Canal (average 2008-2010)

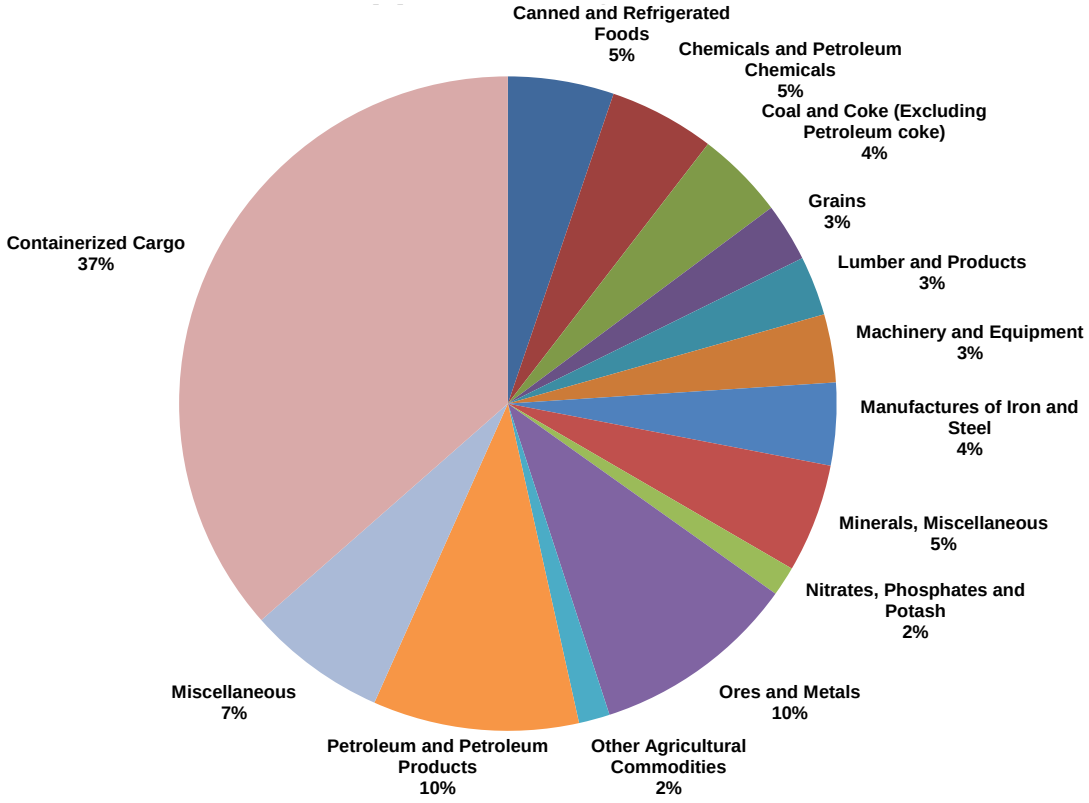
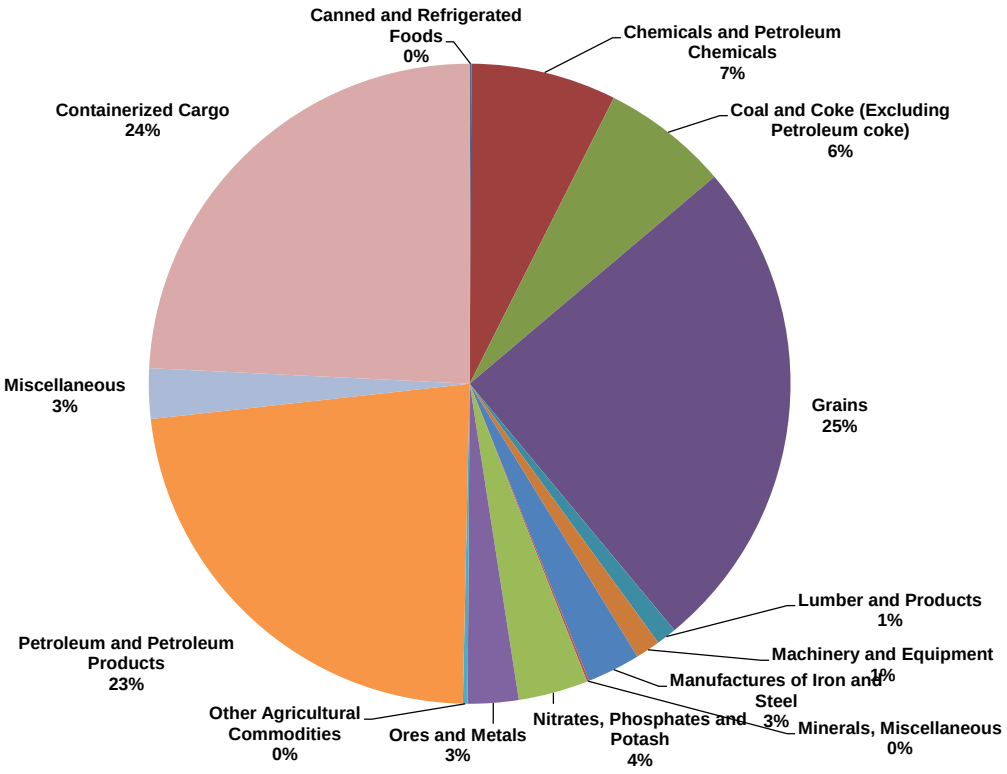


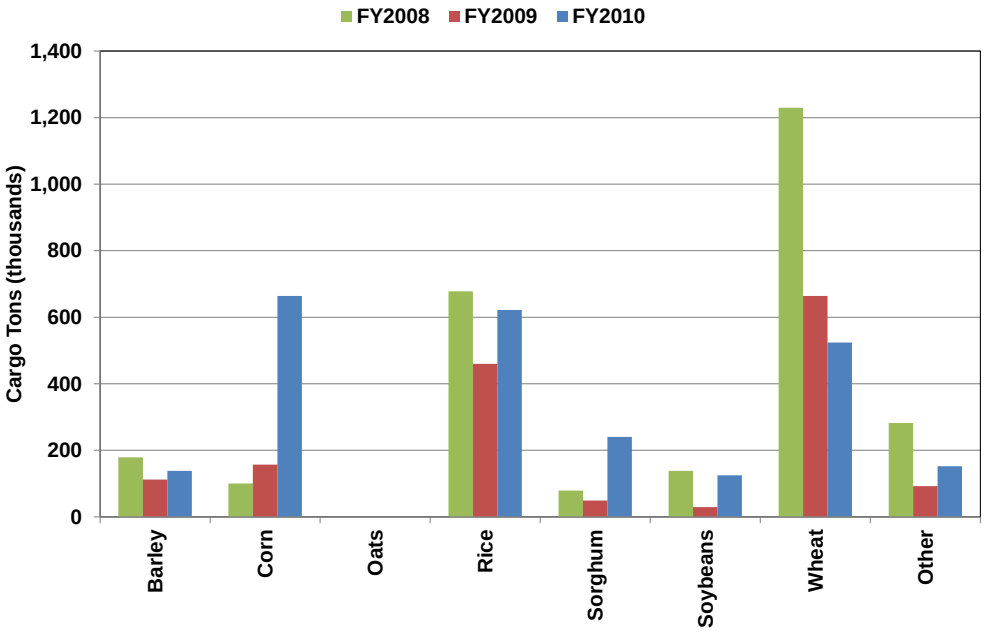
Figure 11: Major Commodity Groups from Atlantic to Pacific Traffic Transiting the Panama Canal (average 2008-2010)



2. Grain

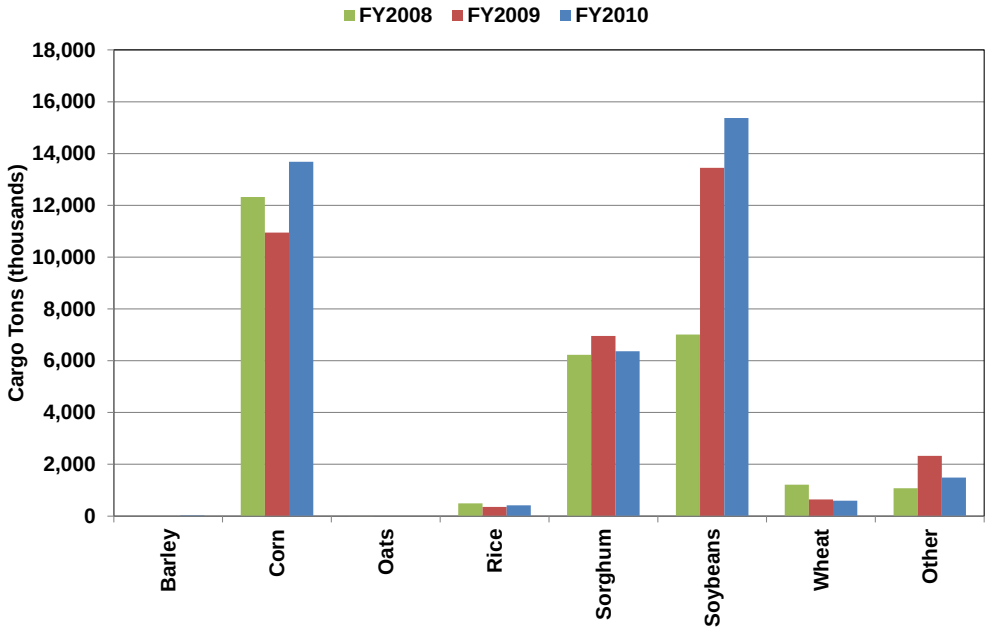
- Grain volumes originating in Asia and being shipped to the U.S. is insignificant as shown in Figure 12.

Figure 12: Grains from Pacific to Atlantic Transiting the Panama Canal



- Grain shipments transiting the Panama Canal has increased.
    - Soybean traffic has more than doubled the last three years.
        - China's increasing soybean demand is driving the volume expansion.

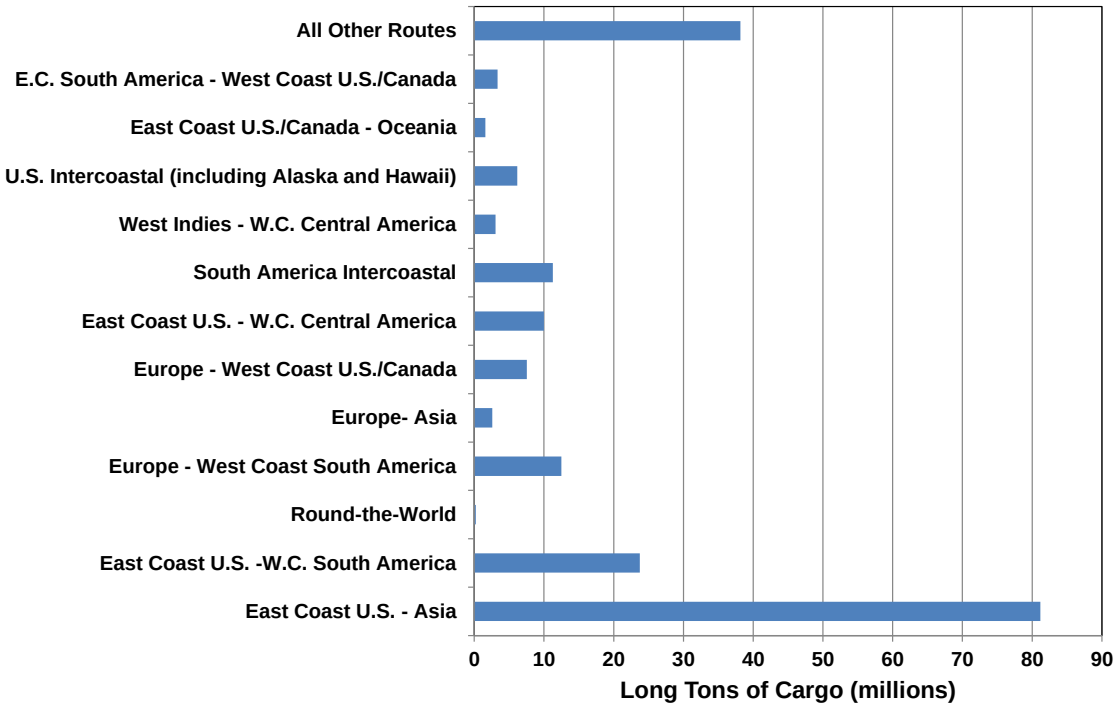
Figure 13: Grains from Atlantic to Pacific Transiting the Panama Canal



3. Trade Routes

- The U.S. to Asia trade route transiting the Panama Canal is three times larger than the next largest trade route as shown in Figure 14.

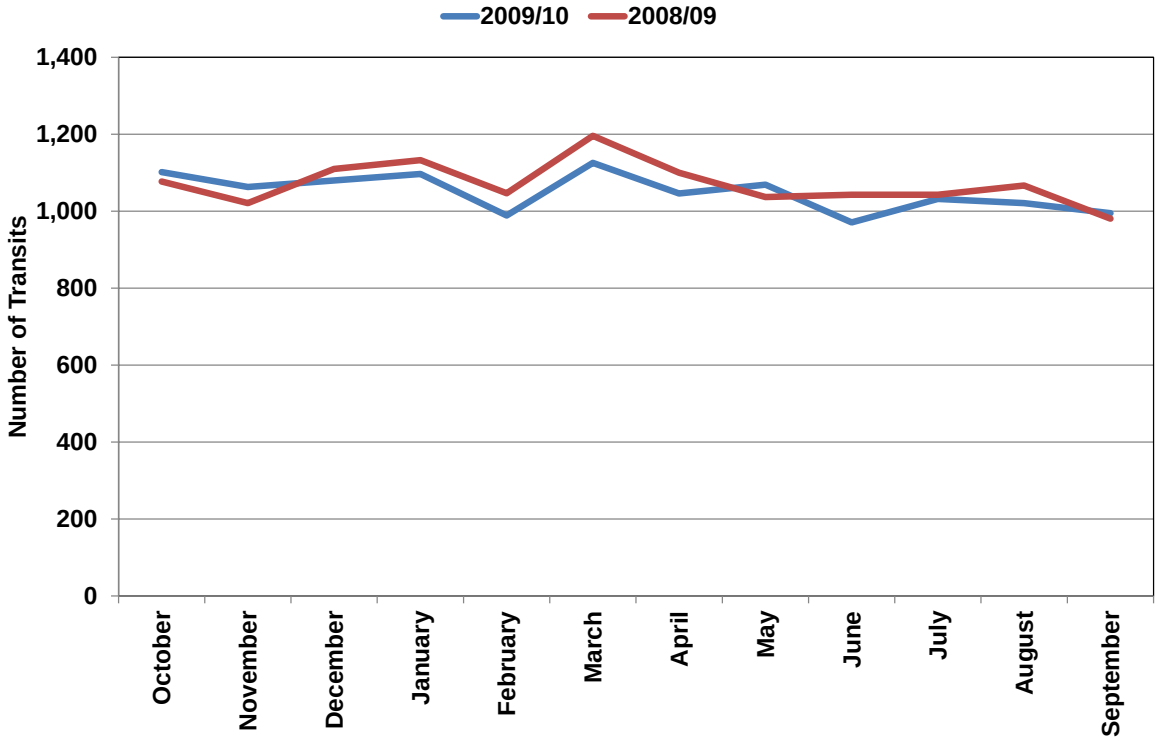
Figure 14: Panama Canal Traffic by Specific Trade Routes (2009-2010)



4. Seasonal Traffic

- Traffic through the Panama Canal is relatively steady throughout the year as shown in Figure 15.

Figure 15: Oceangoing Commercial Traffic Transiting the Panama Canal by Month



B. Panama Canal Toll Revenues

- Tolls are the fees paid by ships to use the Canal.
    - In general, tolls are determined by ship measurement parameters.
    - The adopted system follows the precept of article 315 of the Political Constitution of the Republic of Panama to the effect that the Panama Canal "shall remain open to the peaceful and uninterrupted transit of vessels of all nations," is consistent with the principles of International Law, and ensures equal treatment for all users of the waterway.
- The tonnage measurement system in use in the Canal, for the most part, is known as Panama Canal Universal Measurement System (PC/UMS), following the rules of the 1969 International Convention on Tonnage Measurement of Ships.
    - To determine net Canal tonnage, this system applies a mathematical formula for the measurement of total ship volume. A net Panama Canal ton is equivalent to 100 cubic feet of volumetric capacity. The appropriate

rate is applied depending on whether the ship is laden or in ballast (empty).
    - The "laden" rate is applied to ships carrying cargo or passengers, and the "ballast" rate is applied to ships that are not carrying passengers or cargo.
    - For a ship to be applied the "ballast" (empty) rate, it may not carry fuel for its own consumption beyond the volume of the certified tanks with the official mark for liquid fuel.
    - Other floating craft, including warships with the exception of military and naval transports; colliers; supply vessels; and hospital ships are charged on the basis of their actual displacement tonnage.
        - One displacement ton is equivalent to one long ton or 35 cubic feet of salt water.
- In October 2002, Panama adopted a new Canal tolls structure. The structure in force until then, which dated back to 1912, was based on a rate per ton applicable to all ships. The change was based on ship size and type and provided for separate locomotive usage rates, which allows each vessel to be charged for the specific services it uses.
- In 2005, the ACP implemented a change in its admeasurement system applicable only to full container vessels and those vessels with container-carrying capacity on-deck.
    - The full container vessel adjustment modified the traditional measure utilized as the charge basis for these vessels, from PC/UMS Net Ton to a twenty feet container, or TEU ("twenty-foot equivalent unit") and established the total TEU capacity, including on-deck, as the basis for the new charge.
    - The implementation was conducted over three years, starting May 1, 2005, and culminating on May 1, 2007.
- For vessel types with on-deck container carrying capacity, the ACP continues to apply the PC/UMS tonnage to measure the enclosed spaces and spaces below deck, and charge a per TEU fee to the actual number of containers carried on-deck, in accordance with the first table.
- Prior to the implementation of the new system the ACP charged full container vessels for a small portion (8.78%) of the cargo transported on-deck and applied the PC/UMS net ton to enclosed spaces and below deck.
- In 2007, continuing with the price differentiation efforts begun in 2002, the ACP modified its regulations for the admeasurement of vessels and the tolls system of the Panama Canal to more closely align Canal toll charges to the value of the route.
    - In the case of passenger vessels, the ACP assessed tolls based on the maximum passenger capacity in accordance with the International Tonnage Certificate 69, or the vessel's passenger ship safety certificate; vessels over 30,000 gross tons and whose PC/UMS ÷ maximum passenger capacity ratio is equal to or less than 33 were charged on a per berth basis.
- The following characteristics make a difference in the composition and rate of toll levies. Canal Toll components may consider the following criteria.

  - Laden or ballasted
  - Direction of travel North south or east west
  - Draft in meters
  - Beam in meters
  - Vessel type makes a difference where particular types may be classified differently. The Suez Canal as well as the Panama Canal to differentiate vessels according to cargo as well as the ship itself.
    - Cargo – OBO with crude,
    - OBO with petroleum
    - LPG
    - LNG
    - OBO with Chemicals or other Liquid Bulk,
    - Container
    - General Cargo
    - Roll-on, Roll-off
    - Vehicle
    - Passenger
    - Special Floating vessel, non-propelled or propelled
    - Other / Military / Government / Research
  - Rebates
  - Tughire
- Using the Angelic Grace as an example, the BOYD rate calculator provides a breakout of all the fees associated with transiting the Panama Canal as shown in Figure 16 and Figure 17.
  - A fully laden ship is approximately $170 thousand and an empty ship is approximately $140 thousand.

Figure 16: Panama Canal Laden Transit Fees for Angelic Grace

TRANSIT RELATED EXPENSES FOR Angelic Grace

Ship Length:	Ship Beam:	* PC/UMS Net Tons:	Drafts	Displacement	Oil carrying capacity:
711.76 (Feet)	105.81 (Feet)	35000	39.5 (Feet)	74764 (Tons)	2000 (MT)

Calculate charges | Reset form

* PCA has their own calculation for measuring PC/UMS Net tons.
See Quick Reference Guide Click Here.

LADEN TRANSIT CALCULATED CHARGES:

Tolls:	$148,500.00	(uses PC Net Ton)
Booking:	$25,000.00	(uses PC Net Ton)
Line Handling:	$4,745.00	(uses length and beam)
Tug Assistance:	$11,445.00	(uses length and beam)*
Locomotives x Wires 6 x 12	$3,600.00	(The basis of the rate is $300.00 per wire.)
PCSOPEP:	$350.00	(uses oil carrying capacity)
Inspection Fee	$120.00	Per Transit
Panama Canal Security Charge	$440.00	Per Transit
AIS Rental	$170.00	Per Transit
Bank Commission:	$423.43	(0.25% of transit charges)
TOTAL:	$169,793.43	

* NOTE: Vessels under 570 feet (173.736 meters) in length and under 80 feet (24.384 meters) in breadth : with a summer load displacement equal to or greater than 20,000 long tons $4,050.00. With a summer load displacement below 20,000 long tons No Charge.

Source: BOYD

Figure 17: Panama Canal Ballast Transit Fees for Angelic Grace

BALLAST TRANSIT CALCULATED CHARGES:

Tolls:	$118,750.00	(uses PC Net Ton)
Booking:	$25,000.00	(uses PC Net Ton)
Line Handling:	$4,745.00	(uses length and beam)
Tug Assistance:	$11,445.00	(uses length and beam)*
Locomotives x Wires 6 x 12	$3,600.00	(The basis of the rate is $300.00 per wire.)
PCSOPEP:	$350.00	(uses oil carrying capacity)
Inspection Fee	$120.00	Per Transit
Panama Canal Security Charge	$440.00	Per Transit
AIS Rental	$170.00	Per Transit
Bank Commission:	$349.05	(0.25% of transit charges)
TOTAL:	$139,969.05	

* NOTE: Vessels under 570 feet (173.736 meters) in length and under 80 feet (24.384 meters) in breadth : with a summer load displacement equal to or greater than 20,000 long tons $4,050.00. With a summer load displacement below 20,000 long tons No Charge.

OTHER ESTIMATED CHARGES:

Agency Fee (incl. tax):	Upon Request
Launch Hire:	$ 300.00
Communications:	$ 150.00
Car Hire:	$ 100.00
Petties:	$ 125.00
Fumigation Fee:	$ 250.00
TOTAL:	$ 925.00 *

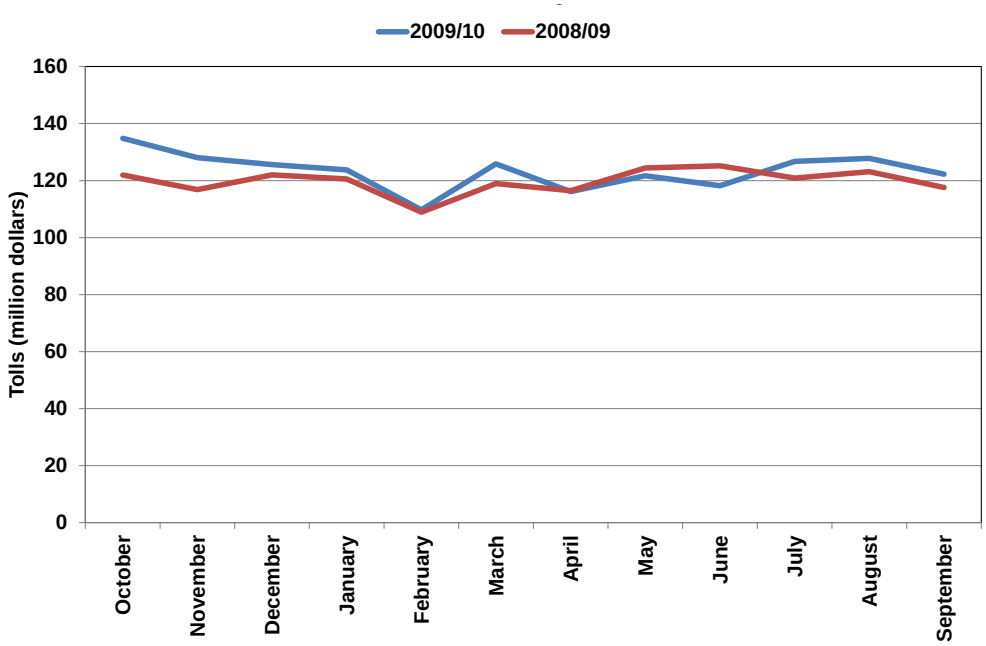
* Total does not include Agency Fee. Please contact us for a customized quotation based on your needs.

Source: BOYD

- Toll revenues collected from vessels transiting the Panama Canal has remained in a tight range the previous two years as shown in Figure 18.
- Laden (loaded) containerized vessels contributed the most to Panama Canal toll revenues with over $760 million in 2010 from 3,003 vessel transits, carrying 104.2 million net cargo tons.

- Laden bulk vessels, were the second most frequent vessel type with 2,275 transits contributing $189.1 million in toll revenue from 51 million net cargo tons.[3]

Figure 18: Toll Revenues from Oceangoing Commercial Traffic Transiting the Panama Canal by Month



C. Importance of Panama Canal Expansion to Ocean Fleets

- Serving future capacity needs, the Panama Canal expansion will accommodate vessels of 1,200 feet in length or 366 meters. The width of vessels will able to be increased up to 160 feet, or 49 meters maximum. With the Panama Canal being readied for greater capacity, it will allow increased tonnage on existing vessels, leading to lower unit cost of the cargoes, without increasing vessel capital cost.
- The Panama Canal Authority or in Spanish Autoridad del Canal de Panamá (ACP) reported that of the 12,478 vessel transits in 2010, 22.8% were of a scale greater than 40,000 Gross Register Tonnage (GRT), and representing the largest vessels which might operate, when laden, near the physical draft limitations. In fiscal year 1997, 30% of the vessels transiting the canal were of this scale, yet only about 8% of the ships transited the canal with drafts exceeding 39 feet. Each 6-inch increment of draft displaces approximately 1,000 metric tons of cargo on a Panamax ship of around 740 feet in length. That represents about 2% of the ship's total capacity around 55,000 tons. In 1998, the ACP (then known as the PCC) estimated that an initial draft restriction to 39 feet had displaced 700 tons of cargo per ship, and a subsequent restriction to 38.5 feet displaced an additional 1,030 tons per ship.

[3] http://www.pancanal.com/eng/op/transit-stats/table04.pdf

- On average, bulk carriers are getting bigger. In 1990 the average Deadweight Tonnage (DWT) size was around 43,000, while in 2008 it had risen to 55,398[4]. Several of today's most common vessel classes are explained below.

'Handysize' are the medium bulk carriers of between 10,000 to 35,000 Deadweight Tonnage (DWT) (130 - 150 m LOA & 10m draft). They can carry cargoes to a large number of ports, may carry considerable variety and quantity of bulk cargoes.

'Handymax' bulk carriers are between 35,000-50,000 DWT (150m-200 m LOA and 11m ~ 12 m draft). The smaller Handysize, and Handymax vessels are both general purpose in nature. These together comprise 71% of all bulkers, and have the highest rate of growth partly due to new regulations coming into effect which put greater constraints on the building of larger vessels.

'Supramax' scale from 45,000 to 59,000 DWT, (150m–200 m LOA, often 52,000–58,000DWT), with five cargo holds and four cranes. They may also be referred to as Ultra Handymax.

'Panamax' (200-230 m LOA, draft 13m ~ 15m) refers to design size limitations imposed by the Panama Canal locks and adopted by the international shipping community: beam must not exceed 106 feet (32.2 m); fully loaded vessels must not exceed 80,000 tons DWT. They generally carry grain, coal and iron ore from U.S. ports.

'Capesize' bulk carriers (230 ~ 270 m LOA, draft 17 m) of 80,000 to 199,000 DWT which are presently too large to cost effectively operate in the confines of the Panama Canal and trade from the Atlantic around the Cape of Good Hope. Only a few ports in the world can accommodate them in fully loaded condition.

Suezmax means the largest vessel that can pass through the Suez Canal. The maximum allowed draught of the Suez Canal is currently 18.90 m (62 feet). However, the authorities intend to increase this draft to 21.95 m by the end of 2017.[5]

- At a macro level, the principal vessel classes used in the grain trade are Panamax and Supramax. Panamax vessels carry a significant share of U.S. grain.
- Since Panamax vessels are the largest type capable of transiting the Panama Canal, with a draft of 39.5 feet, they serve as an example of the potential for additional capacity.
- So, using the maximum 39.5 foot depth of the Panama Canal, assuming a rate per MT of $62 from the Center Gulf to Asia, a vessel fully laden to carrying capacity today may be able to load more revenue producing cargo.
    - Depending on vessel design, being able to load additional tonnage of 13,300 more MTs would bring the total draft to 45 feet.

[4] http://www.coracleonline.com/introductions/panama-canal-route.htm
[5] http://www.bulkcarrierguide.com/size-range.html

  - Other factors would impact voyage costs considering the added tonnage. Load and unload time in port would increase by about a half day each.
  - That added day of vessel charter cost, also be taken into account, still results in a benefit to reducing cargo delivered cost.
  - Enabling cargo operations to achieve a lower delivered unit cost of the product, assumes the level of tolls remained the same, and results in a per ton cost of $49.
- With an expanded Panama Canal and grain vessels loaded to a draft of 45 feet, this will lower the ocean freight rate 20% or $13 per MT, which is equivalent to $0.35 per soybean bushel.
- Even if tolls increased by 25% from the current level the landed cost model indicated an increase to $50 per MT on a vessel loaded to 70,000 MT, which is still $12 per MT below a vessel loaded to 39.5 feet without a toll increase. This reduces the spread between the PNW to Asia freight rate, leading to a more competitive position relative to moving grain by rail to the PNW versus the rate from the Gulf to Asia via the Panama Canal.

D. Review of Board Structure Overseeing Expansion

1. The Panama Canal Authority (ACP)

The Panama Canal expansion project was proposed by the Panama Canal Authority, which was first established under the 1977 Panama Canal Treaty (Torrijos-Carter Treaty). The entity assumed management of the Canal in 1999 from the Panama Canal Commission, the joint U.S. Panama entity responsible for managing the Canal during the 1979-1999 transition period of the Canal from U.S. to Panamanian control. According to Panama's National Constitution, Title XIV, the Panama Canal Authority is the entity "with exclusive charge of the operation, administration, management, preservation, maintenance, and modernization of the Canal, as well as its activities and related services,…so that the Canal may operate in a safe, continuous, efficient, and profitable manner." Specific legislation for the operation and organization of the Panama Canal Authority is stated within the Organic Law of June 11, 1997. The objective of the Authority is to preserve the conditions of the Panama Canal so that it will "remain an enterprise for the peaceful and uninterrupted service of the maritime community, international trade, and the Republic of Panama." While the Authority is an entity under the government of Panama, it is financially autonomous. The Authority also has its own patrimony, although the Panama Canal is the patrimony of the Republic of Panama.

The ACP is organized by an administrator and a deputy administrator, who are supervised by an 11-person board of directors. The administrator is the highest-ranking executive officer and legal representative of the ACP, and is "responsible for its administration and the implementation of the policies and decisions of the Board of Directors." The administrator is appointed for a seven-year term and may be re-elected for an additional term. The composition of the 11-member board involves three different

appointments. The chair of the board is designated by the President of the Republic and serves as Minister of the State for Canal Affairs. As Canal Affairs Minister, the chair attends and has the right to vote in Cabinet Council meetings. One director of the board is appointed by the legislative branch (Legislative Assembly). The remaining nine board directors are appointed by the President of the Republic of Panama, given both the consent of the Cabinet Council and the ratification of the members of the Legislative Assembly by an absolute majority. The current Panama Canal Authority Administrator, Deputy Administrator, and Board of Directors include the following:

Administrator
Alberto Alemán Zubieta

Deputy Administrator
José Barrios Ng

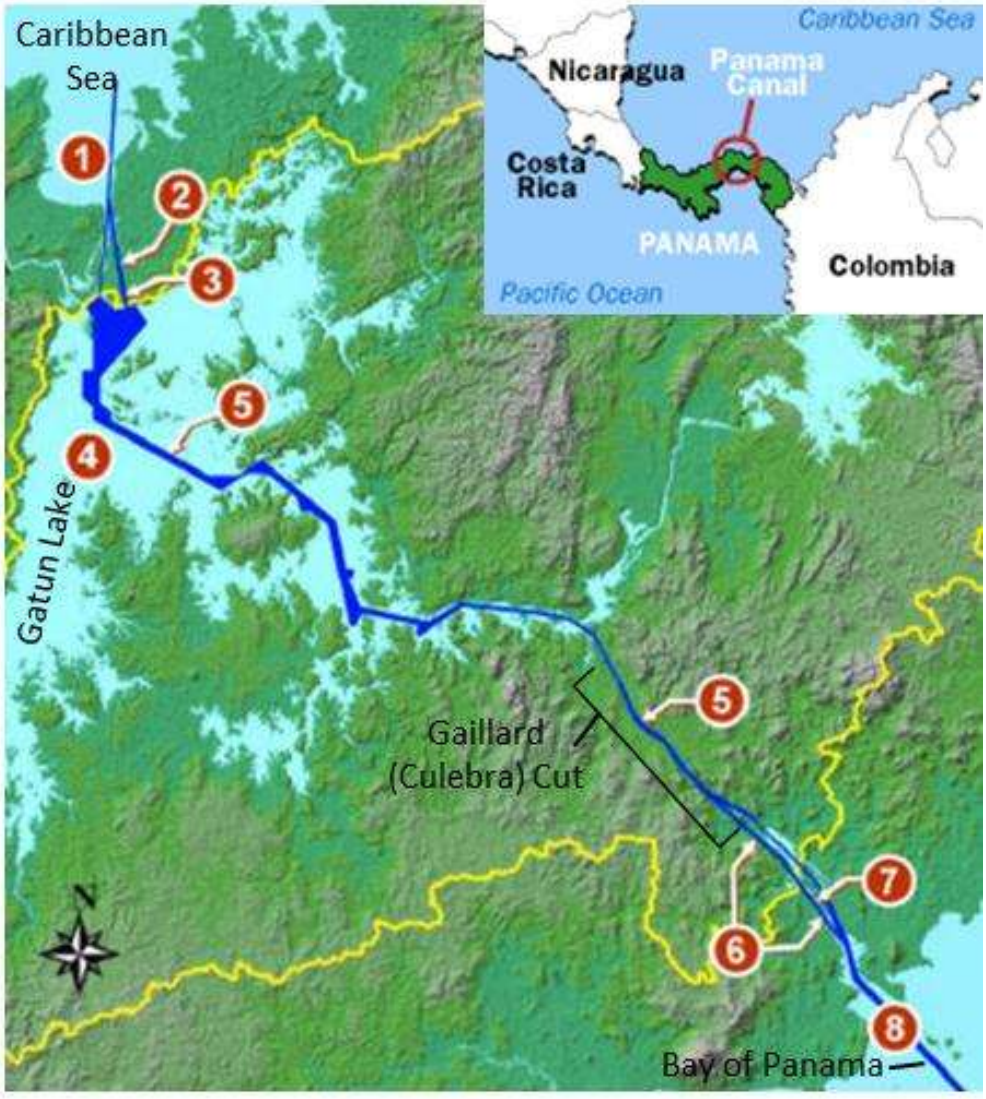
Board of Directors
Romulo Roux (Chairman)
Adolfo Ahumada
Marco A. Ameglio S.
Rafael E. Bárcenas P.
Guillermo O. Chapman, Jr.
Nicolás Corcione
Ricardo de la Espriella Toral
Norberto R. Delgado D.
Eduardo A. Quirós B.
Alfredo Ramírez, Jr.
José A. Sosa A.

The board members are appointed to nine-year terms, which overlap in order to remain independent of Panama's administrations.

E. Key Expansion Design Elements and Project Progress

- Expansion of the Panama Canal began in September 2007 and is expected to be completed by 2014. The expansion effort consists of four main components.
    - Construction of the Post-Panamax locks as shown in Figure 19.
    - Excavation of the Pacific Access Channel.
    - Improvements to navigational channels.
    - Improvements to the water supply (by increasing operating level of Gatun Lake).

Figure 19: Panama Canal Expansion Projects

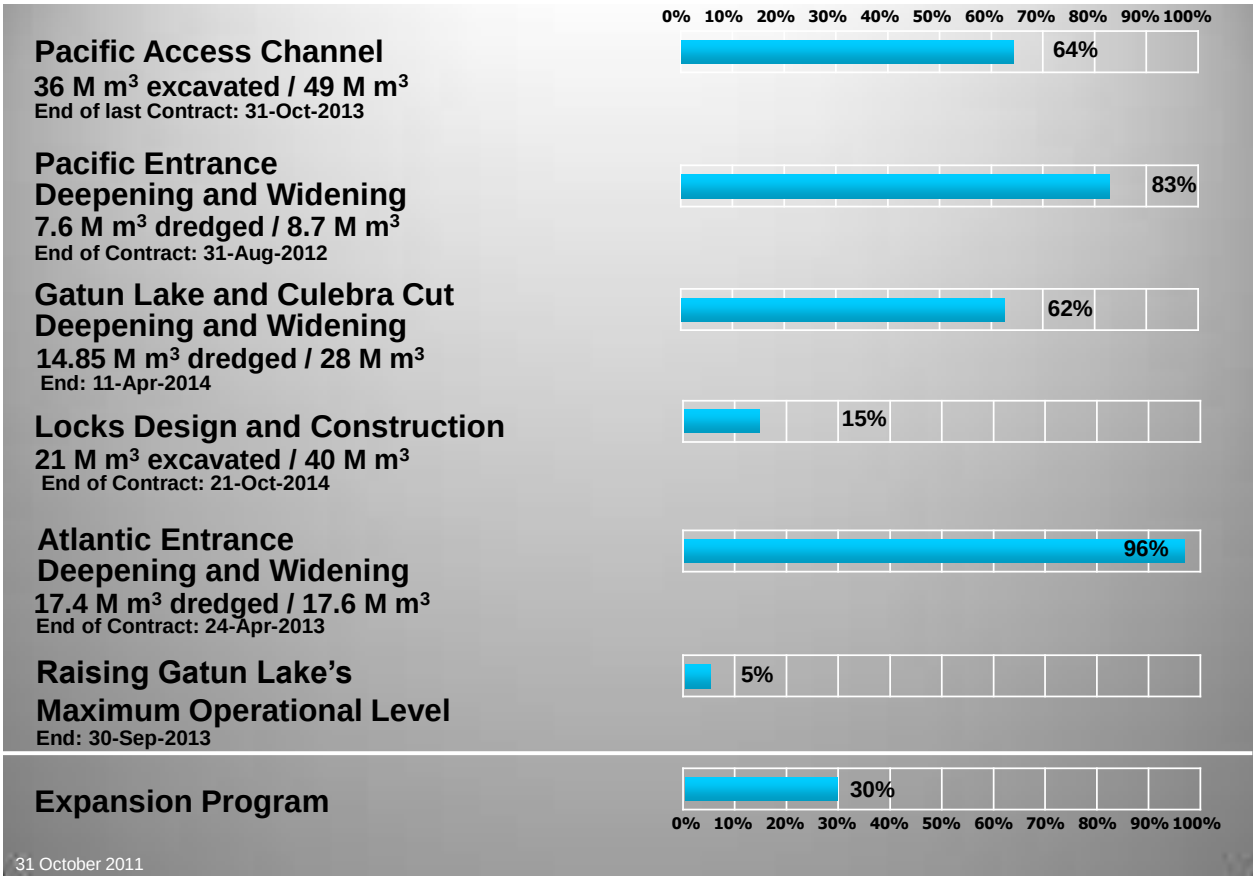


Source: Panama Canal Authority

Number and Project

1. Deepening and widening of the Atlantic entrance channel
2. New approach channel for the Atlantic Post-Panamax locks
3. Atlantic Post-Panamax locks with three water-saving basins per lock chamber
4. Raising the maximum Gatun Lake operating water level
5. Widening and deepening of the navigational channel of Gatun Lake and the Culebra Cut
6. New approach channel for the Pacific Post-Panamax locks
7. Pacific Post-Panamax locks with three water-saving basins per lock chamber
8. Deepening and widening of the Pacific entrance channel

Figure 20: Panama Canal Expansion Progress (October 2011)



Source: ACP

1. Construction of the Post-Panamax Locks

- The dimensions of the existing locks on the Panama Canal measure 111 feet wide, 1,000 feet long and 42 feet deep, and can support ships up to 965 feet long and 106 feet wide that have a draft of up to 39.5 feet.
    - These ships are classified as Panamax vessels, as they are the maximum size of a ship that can fit through the Canal's existing locks.
    - The class of vessels larger than the capacity of the existing locks is referred to as Post-Panamax.
        - The new locks under construction will be 180 feet wide, 1,400 feet long, and 60 feet deep, and will be able to accommodate Post-Panamax vessels with a maximum size of 160 feet wide and 1,200 feet long, with a draught of 50 feet.
        - While Panamax container ships can carry a load of 4,400 twenty-foot equivalent unit (TEUs) containers, Post-Panamax vessels will have a design capacity of up to 12,400 TEUs. Therefore, the capacity of the Panama Canal will double following its expansion.
- The two new locks will be located near the existing locks, with one set of locks at both the Atlantic and Pacific canal entrances. An example of the new lock at the Pacific entrance near the Miraflores Lock is shown in Figure 21.

- Each new lock will have three chambers, and each chamber will have three water-saving basins.
- Each new lock will also have a lateral filling and emptying system, and rolling gates.
  - The water-saving basins are expected to reduce water use by 7% compared to the existing locks, and will reuse 60% of the water used in a lockage.
  - Each set of basins (next to a lock chamber) will measure 1,400 feet long, 230 feet wide and 18 feet deep. The rolling lock gates allow for servicing to be performed on-site, unlike the existing locks and will result in increased lock capacity and shorter maintenance times.

Figure 21: Design for Post-Panamax Locks, View from Pacific Entrance

Source: Panama Canal Authority, 2011

- The construction of the new set of locks will require the excavation of 15.6 million cubic meters of material on the Atlantic side and 22 million cubic meters on the Pacific side.
- The excavation on the Atlantic and Pacific sides will cover 2.2 kilometers and 2.7 kilometers in length, respectively.
- As of October 2011, the ACP estimated that the construction of the new locks is 15% complete.

2. Excavation of the Pacific Access Channel

- A second major undertaking of the Panama Canal expansion effort is the excavation of the Pacific Access Channel (PAC), a new channel that will link the new Pacific locks to the Culebra Cut.
    - The Culebra Cut is the Panama Canal's narrowest section, an eight-mile channel built through solid rock, it was also the Canal's most difficult excavation project during its original construction.
    - The new excavation of the PAC began in July 2007 and has been divided into four separate contracts.
        - It involves the excavation of nearly 50 million cubic meters of material (total of 6.1 km in length) and the clearing of 416 hectares of land, 226 hectares of which is land bearing munitions and explosions of consideration.

Table 20: Pacific Access Channel Expansion

Phase	Contractor/ Consortium	Material for Excavation (million cubic meters)	Land for Clearing (ha)	Other Projects	Progress (%, as of May 2011)
1	Constructora Urbana S.A.	7.3	146 (MEC)	3.5 km relocation of Borinquen Rd.	100
2	CILSA-Minera Maria	7.4		1.3km relocation of Borinquen Rd.; 3.5km deviation of Cocoli River	100
3	Constructora Meco S.A.	8.0	190		63
4	Ingenieros Civiles Asociados S.A. de C.V.; Fomentos de Construcciones y Contratas S.A.; Constructora Meco S.A.	26.2	80 (MEC)	15,367 MT of piling; Construction of 2.3 km Borinquen Dam	9
	Total	**48.9**	**416**		

Source: Panama Canal Authority presentation, May 2011

- More than one half of the 48.9 million cubic meters of the PAC has been excavated.
    - The first phase of excavation included, among other projects, leveling Paraiso Hill from 136 to 46 meters above sea level as shown in Figure 22.

        - The project amounted to the excavation of 7.3 million cubic meters of material, and was completed in 2010.
    - Within the second phase of the greater PAC project (PAC2), the contractor removed 7.4 million cubic meters of material, diverted a 3.5 kilometer stretch of the Cocolí River, and relocated a 1.3 kilometer section of Borinquen Road.
        - PAC2 was completed in the first quarter 2010.
    - During the first half of 2011, the contractor for phase three of the PAC project (PAC3) further leveled Paraiso Hill from 46.0 to 27.5 meters above sea level.
        - Having excavated 5.0 million cubic meters of material and cleared 190 hectares of MEC land, as of May the contractor had completed 63% of PAC3.
    - Within PAC4, the final phase of the PAC project, preparations are underway for the construction of the Borinquen Dam, which will separate the Pacific Access Channel and the Miraflores Lake.
        - The dam will be 2.3 kilometers long and will be constructed by the consortium of ICA-FCC-Meco, or, Ingenieros Civiles Asociados S.A. da C.V. (Mexico), Fomentos de Construcciones y Contratas S.A. (Spain), and Constructora Meco S.A. (Costa Rica). The dam construction project is one of four main projects under the PAC4 contract, awarded to ICA-FCC-Meco for $267.8 million.
        - PAC4 is expected to be completed by 2013.

Figure 22: Paraiso Hill Excavation for the Pacific Access Channel, 2007 and 2009

September 2007 **July 2009**

Source: Panama Canal Authority

3. Improvements to Navigational Channels

- To ensure that Post-Panamax vessels will be able to safely navigate through all waters of the 50-mile-long Panama Canal, ACP has awarded contracts to dredge multiple channels.
    - Five dredging projects under this component of the Panama Canal's expansion, in addition to their excavation and dredging requirements are outlined in Table 21.
- As of October 2011, the Panama Canal Authority reported that the dredging of Gatun Lake and the Culebra Cut is 62% complete.

Table 21: Dredging Projects to Improve Navigational Channels

Number	Dredging Project	Dredged or Excavated Material (cubic meters)
1	Dredging Pacific entrance navigational channel	8,700,000
2	Deepening and widening Gatun Lake and deepening of the Culebra Cut	20,000,000
3	New Pacific Access Channel north approach	4,000,000
4	Gatun Lake north access channel	4,600,000
5	Canal Atlantic entrance	17,100,000

Source: Panama Canal Authority

4. Improvements to the Water Supply

- The fourth and final main component of the Panama Canal expansion project involves increasing the maximum operating level of Gatun Lake, which spans 163 square miles and is one of the world's largest man-made bodies of water.
    - Specifically, the level of Gatun Lake will be increased from 26.7 meters to 27.1 meters (by 45 centimeters).
    - Increasing the operating level of the lake will allow for three additional daily transits to take place by increasing the lake's storage capacity by more than 200 million cubic meters.
        - Specific projects required to improve the water supply include, among other projects, modernizing the gates at Gatun Dam and the hydraulic structures that open and close the gates of the Pedro Miguel Locks and the Gatun Locks upper level.
- As of October 2011, improvements to the water supply of the Panama Canal were 5% completed.
    - The project is expected to be completed by the fourth quarter 2013.
    - Teams have already extended four gates, fabricated two new gates, and received two new caissons to maintain and operate the extended spillway gates.
        - The ACP reports that Canal personnel are preparing designs to modify existing lock gates and testing the seal prototypes for the existing locks' submersible hydraulic arms in Pedro Miguel and Gatun.

5. Paleontological and Environmental Projects

- The ACP has taken certain measures to preserve archeological findings and to decrease the environmental impact of the expansion.
    - The Authority contracted the Smithsonian Tropical Research Institute (STRI) to assess areas for paleontological finds during the large scale excavations taking place during the expansion. As a strategic location that historically "connected the Americas," Panama is an important source of archeological history, and scientists are working quickly to uncover fossils that shed light on the formation of the Isthmus of Panama three million years ago, the historic migration of species, and the Caribbean's ecosystems.
- The Authority provided compensation to Panama's National Environment Authority (ANAM) and Aquatic Resources Authority (ARAP), and contracted additional environmental consultants to work on reforestation projects, wildlife rescue and relocation activities, and to provide environmental project inspection services.
    - As of 2011, 565 hectares have been reforested in protected areas in Panama.
        - Two reforestation projects related to areas affected by phases three and four of the Pacific Access Channel projects were still in progress as of May 2011, and less than 10% completed.

F. Estimated Project Costs and Plans to Repay Costs

- The estimated total cost of the seven-year Panama Canal expansion project is $5.25 billion, and broken down as follows: construction of the new locks ($2.73 billion), construction of water-saving basins ($620 million), construction of new channels ($820 million), improvements to navigational channels ($290 million), water supply improvements ($260 million) and inflation during the construction period ($530 million). As of May 2011, the ACP had awarded project contracts totaling $4.2 billion, or 80% of the estimated cost.
- Multiple firms won contracts for the four main components of the Panama Canal expansion project, as well as for additional responsibilities such as management services, legal advisory services, environmental impact studies, paleontological advisory services, reforestation, wildlife rescue and relocation, among others.
    - The winning bid of the largest project, the construction of the new locks, won by the consortium of firms led by Sacyr Vallehermoso and Impregilo under the name of Grupos Unidos por el Canal S.A. (GUPCSA), was for $3.12 billion.
    - The bids for the four excavation phases of the Pacific Access Channel totaled $653.4 million, and the contractors for these projects included Constructora Urbana, S.A. (Cusa), CILSA-Minera Maria (CILSA), Constructora Meco S.A. (Meco), Ingenieros Civiles Asociados S.A. de C.V., and Fomentos de Construcciones y Contratas S.A.

- Panama Canal's most recent (annual) audit was completed through September 30, 2010 with an ending balance for accumulated costs of investment in progress and operating costs as outlined in Table 22.

Table 22: Panama Canal Expansion Investment and Operating Costs through September 2010

Capitalized Costs	
Construction of the new locks	$179.8 million
Construction of the Pacific Access Channel	$148.5 million
Navigational channel improvements	$305.9 million
Water supply improvements	$598 thousand
Program management	$72.8 million
Commission fee and other financing costs	$26.9 million
Total Capitalized Costs	**$734.6 million**
Operating Expenses	$4.6 million
Total Capitalized Costs and Expenses	**$739.2 million**

Source: Panama Canal Authority

- The Panama Canal Expansion project will be self-financed by the ACP and repaid through a combination of graduated toll increases and external bridge financing of $2.3 billion.
    - The ACP expects to double tolls from roughly 2006 to 2025[6].
    - The ACP has not prepared a fixed toll structure. ACP is assessing market studies in preparation of developing the future toll structure.
    - The external financing is primarily temporary (to cover "peak construction" in 2009 through 2011), and is through a group of bilateral and multilateral credit entities.
    - The ACP Board of Directors approved the signing of five financing contracts totaling $2.3 billion after receiving authorization by Panama's Cabinet Council. The contracts were with the following financial agencies.
        - European Investment Bank (BEI; $500 million)
        - Japan Bank for International Cooperation (JBIC; $800 million)
        - Inter-American Development Bank (BID; $400 million)
        - International Financial Corporation (CFI; $300 million)
        - Andean Development Corporation (CAF; $300 million)
- As of September 30, 2010[7], the ACP has used loans totaling $300 million from JBIC ($200 million) and EIB ($100 million). The Authority expects to be able to repay financing in approximately ten years.

[6] As stated in the "Proposal for the Expansion of the Panama Canal: Third Set of Locks Project" from 2006, found at http://www.pancanal.com/eng/plan/documentos/propuesta/acp-expansion-proposal.pdf

[7] Date of the project's most recent audit by Deloitte, found at http://www.pancanal.com/eng/fn/reports/special-expansion/2010-english.pdf

- The ACP estimated in their expansion proposal that investment in the project would see a 12% internal rate of return.

G. Challenges and Obstacles Going Forward

1. Opposition to Expansion Project

- The Panama Canal expansion proposal was met with a certain degree of resistance. Groups involving agricultural, civil, environmental, and social organizations, in addition to former political leaders, voiced opposition to the project.
  - An organization known as the Farmers' Coordination Against the Dams (*Coordinadora Campesina Contra los Embalses*) claimed that the expansion would lead to flooding and drive people away from their homes.
  - A social and environmental organization, the National Front for the Defense of Economic and Social Rights (*Frenadeso*) voted against the national canal expansion referendum.
  - Former Presidents Jorge Illueca and Guillermo Endara, and former Administrator of the Canal, Fernando Manfredo, asserted that the Canal project was highly priced and financially risky, and opposed the expansion.
- Despite the opposition, however, the expansion project was approved at three levels, and each time approved favorably.
  - First, in June 2006, the President of Panama at the time, Martín Torrijos, and his Cabinet approved the project.
  - During the following month, Panama's Legislative Assembly next approved the project with a vote of 72 out of 78 deputies in favor.
  - Finally, in accordance with the National Constitution (Article 319), the project proposal was last submitted to the public in October 2006, who approved the national referendum by a 78% favorable vote.

2. Labor Disputes

- In July 2010 under the consortium *Grupos Unidos por el Canal* (GUPCSA), work stalled due a strike led by the construction union, Sindicato Único Nacional de Trabajadores de la Industria de la Construcción y Similares (SUNTRACS).
  - GUPCSA is affiliated with Panama's Chamber of Construction, and the GUPCSA workers are affiliated with SUNTRACS.
    - Nearly 7,000 GUPCSA workers joined the SUNTRACS-led protests, demanding higher salaries, more sanitary working conditions and a solution to the lack of transportation for workers.
    - During protests by SUNTRACS (union) members backing the GUPCSA (non-union) strikers, 30 SUNTRACS members were arrested.
    - GUPCSA did not increase wages, which remain between $2.90 and $3.37 per hour, but did negotiate improved working conditions.

3. Water Issues

- Since the first time in 1989, the Panama Canal was forced to close in December 2010 due to extreme, heavy rainfall.
- Rainwater is crucial to the Canal's operation, as the locks operate using water from Gatun Lake, which is stocked during rainfall. While too little rainfall would slow or stall canal transits, too much rainfall also stalls the operation of the locks, as locks must be opened to release rainfall into the ocean, such as was the case in 2010.
- The amount of forest area in the watershed nearby the Canal plays a significant role in the water supply both for the operation of the canal, as well as for local, residential drinking water use.
    - Gatun Lake is replenished from the rain collected during Panama's rainy season, and forestation within the watershed helps to store the water, affecting both its quantity and quality.
- As the Panama Canal expansion will double the capacity of the Canal, the two new locks will be 65% larger than the existing locks, and water conservation therefore continues to be a critical consideration in the expansion effort.
    - Currently, each vessel transit requires approximately 52 million gallons of freshwater. However, different components of the expansion address the need for water conservation in the face of increased canal capacity.
        - Again, the new locks will reuse 60% of the water used in a lockage, thus reducing water use by 7% from transits with current locks.
        - The water level of Gatun Lake will increase, providing 550 million additional gallons of water per day.
        - Given the larger capacity of the new locks, smaller ships will be able to double up instead of passing through the less water-efficient existing locks, thus potentially providing further water savings.

V. Port Profiles

Ultimately the expansion of the Panama Canal will increase the feasibility of larger vessels to deliver products to the East Coast and Asia. For this to occur, the ports have to be able to accommodate the vessels. The port profile section examines the current status and future plans of ports to adapt to larger vessels.

A. U.S. Port Profiles

There are 150 ports in the U.S. that handle some form of cargo from domestic, foreign, imports or exports. Of these ports, 59 are located on U.S. coasts (58 East Coast and Los Angeles/Long Beach), handle foreign products and have dredging updates reported by the Army Corps of Engineers. Currently three East Coast ports are dredging their ship channels deeper: New York/New Jersey, Philadelphia and Baltimore. Ten East Coast ports are having discussions or feasibility studies prepared on deepening their ship channels: Boston, MA; Norfolk, VA; Wilmington, NC; Charleston, SC; Savannah, GA; Jacksonville, FL; Canaveral, FL; Ft. Lauderdale, FL; Palm Beach, FL; Miami, FL. East Coast ship channel depth comments are shown in Table 23.

Currently two Gulf Coast ports are dredging their ship channels deeper, Texas City, TX and Corpus Christi, TX. Eleven Gulf Coast ports are having discussions or feasibility studies being prepared on deepening their ship channels, Port Manatee in Palmetto, FL; Pascagoula, MS; Lake Charles, LA; Port Arthur, TX; Port Neches, TX; Beaumont, TX; Galveston, TX; Texas City, TX; Freeport, TX; Corpus Christi, TX and Brownsville, TX. Gulf Coast ship channel depth comments are shown in Table 24.

Currently the Port of Los Angeles is the only West Coast port dredging their ship channels deeper. Four West Coast ports are having discussions or feasibility studies being prepared on deepening their ship channels, Stockton CA; Coos Bay, OR; Grays Harbor in Aberdeen, WA and Anchorage, AK.

Table 23: Current Channel Depth of U.S. Atlantic Coast Ports

City	State	Port Authority	Comments on Channel Depth
New Haven	CT	New Haven Port Authority	Channel is 35' with no immediate plans to deepen it further.
Wilmington	DE	Wilmington Port Authority	Wilmington's channel (Christina River) is 35'-38' at Mean Low Water with a 5' range of tide and no immediate plans to deepen it further.
Canaveral	FL	Canaveral Port	Federal navigation channel is now dredged to 40' deep at
Ft. Lauderdale	FL	Port Everglades	Channel is now 42' deep and berth depths range from 27' to 44'; port has a feasibility study underway to deepen its navigation channel to 50'.
Jacksonville	FL	JAXPORT	Main channel is 40' deep now; port is looking to go to 45' and has a feasibility study underway for an estimated $500 million to $600 million project. A separate project, called Milepoint, which is where the Intracoastal Waterway intersects the St. John's River and where the cross currents restrict vessels to 35' of draft until high tide. There is a study underway to reduce the cross currents and eliminate the navigation restrictions.
Miami	FL	Port of Miami	Main channel is 42'; port has a 50' channel authorized, but all necessary Corps funding not yet secure for construction. Florida's governor, Rick Scott, has pledged $77 million into the project. The project is currently in the preconstruction engineering and design phase.
Palm Beach	FL	Port of Palm Beach District	Channel is currently 33' deep with feasibility study underway to go to 42'
Brunswick	GA	Georgia Port Authority	Navigation channel is 36', with no plans to deepen.
Savannah	GA	Georgia Port Authority	Channel is currently 42' deep, but Corps of Engineers will dredge to 48' at a cost of $588 million if project study issues are resolved. Savannah has to be reauthorized in next WRDA because cost now exceeds the 120% of authorized cost threshold. There is also pressure from South Carolina side of bi-state oversight authority over whether to dredge river further to 50' to encompass proposed Jasper County container terminal between South Carolina and Georgia.
Boston	MA	Massport	Channel is 40' now, port wants to go to 45' to 50'; feasibility study underway but not yet completed.
Baltimore	MD	Maryland Port Authority	Currently has a 50' channel, but no 50' deep container berths. New lease with Ports America at a Seagirt terminal gives the responsibility to the terminal operator to pay for dredging the berths to 50' by 2014. Berth dredging now underway and completion is slated by the end of 2012.
Portland	ME	Port of Portland	Channel is now 35', with no immediate plans to deepen
Morehead City	NC	North Carolina State Port Authority	Channel is currently 45', with no immediate plans to go deeper.

Source: American Association of Port Authorities, Interviews and Port Websites

Table 23: Current Channel Depth of U.S. Atlantic Coast Ports (continued)

City	State	Port Authority	Comments on Channel Depth
Wilmington	NC	North Carolina State Port Authority	Channel is currently 42'. Port wants to go deeper, and a feasibility study is getting underway for Wilmington Harbor.
New York/ New Jersey	NY/NJ	Port Authority of New York/New Jersey	Depth to container terminals is currently 40'-45'; construction is underway on $2.3 billion federal project to deepen main and access channels to 50' and expected to be completed before the end of 2014. Depth to non-container facilities runs between 35'-45'.
Philadelphia	PA	Philadelphia Regional Port Authority	Channel is currently 40', but project underway to deepen it to 45'. Initial construction began in 2010 but will be several years before completion.
Fernandina Harbor	PR	Puerto Rico	Dredged to 35' with no immediate plans to deepen.
Ponce	PR	Puerto Rico	Port recently finished construction on a 50' navigation channel and post-Panamax container berth as part of an $84.4 million government-funded expansion, giving the port an annual container capacity of up to 500,000 TEUs.
San Juan	PR	Puerto Rico	Channel is dredged to 40', with plans to widen the channel further but no immediate plans to deepen.
Charleston	SC	South Carolina State Ports Authority	Main entrance channel is 47' and harbor channel is 45' deep at low tide. The USACE completed a reconnaissance study in July 2010 determining a federal interest in further deepening the navigation channel, which was a key funding to begin the feasibility study provided in USACE FY 2011 Work Plan.
Norfolk	VA	Virginia Port Authority	Virginia Ports Authority is currently the only U.S. Atlantic port that has 50' depths all the way to the dock. The Corps has authorized their channel to 55' and a general reevaluation report (GRR) is underway to go to that depth.

Source: American Association of Port Authorities, Interviews and Port Websites

Table 24: Current Channel Depth of U.S. Gulf Coast Ports

City	State	Port Authority	Comments on Channel Depth
Mobile	AL	ASPA	Main channel is 45' and Corps has authorized deepening to 50' but no immediate plans to go further. The port recently finished a turning basin enlargement.
Palmetto	FL	Port Manatee	Main channel depth is 40' now; port has a re-evaluation study underway to deepen it to 45'.
Tampa	FL	TPA	Federal navigation channel is dredged to 43' with plans to widen, but no immediate plans for channel deepening.
Lake Charles	LA	Port of Lake Charles	Port has a 40' deep channel and has under consideration the question of deepening the channel to 50'.
New Orleans	LA	Port of New Orleans	Channel is dredged to 45' and is authorized to 55', no immediate plans to deepen.
Gulfport	MS	Mississippi State Port Authority	Channel is currently dredged to 36', but port would like to deepen.
Pascagoula	MS	Jackson County Port Authority	Main entrance channel is 42' into the Bayou Casotte Harbor. Channel depth into Pascagoula River Harbor is 38'. Channel width into both harbors is 350'. Widening of the bar channel from 450' to 550' and construction of the DMMS in the Pascagoula River Harbor are scheduled to begin in late 2011. A feasibility study is underway for widening the channel into the Bayou Casotte Harbor.
Beaumont	TX	Port of Beaumont	Channel is currently 40' deep; looking to deepen as much as 48'; feasibility study is underway.
Brownsville	TX	Brownsville Port Authority	Main channel depth is 42'; feasibility study now underway to deepen it to 50'.
Corpus Christi	TX	Port of Corpus Christi Authority	Corpus Christi Ship Channel and LaQuinta Ship Channel currently at 45' deep. Corpus Christi Ship Channel authorized 52' deep in 2007 and will be deepened upon re-authorization and when construction funds are secured. LaQuinta Ship Channel will be under construction in 2011 to extend its length at an authorized depth of 39', with plans in the near future to deepen the new extension to 45' deep.
Freeport	TX	Freeport Port Authority	Main channel is now 45' deep, port is looking at widening and deepening to 55'; feasibility study underway.
Galveston	TX	Port of Galveston	Main channel recently dredged to 45' from 40'; looking to extend channel upstream into Galveston about 2,000 linear feet.
Houston	TX	Port of Houston Authority	Main navigation channel depth is 45' with branch channels ranging from 40' to 45'. Port has no immediate plans to
Port Arthur	TX	Port of Port Arthur Navigation	Channel is currently 40' deep; looking to deepen as much as 48'; feasibility study is underway.
Port Neches	TX	Sabine Neches	Channel is currently 40' deep; looking to deepen as much as 48'; feasibility study is underway.
Texas City	TX	Texas City Port Authority	Construction slated to be finished in 2011 to deepen channel from 40' to 45'; authorized to go to 50' depth in the future.

Source: American Association of Port Authorities, Interviews and Port Websites

Table 25: Current Channel Depth of U.S. West Coast Ports

City	State	Port Authority	Comments on Channel Depth
Anchorage	AK	Port of Anchorage	Channel currently dredged to 35' although a feasibility study is underway to deepen to 45'.
Eureka	CA	Port of Humboldt Bay	Channel is dredged to 42' with no current plans to deepen further.
Long Beach	CA	Port of Long Beach	Channel is 76' deep with no immediate deepening planned.
Los Angeles	CA	Port of Los Angeles	Channel depths range from 53' to 81' with the final segment of POLA's 53' deepening program expected to be complete by end of 2011.
Oakland	CA	Port of Oakland	Channel and berths recently dredged to 50'; no immediate plans to deepen further.
Port Hueneme	CA	Oxnard Harbor District	Channel is currently 36' with no immediate deepening planned.
Redwood City	CA	Port of Redwood City Commission	Channel is currently dredged to 30' with feasibility study underway to deepen to 35'.
Richmond	CA	Port Department City of Richmond, CA	Channel is currently at 38' with no immediate plans to deepen further.
San Diego	CA	San Diego Unified Port Commission	Channel is currently 47' with no immediate deepening plans.
San Francisco	CA	Port of San Francisco Commission	Channel and berths dredged to 40' with no immediate plans to deepen further.
Stockton	CA	Port of Stockton Commission	Channel depth is now at 35', a feasibility study is underway to deepen it to 45'.
Honolulu	HI	Port of Honolulu	Channel is currently dredged to 40' with no existing plans to deepen further.
Astoria	OR	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.
Coos Bay	OR	Oregon International Port of Coos Bay Commission	Channel authorized and maintained at 37'. Port district is currently pursuing navigation system improvements in lower Coos Bay, deepening and widening of 8.5 miles of the channel, through Section 203/204 of the Water Resources Development Act of 1986.
Portland	OR	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.
St. Helens	OR	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.

Source: American Association of Port Authorities, Interviews and Port Websites

Table 25: Current Channel Depth of U.S. West Coast Ports (continued)

City	State	Port Authority	Comments on Channel Depth
Kalama	WA	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.
Longview	WA	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.
Seattle	WA	Port of Seattle Commission	Navigation channel is naturally deep.
Tacoma	WA	Port of Tacoma Commission	Navigation channel is naturally deep. The port has terminals on three major waterways (Sitcum, Blair and Hylebos) that were developed through various dredging projects since 1929. Both the Sitcum and Blair waterways have current channel depth of 51'. The Hylebos channel has depths ranging from 30' to 40' deep, which is adequate to handle the types of vessels calling the terminals on that waterway. There are no immediate plans to deepen any of these waterways further.
Vancouver	WA	Lower Columbia River	The 105.6 navigation channel was recently dredged from 40' to 43', from Astoria to Portland, including ports in Astoria, St. Helens and Portland, OR., Longview, Kalama and Vancouver, WA.
Aberdeen	WA	Port of Grays Harbor	Channel is currently maintained at 36', although authorized to 38'; port looking to go to 38' or possibly deeper.

Source: American Association of Port Authorities, Interviews and Port Websites

B. Organizations and Port Authorities with Memorandums of Understanding (MOU)

The Soy Transportation Coalition and 23 port authorities in the U.S. have signed MOUs with the ACP. The purpose of the MOUs is to increase understanding by sharing information between organizations and ACP. The focus of this section is on those organizations and ports and their expansion efforts due to the expansion of the Panama Canal. The Soy Transportation Coalition is unique in that it is the only commodity or product association to have entered into an MOU with the ACP. The agreement allows the two organizations to share information and perform joint promotional events in the effort to raise awareness of the Panama Canal expansion and its potential impact on U.S. agriculture.

The ports signing MOUs are located close to two-thirds of the U.S. population. Approximately 60% of the U.S. population is east of the Mississippi River and the Center Gulf enables a shipper to reach population west of the Mississippi River. Detailed maps of theses ports are shown in Figure 24, Figure 25, Figure 26 and Figure 27.

Figure 23: Timeline of Ports Signing MOUs with the Panama Canal Authority

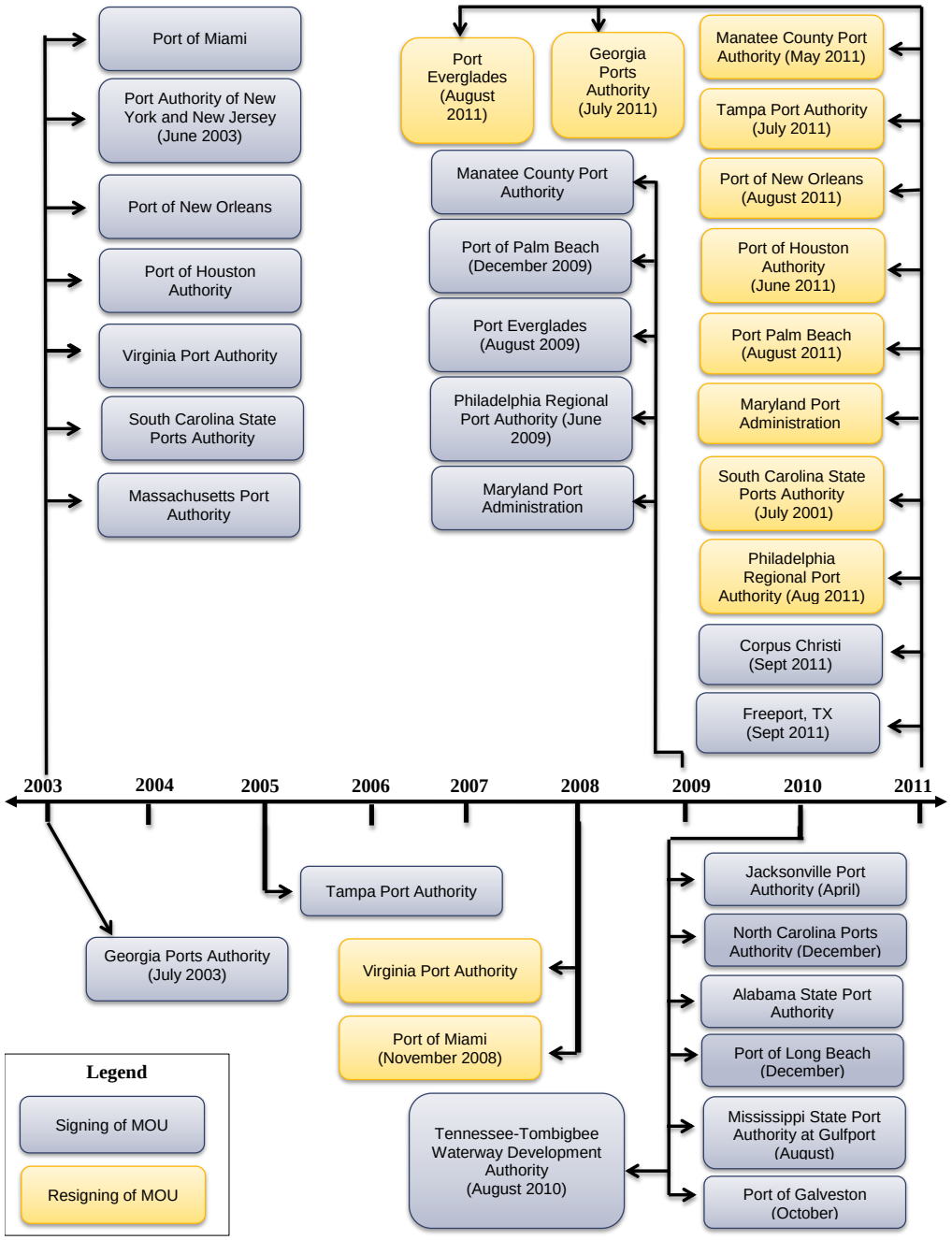


Figure 24: U.S. Ports with Memorandums of Understanding with the Panama Canal Authority

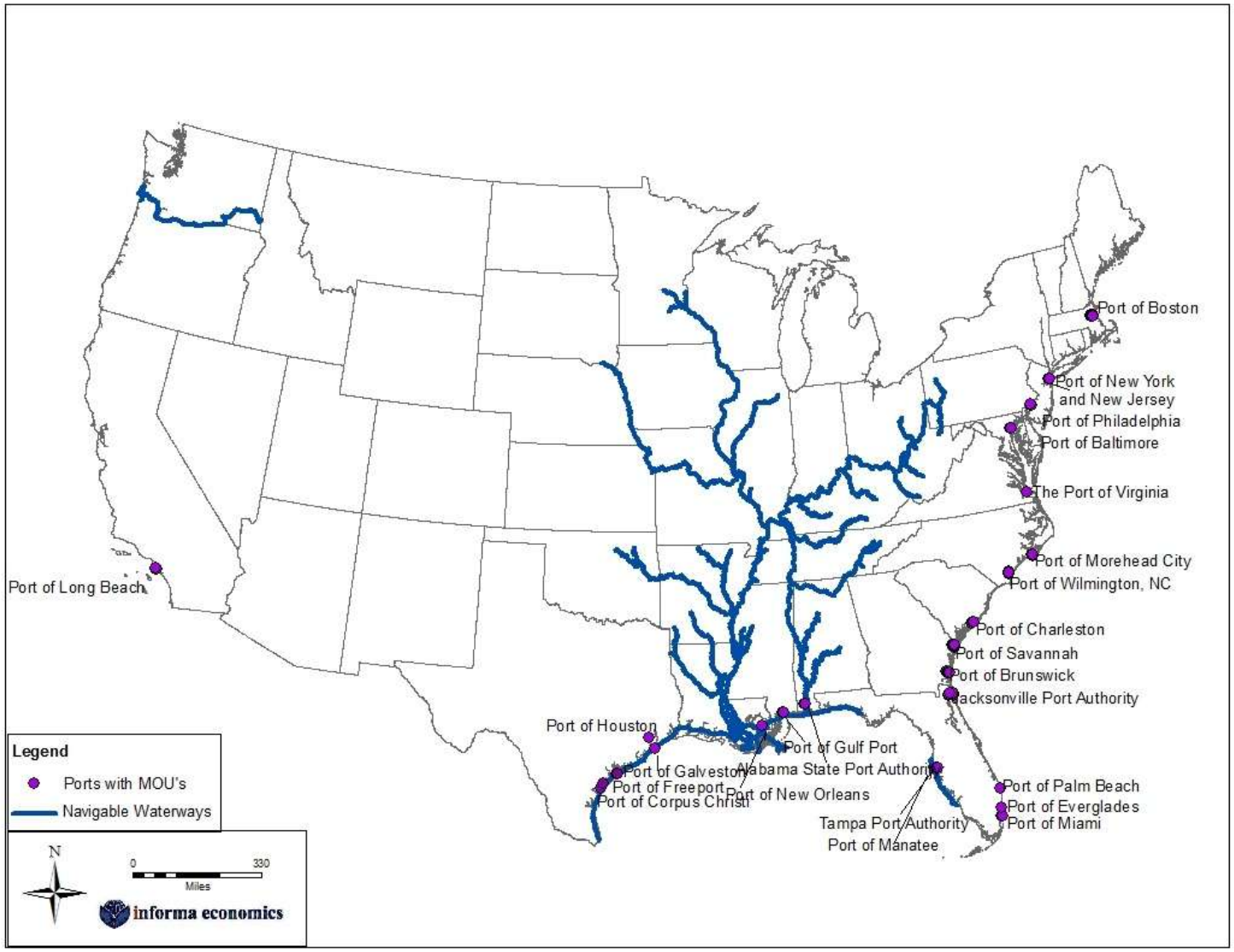


Figure 25: U.S. Ports with Memorandums of Understanding with the Panama Canal Authority and U.S. Populated Areas

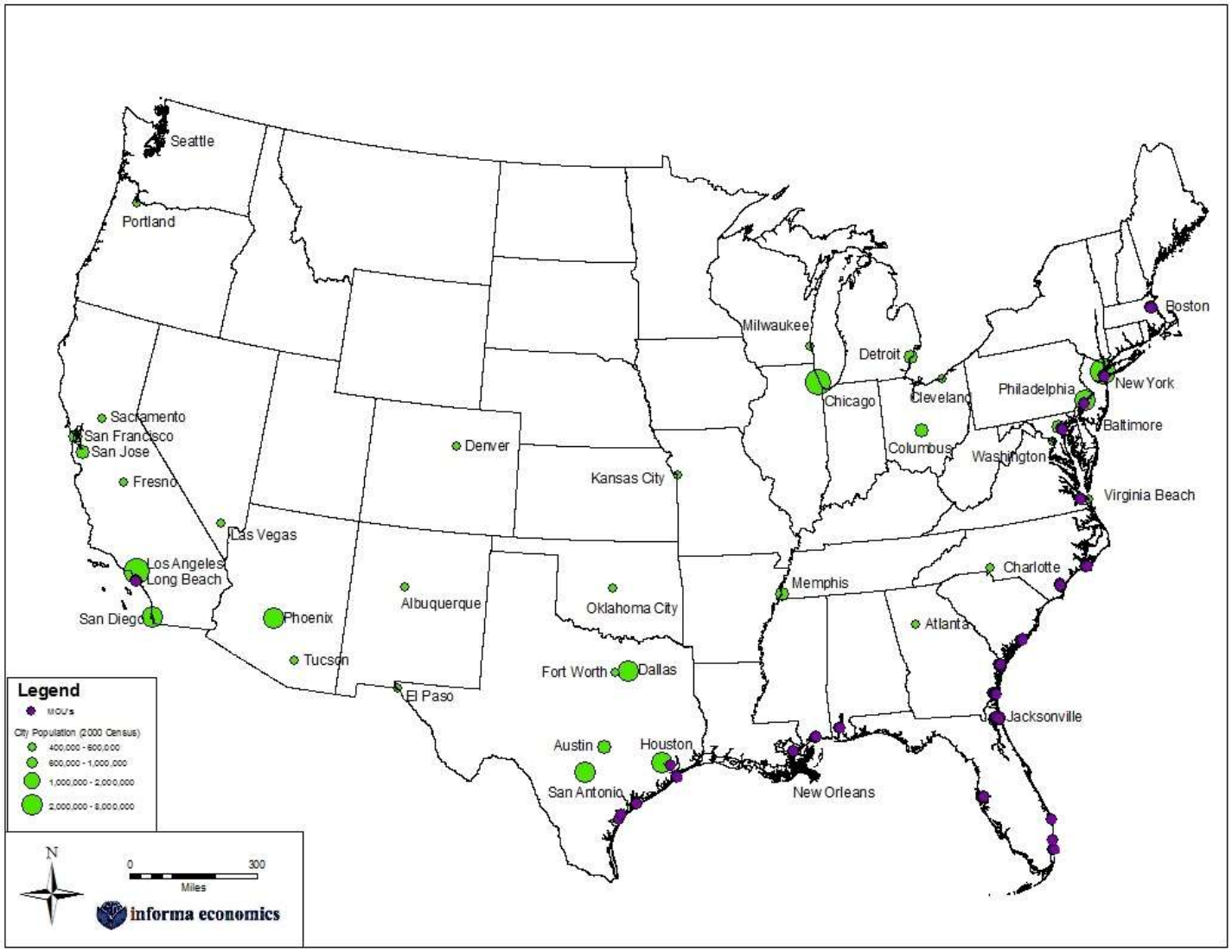


Figure 26: U.S. Ports with Memorandums of Understanding with Panama Canal Authority and Railroads and Navigable Waterways

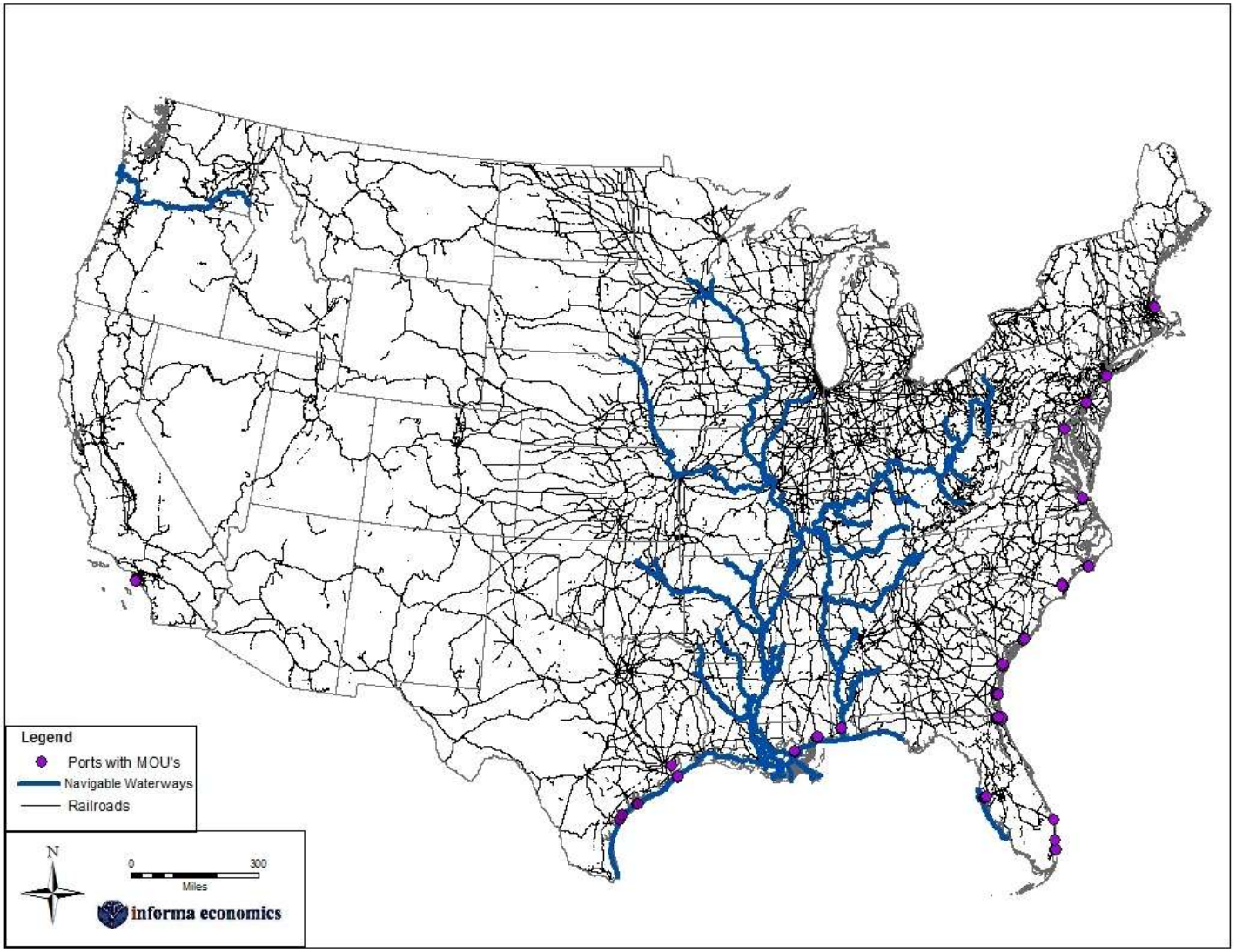


Figure 27: Ports with Memorandums of Understanding with Panama Canal Authority, Current and Projected Channel Depths

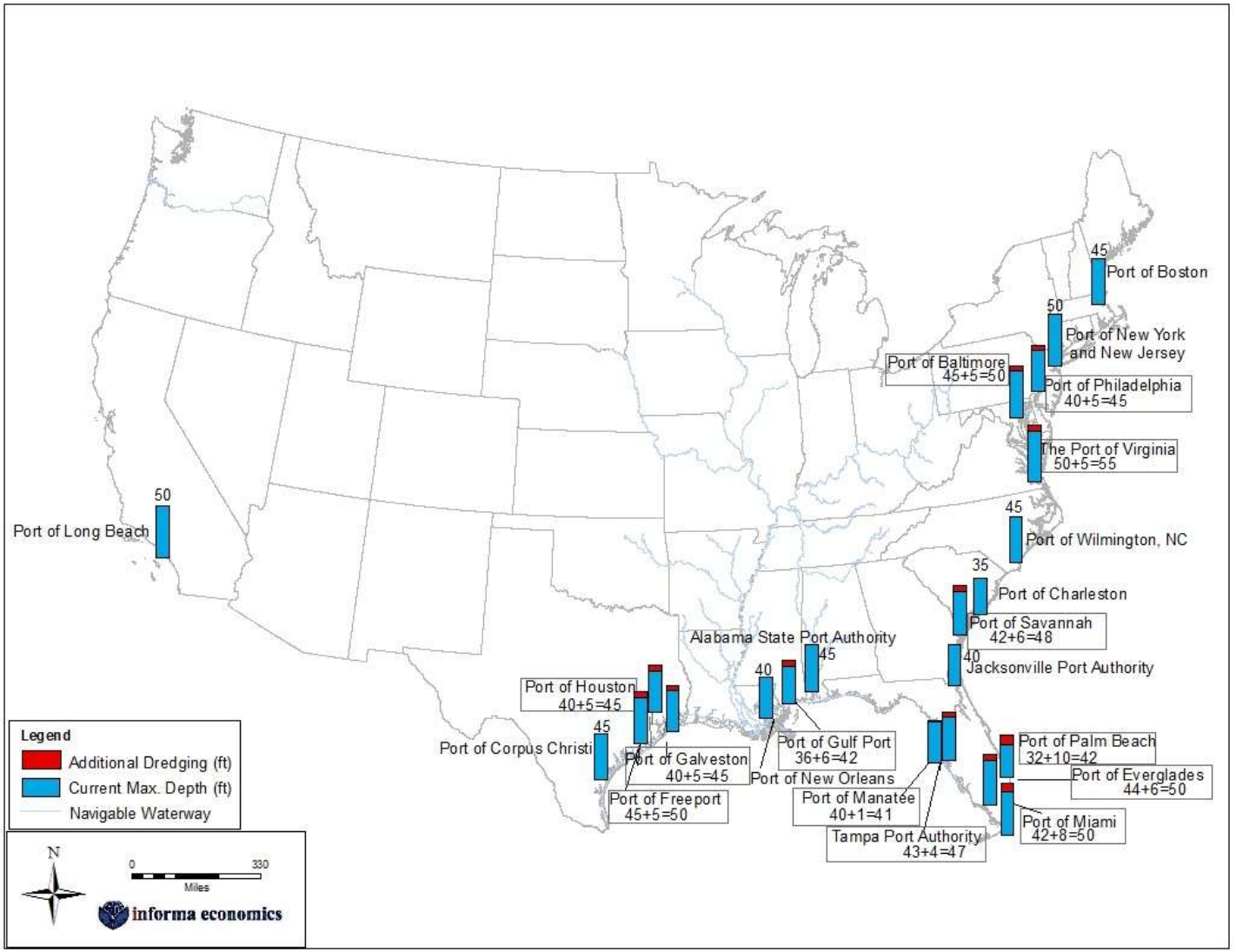


Table 26: U.S. Ports with Memorandums of Understanding with the Panama Canal Authority and 2009 Port Volume (short tons)

Port Name	State	TOTAL	DOMESTIC	FOREIGN	IMPORTS	EXPORTS
Houston	TX	211,340,972	63,371,521	147,969,451	84,629,722	63,339,729
New York and New Jersey	NY & NJ	144,689,593	61,220,507	83,469,086	64,032,262	19,436,824
Long Beach	CA	72,500,221	13,927,612	58,572,609	37,283,269	21,289,340
Corpus Christi	TX	68,239,968	17,435,654	50,804,314	39,673,722	11,130,592
New Orleans	LA	68,126,087	37,068,258	31,057,829	14,143,810	16,914,019
Los Angeles	CA	58,406,060	7,006,435	51,399,625	31,278,985	20,120,640
Mobile	AL	52,219,034	24,382,600	27,836,434	15,595,340	12,241,094
Norfolk Harbor	VA	40,325,961	6,602,211	33,723,750	8,192,966	25,530,784
Pascagoula	MS	36,617,585	8,407,935	28,209,650	21,506,634	6,703,016
Tampa	FL	34,888,052	22,804,143	12,083,909	5,767,967	6,315,942
Savannah	GA	32,338,995	1,950,236	30,388,759	16,694,456	13,694,303
Philadelphia	PA	31,750,604	11,431,769	20,318,835	19,899,793	419,042
Baltimore	MD	30,136,169	9,882,907	20,253,262	10,472,328	9,780,934
Freeport	TX	27,362,765	4,025,067	23,337,698	21,093,998	2,243,700
Boston	MA	20,455,925	6,952,251	13,503,674	11,961,078	1,542,596
Port Everglades	FL	20,058,993	10,456,994	9,601,999	6,777,336	2,824,663
Newport News	VA	18,043,126	4,142,003	13,901,123	227,030	13,674,093
Jacksonville	FL	17,686,279	7,047,676	10,638,603	9,040,120	1,598,483
Charleston	SC	15,834,464	2,378,893	13,455,571	8,436,693	5,018,878
Galveston	TX	9,791,907	5,248,200	4,543,707	1,105,885	3,437,822
Miami	FL	6,771,535	519,139	6,252,396	3,061,298	3,191,098
Wilmington	NC	6,715,576	1,836,703	4,878,873	3,544,741	1,334,132
Morehead City	NC	3,278,457	1,617,125	1,661,332	556,543	1,104,789
Port Manatee	FL	2,897,599	309,730	2,587,869	1,498,513	1,089,356
Palm Beach	FL	2,341,642	997,779	1,343,863	353,570	990,293
Brunswick	GA	2,093,808	27,616	2,066,192	784,325	1,281,867
Gulfport	MS	1,867,820	24,353	1,843,467	1,286,636	556,831

Source: Army Corps of Engineers

Table 27: Descriptive Statistics of U.S. Ports with Memorandums of Understanding with the Panama Canal Authority

Port Authority	Number Terminals	Current Depth (feet)	Projected Depth (feet)	Number Railroads
Georgia Ports Authority	8	30-42	48	2
Port of Miami	1	42	50	3
The Port Authority of New York and New Jersey	6	37-50	50	4
Massachusetts Port Authority	1	45		1
South Carolina State Ports Authority	6	35		2
Virginia Port Authority	4	28-50	55	4
Maryland Port Administration	3	35-45	50	1
Philadelphia Regional Port Authority	7	32-40	45	3
Broward County S Port Everglades Department	1	31-44	50	2
Port of Palm Beach	1	32	42	2
Jacksonville Port Authority	3	38-40		3
Port of North Carolina	2	42-45		2
Port of Houston Authority	8	35-40	45	3
Port of New Orleans	15	35-40		6
Tampa Port Authority	2	34-43	47	1
Manatee County Port Authority	1	40	41	1
Alabama State Port Authority	6	36-45		5
Port of Galveston	4	34-40	45	2
Tennessee - Tombigbee Waterway Development Authority		40-45	N/A	3
Mississippi State Port Authority at Gulfport	1	36	42	3
Port of Long Beach	6	36-50		2
Port of Corpus Christi	6	34-45		3
Port Freeport, TX	1	45	50	1

Source: Port websites

C. U.S. Ports with Memorandums of Understanding with the Panama Canal Authority, and Canal Planned Expansion Efforts

The ports that have signed MOUs are expanding due to the expansion of the Panama Canal. The following description of ports and their expansion efforts are in no particular order.

1. Georgia Ports Authority

To increase capacity for the opening of the Panama Canal expansion, the Georgia Ports Authority (GPA) is moving forward with expansion efforts at both the Port of Savannah and the Port of Brunswick, and is expecting to invest approximately $1.2 billion over the next decade. The GPA is currently working on the following projects:

- At the Port of Savannah, GPA is increasing the depth of the Savannah River Navigational Channel. Currently the shallowest port of all major world ports—at 42 feet—the project involves dredging the channel to a depth of 48 feet, and is expected to be completed by 2014.
- At the Port of Savannah Garden City Terminal, the GPA plans to install 25 high-speed super Post-Panamax container cranes, at a rate of two being installed roughly every 18 months, over the next ten years. In addition to the new cranes, GPA plans to fully convert to the use of Rubber-Tired Gantries (RTG) and will be installing 86 RTGs over the next decade.

- At the Colonel's Island Terminal, GPA completed the Highway 17 overpass, allowing for unimpeded road and rail access to the north and the south of the island, and freeing up 900 acres for future development.

Projects at the Port of Savannah, among other long-term GPA expansion efforts, are expected to increase the port's throughput capacity from 2.62 million TEUs to 6 million TEUs by 2018.

The GPA is also interested in the cruise business but it is currently putting most of its money into container handling equipment.

Savannah already has 96 RTGs and 18 STS cranes on hand, but wants extra capacity available when the new Panama Canal locks are opened.

2. Port of Miami

The Port of Miami is undergoing a port overhaul including three major projects, all of which are expected to be completed by 2014:

- Deepening the existing harbor channel of 42 feet (13m) an additional eight feet to accommodate larger ships and provide quicker access to the port area for trucks. Miami is currently the only port in the southeast that has both the funding and approval to become a 50 feet deep port; the only other ports meeting the 50 feet criterion are the northerly gateways of Norfolk, New York and Baltimore.
- Constructing a tunnel under Biscayne Bay. The Port of Miami Tunnel Project includes drilling two parallel tunnel bores to connect the MacArthur Causeway on Watson Island to Dodge Island to provide a new point of access for the port beyond its current congested downtown route. At their lowest point, the twin tunnels will dip roughly 120 feet below sea level, allowing the navigation channel above them to be lowered to at least 50 feet. Engineers expect that the eastbound tunnel should take around seven months to bore and should be completed by the spring of 2012. The westbound bore, meanwhile, should be completed by mid-2013.
- Refurbishing a rail line from the port to the FEC Hialeah Railyard, a major rail cargo hub near Miami International Airport. This project will restore cargo rail service to and from the Port of Miami. In 2007, a storm interrupted the rail service and freight trucks have since hauled cargo to and from the port area. However, even prior to the storm, rail service was sporadic, and as the expansion of the Port of Miami will allow for a larger volume of cargo to enter the port, the rail restoration will likewise increase the volume and speed of cargo movement in the port.

3. The Port Authority of New York and New Jersey

The Port Authority of New York and New Jersey has made significant investments to increase the capacity of its facilities and to be able to accommodate the larger vessels

expected following the completed expansion of the Panama Canal. The Port Authority is undergoing projects with three primary focuses:

- Enhancing the port's inland access, with projects underway on both the New York and New Jersey sides of the harbor. On Staten Island, the Port Authority launched the ExpressRail Staten Island in 2007, which is a ship-to-rail service to the Howland Hook Marine Terminal, and operates of five separate tracks. Meanwhile at the New Jersey Marine Terminals, the Port Authority is investing $22 million to build additional tracks at ExpressRail Elizabeth, which serves Maher and APM terminals, and at ExpressRail Newark, which serves the Port Newark Container Terminal, Inc. In total, the Port Authority will invest more than $600 million in enhancing the ExpressRail system, and once complete, the system will be able to move 1.5 million cargo containers per year.
- The Port Authority of New York and New Jersey has been working with the U.S. Army Corps of Engineers on the Harbor Deepening Project (HDP). By 2005, work was completed on dredging the Kill Van Kull and Newark Bay channels to 45 feet. The next phase of the HDP consists of deepening other key channels to 50 feet, and is expected to be completed in 2014.
- Improving the New York Container, Maher, APM, and Port Newark Container Terminals. The New York Container terminal plans to construct a fourth container berth. Maher Terminals has invested $400 million over the past five years to improve infrastructure and technology and to acquire equipment. APM Terminals is meanwhile making $250 million in capital investments for new cranes and refrigerated container racks. It has also expanded its terminal area by 84 acres to 350 acres. The Port Newark Container Terminal has invested $250 million since 2000 to increase its capacity to 750,000 containers annually. The terminal will have three 50-foot berths and one 45-foot berth after deepening two of its berths.

4. Massachusetts Port Authority

Since signing an MOU with the ACP in 2003, and given their expectation for worldwide cargo to double by 2020, the Massachusetts Port Authority (Massport) has undertaken a number of projects to increase its handling capacity. In addition to a $15 million purchase in 2010 of two pre-owned low profile cranes and four RTG yard cranes, Massport has invested roughly $70 million in the following improvements to its container business:

- Expanding Conley Terminal's yard configuration by 50% and adding new machinery;
- Acquiring a 30-acre parcel of land adjacent to the terminal to allow for growth in container operations;
- Designing a dedicated truck route and buffer to Conley Terminal, and;
- Implementing an enhanced computerized terminal operating system.

5. South Carolina State Ports Authority

After initially signing an MOU with the ACP in 2003, the South Carolina Ports Authority renewed the MOU in July 2011 for an additional three years. At South Carolina's Port of Charleston, container business has now been consolidated to two terminals, while

the Columbus Street Terminal just completed a $22 million reconfiguration as the port's principal break bulk, roll-on/roll-off and project cargo-handling facility. In response to anticipated growth in demand for shipping, the Port Authority invested $1.3 billion in a 10-year plan for increasing the capacity of the Port of Charleston. The plan includes two major components:

- Construction of a new 280-acre container terminal that will increase port capacity by 50%. Construction of the 171-acre first phase is expected to be completed by 2018.
- Improvements to existing terminals by, among other projects, replacing the Ports Authority's ORION and Yard Management systems with a terminal operating system to increase automation and streamline gate processes.

The Port Authority is also watching the cruise ship sector and in April commissioned a new $2 million hydraulic passenger loading bridge at its existing cruise terminal. By late 2012 the Port Authority hopes to have a completely new passenger terminal in operation on Union Pier where some 30 acres of property will be developed to support the facility.

6. Virginia Port Authority

The Virginia Port Authority signed an MOU with the ACP in 2003 and renewed the MOU in 2008. As of 2010, the Port Authority had made the following improvements to the Port of Virginia:

- Completed building out of areas for increased handling capacity at the Norfolk International Terminal (NIT);
- Begun expansion of rail yards at NIT aimed to double rail capacity at NIT;
- Completion of a new rail shuttle carrier at the NIT;
- Obtained authorization to dredge the main channel leading to the NIT to 55 feet (from 50 feet) when needed;
- Completed design and obtained permits and federal support for construction at the Craney Island Marine Terminal;
- Completed Commonwealth Railway Mainline Safety Relocation project to reduce rail transit time and costs for rail cargo to the Midwest and beyond and
- Initiated electronic gate project intended to reduce congestion at truck gates.

7. Maryland Port Administration

In June 2011, the Maryland Port Administration (MPA) and the ACP renewed their original MOU signed in 2009 for an additional five years. To prepare for the opening of the Panama Canal expansion in 2014, the MPA has launched the following projects at the Port of Baltimore:

- Constructing an additional berth at the Seagirt Terminal with three super Post-Panamax cranes a berth depth of 50 feet, following the signing of a 50-year lease of the terminal to the Ports America Chesapeake in 2010; and
- Investing $21 million in crane updates at the Dunkalk Marine Terminal.

8. Philadelphia Regional Port Authority

The Philadelphia Regional Port Authority and the ACP signed an MOU in June 2009 and recently resigned an agreement in August 2011. Since 2009, the Philadelphia Regional Port Authority has initiated numerous projects to improve the capacity of its facilities at the Port of Philadelphia. Such projects already underway include:

- Adding two Post-Panamax Gantry Cranes to the Packer Avenue Marine Terminal;
- Increasing access to refrigerated outlets;
- Increasing the paper warehousing capacity to 200,000 square feet;
- Tripling the capacity of containers at the port;
- Providing an additional 2,500 feet of docking space; and
- Deepening the channel of the Delaware River from 40 to 45 feet

In addition to these projects already underway, the Port Authority intends to expand north and south of the Packer Avenue Marine Terminal. All projects combined will more than triple the Port of Philadelphia's total capacity of the container facilities.

9. Port Everglades

Port Everglades signed an MOU with the ACP in August 2009 and recently resigned an agreement in August 2011. The port has been undergoing significant capital improvements guided by the Port's Master/Vision Plan. The capital improvements are funded by port user fees, and state and federal grants, and include the following projects related to increasing cargo capacity:

- Replacement of an older gantry crane with a newer, more fuel efficient mobile harbor crane;
- Construction of the $11.5 million "Manatee Crossing," a bridge over a canal that allows trucks to pass from Midport to Southport of Port Everglades without having to leave and reenter restricted areas within the port;
- Evaluation of the feasibility of deepening the port harbor by the Army Corps of Engineers. The study should be completed by 2012, and the project, which would entail deepening the harbor to 50 feet (from its current depth of 42 feet), would begin in 2015 and be completed by 2017;
- Addition of a new 41-acre marine terminal at Southport for containerized cargo;
- Construction of the Ellen Lane Overpass, a four-lane bridge overpass on the primary entrance to Port Everglades that will facilitate access to and from the container and cruise terminals to major highways, and will allow for the construction of an at-grade rail spur to Southport;
- Construction of an Intermodal Container Transfer Facility in Southport which will connect, via rail spur, the port to the Florida East Coast Railway, and prevent the need for trucks to enter or exit the port for this purpose; and
- Expansion of the Southport Turning Notch on the port's main channel by 1,500 feet to increase berthing capacity in the port.

10. Port of Palm Beach

In December 2009, the Port of Palm Beach and the ACP signed an MOU. In anticipation of increased cargo with the completion of the Panama Canal expansion, plans are currently underway to build at least one, if not two inland ports, facilities that would move the sorting and processing of shipping containers inland.

- In 2009, the Port of Palm Beach selected Florida Crystals Corp. to partner in the creation of a western Palm Beach County Intermodal Logistics Center (ILC), to be located on 850 acres off U.S. 27, slightly north of South Bay. This would allow lines such as Tropical Shipping and others to carry containers from Freeport Bahamas daily into the port and then be sent to the ILC.
- The U.S. Army Corp of Engineers is preparing a feasibility study to dredge the inlet and turning basin to 38-42 feet.

In early August 2011, the Port of Palm Beach signed a second agreement to collaborate with the Treasure Coast Intermodal Campus' principals to help bring a second site, located 70 miles from the Palm Beach County center on 4,000 acres in southwestern St. Lucie County, to fruition. The realization of both inland ports may depend partially on the increases in cargo volume in the South Florida area in the coming years.

11. Jacksonville Port Authority

In April 2010, the Jacksonville Port Authority and the ACP launched a partnership with the signing of an MOU. Even prior to the MOU, the Jacksonville Port Authority has been taking measure to enhance its existing infrastructure and equipment. Such measures include the following projects at its three terminals:

- Installation of two new gantry container cranes;
- Refurbishment of the rail infrastructure at the Blount Island Marine Terminal;
- Investment in rehabilitation at the Blount Island and Talleyrand Marine Terminals; and
- Development of plans for the Hanjin Container Terminal, to be constructed on a 90-acre site adjacent to the 158-acre TraPac Container Terminal at Dames Point, completed in 2009 and having the capacity to handle roughly 1 million TEUs of cargo annually.

12. North Carolina Ports Authority

In December 2010, the North Carolina Ports Authority signed an MOU with the ACP. Currently 60% of the cargo arriving at the North Carolina Ports Authority's Wilmington port and 65% of cargo arriving at the Ports Authority's Morehead City port transits the Panama Canal. Because of the importance of the Panama Canal and North Carolina's expectation of increased business upon completion of the Panama Canal expansion, the Port Authority has been implementing capital improvements at both ports, including:

- Installing a new warehouse at the Port of Morehead City; and
- Continuing expansion of the container terminal at the Port of Wilmington by installing four Post-Panamax container cranes, new and powerful handling equipment, and a new terminal operating system.

13. Port of Houston Authority

In June 2011, the Port of Houston Authority and the ACP renewed their MOU for an additional three years. The MOU was originally signed by both parties in 2003. Containerized cargo going to Houston is expected to increase by 15% over the next few years, as a result of the Panama Canal expansion. In response, the Port of Houston Authority continues to enhance its port by way of the following projects, among others:

- Constructing the $1.4 billion Bayport Container and Cruise Terminal to relieve pressure on the capacity of the Barbours Cut Terminal. In conjunction with the terminal construction, the Port Authority is working with Harris County and the Texas Department of Transportation to provide future road improvements near the Bayport area.
- Improving the Barbours Cut Terminal to increase vessel productivity;
- Modernizing the Turning Basin Terminal;
- Deepening and widening the Houston Ship Channel to 45 feet and 530 feet, respectively, and using the dredged material to create roughly 4,250 acres of wetlands; and
- Completing Cargo Bay entrance road to the Turning Basin Terminal to exclusively handle truck traffic that would normally flow through the terminal's main gate.

14. Port of New Orleans

In conjunction with originally signing an MOU with the ACP in 2003, and renewing the MOU in August 2011, the Port of New Orleans has created a Master Plan to undertake both short term and long term projects to spur investment and increase trade at the port. The port will continue short term projects, with a cost of $574 million, through roughly 2012, while the port's long term projects, totaling $465 million, are expected to be completed by 2020. While the Port of New Orleans has plans for numerous projects, within the last ten years it has made the following investments in expanding its facilities:

- $400 million in modernizing facilities including wharves, terminals, marshaling yards, cranes and transportation infrastructure. The Port of New Orleans continues to work on a $250 million project to expand the capacity and efficiency of the Napoleon Avenue Container Terminal, the port's primary container terminal. The first stage of the project involves the following improvements:
  - Installation of two new container gantry cranes
  - Addition of five acres of marshaling area
- $108 million in ten ongoing or completed construction projects involving container yard improvements, a new dockside refrigerated warehouse and terminal, the refurbishment of the Julia Street Cruise Terminal, improvements to the port's break bulk facilities, and the construction of a new modern dredge. All of the projects are either expected to be started or completed by the end of FY2011.

15. Tampa Port Authority

Tampa Port Authority recently renewed (in July 2011) its MOU with the ACP for another five years, after originally signing the MOU in 2005 and renewing the MOU for a first time in 2008. The Tampa Port Authority is following many plans for investment

enhancing existing and creating new facilities, as outlined in its 2008 Strategic and Master Plans. The 2008 plan identifies short, medium and long term projects, to be undertaken from 2008-2012, 2013-2017 and 2018-2027, with an approximate investment of $304-395 million, $408-530 million and $635-825 million, respectively. According to the Master Plan, key recommendations and/or existing projects include:

- Deepening of the main Tampa Bay Navigational Channel to 47 feet, widening of Cut A and B in lower Tampa Bay from 500 feet to 600 feet, existing berths, and creating new berth(s);
- Investing in capital at Hooker's Point, including in dry bulk, liquid bulk, container and break bulk facilities, and in infrastructure;
- Investing in Big Bend/Port Redwing in dry and liquid bulk operations;
- Developing terminal and berth for new tenant, Cemex, at the East Port, where the Tampa Port Authority acquired 36 acres of property as of 2008, expanding East Port by filling new land and creating new port property via landfill;
- Improving transportation to benefit Port of Tampa truck access; and
- Making investments in environment and port security.

16. Manatee County Port Authority

After signing an initial MOU with the ACP in 2009, the two parties renewed their MOU in May 2011. Over the last two decades, the Port has continued to increase the capacity of its facilities by, among other projects, completing two new berths in 2008. Port Manatee's immediate plans for expansion include the following:

- Completing a 1,584 foot berth on the port's south side, dredged to a depth of 41 feet, and expected for completion in October 2011 (currently, the port offers one and a half miles of berthing for ships).
- Constructing a dedicated 52-acre container terminal adjacent to the expanded 1,584 foot berth.

According to the 2009 Port Manatee Master Plan, over roughly the next decade, the port intends to focus on the following:

- Attracting containerized shipping to the port and related support industries;
- Expanding berths and container terminals;
- Creating comprehensive environmental mitigation strategies; and
- Enhancing roads and railroads.

17. Alabama State Port Authority

In 2010, the Alabama State Port Authority signed an MOU with the ACP. The Alabama State Port Authority and its customers have already made harbor and terminal investments of $600 million in general cargo, bulk and containerized freight terminals at the lower harbor to handle larger vessels at the Port of Mobile. Investments included the following projects, among others:

- Construction of the new Pinto Island Terminal;
- Addition of new Post-Panamax gantry cranes;
- Implementation of new optic and computer technology; and
- Creation of a new lower harbor turning basin.

In 2010, the Alabama State Port Authority approved a new $360 million Capital Program for new key public investments at the Port of Mobile including:

- The construction of new interchange and intermodal rail yards;
- Improvements to the cargo yard and construction of a new warehouse;
- Improvements to a cargo terminal; and
- Securing of deep-water land to accommodate future public seaport expansions.

18. Port of Galveston

In October 2010, the Port of Galveston signed a MOU with the ACP. Recently the Port of Galveston has focused on the following expansion efforts:

- Completion of dredging its channel to a navigable depth of 45 feet;
- Continuation of expansion of its Roll-On-Roll-Off dock facilities; and
- Beginning of major capital improvements to piers 15 and 16, scheduled to be completed in 2011.

19. Tennessee - Tombigbee Waterway Development Authority

In August 2010, the Tennessee-Tombigbee Waterway Development Authority signed an MOU with the ACP to foster economic growth, promote the "All-Water Route," and to spur international trade. The Tennessee-Tombigbee Waterway is a 234-mile manmade shipping channel that connects the Tombigbee and Tennessee rivers and offers access to inland ports in Mississippi, Alabama, Tennessee, and Kentucky.

20. Mississippi State Port Authority at Gulfport

In August 2010, the Mississippi State Port Authority at Gulfport signed a MOU with the ACP. While the Port Authority will not increase port capacity in the short term to the extent that it can handle Post-Panamax size vessels, the Authority will be making some smaller scale yet significant improvements to the Port of Gulfport, to both reconstruct facilities damaged by Hurricane Katrina and to meet future shipping demands. The Port Authority is working with $570 million allocated to the following projects:

- Expanding the Port of Gulfport by 84 acres;
- Elevating a main pier; and
- Restoring thousands of square feet of storage space destroyed by Katrina as well as a berth that Katrina left inoperable.

The Port of Gulfport has commented that in the short term the Port may wish to capitalize on attracting smaller ships on a more frequent and consistent basis by dredging the port's channel to 42 feet, for example, (from its current depth of 36 feet), instead of dredging to a "dramatic" 50 feet.

21. Port of Long Beach

In December 2010, officials from the Port of Long Beach signed an MOU with the ACP. In order to increase port efficiency and reduce the port's environmental impact, the Port

of Long Beach is engaged in multiple capital improvement projects. Current projects at the port include the following:

- Contracting a firm to engineer and construct a replacement to the Gerald Desmond Bridge in the Port of Long Beach;
- Modernizing two ageing shipping terminals, including the addition of on-dock rail capacity and the shoring of power hookups to allow the new terminal to move twice the cargo with half the air pollution;
- Modernizing Pier G, a $980 million renovation project of the ITS container terminal;
- Dredging the Long Beach Harbor, a $40 million project to aid the navigation in and around the Port;
- Constructing a new terminal at the Port of Long Beach on existing vacant land in the port, in proposal stages; and
- Redeveloping an existing rail yard on Pier B and removing rail bottlenecks in the port, in proposal stages.

22. Corpus Christi

In September 2011, Port Corpus Christi signed an MOU with the ACP. Recently the Port of Corpus Christi has focused on the following expansion efforts:

- Extending La Quinta Ship Channel approximately 1.4 miles at 41 feet mean low tide (MLT).
- La Quinta Trade Gateway Terminal (Project) is a major component of the Port of Corpus Christi Authority's long-term development plan. Located on a 1,100-acre greenfield site on the north side of Corpus Christi Bay, when completed, this fully permitted project will provide a state-of-the-art multi-purpose dock and container facility. Project features consist of the Federal extension of the 45 feet deep La Quinta Ship Channel, construction of a 3,800 feet long, three berth ship dock with nine ship-to-shore cranes, 180 acres of container/cargo storage yard, an intermodal rail yard, and over 400 acres for on-site distribution and warehouse centers. The facility will have the capacity to handle approximately 1 million TEUs annually. The project is sited adjacent to U.S. 181/IH 37 and is currently served by three Class I railroads (BNSF, KCS, and UP).
- Port Commissioners approved a long term lease to long time port tenant Martin Midstream Partners L.P. for the construction of a new terminal at the Port. The terminal will receive crude oil from the Eagle Ford Shale via the recently announced Harvest Gardendale Pipeline. The newly leased property is located adjacent to the Martin Midstream Partners L.P. existing terminal. Martin Midstream Partners L.P. will construct over 300,000 barrels of crude oil storage at the new facility. It will have the ability to expand the capacity of the terminal by an additional 600,000 barrels.

23. Freeport

In September 2011, Port Freeport of Texas signed an MOU with the ACP.

- Port Freeport's new Velasco Terminal, an 800,000 TEU and multipurpose facility is scheduled to open in the fall of 2012.

- Future expansion includes building a 1,300-acre multi-modal facility, two multi-purpose 1,200-foot berths on 50 feet of water and two dockside 120,000 square-foot transit sheds.

D. Asian Ports that Receive Grains, Soybeans and Products

Many ports throughout Japan, Taiwan and China benefit from natural deep water harbors. Other ports, meanwhile, have recently taken measures to expand port infrastructure and navigational channels to accommodate larger vessel sizes, such as the Post-Panamax class and larger. The following provides an illustration (Figure 28) and discussion of the ports in Japan, Taiwan and China that handle the largest volume of grains, soybeans, and soybean meal imports.

This section reviews the top importing ports receiving imported grains and soybeans. The review includes the top 10 ports in China, Japan and 3 ports for Taiwan. Each country is important to current and future grain, soybean production from the U.S. The profile of the ports includes the volume of agriculture imports, the grain elevators, and berth information, and other similar information that is available. This is especially important because the draft of the Panama Canal will accommodate vessels to 50 feet or 15.2 meters, while on the lower Mississippi River vessel can be accommodated to 45 feet or 13.7 meters. The current and expected depths at grain terminals for China, Japan and Taiwan are shown in Table 28.

Japanese grain terminals for the most part are unable to handle bulk ships loaded beyond 42 feet depth, but five grain terminals have indicated they will deepen berth draft and improve unload and stow capabilities to accommodate larger, deeper draft vessels using the expanded Panama Canal. Japan's major focus at this time is recovering from the devastating earthquake in March 2011. Prior to the earthquake, the port of Nagoya had started to deepen ship channels to 16 meters (52.5 feet) towards their main container terminal. The process is still ongoing.

In recent interviews, Japanese companies indicated plans to invest heavily in Vietnamese port expansions.

Smaller Asian countries do not need to add capacity. Many of these countries depend on larger ports for redistribution. By contrast, China is in the middle of a building boom. China already has five large-scale ports (Shanghai, Ningbo, Xiamen, Yantian, and Hong Kong), able to accommodate the largest-ever Triple-E class AP Moller-Maersk AS container vessels currently being constructed in South Korea. Meanwhile, China has been creating ports in locations where ports previously did not exist, in addition to expanding existing port infrastructure to increase throughput capacity and accommodate larger vessels. Without the same regulatory hurdles as the U.S., China can deepen their ports within two years.

Figure 28: Top Grain and Soybean-Importing Ports in China, Japan and Taiwan

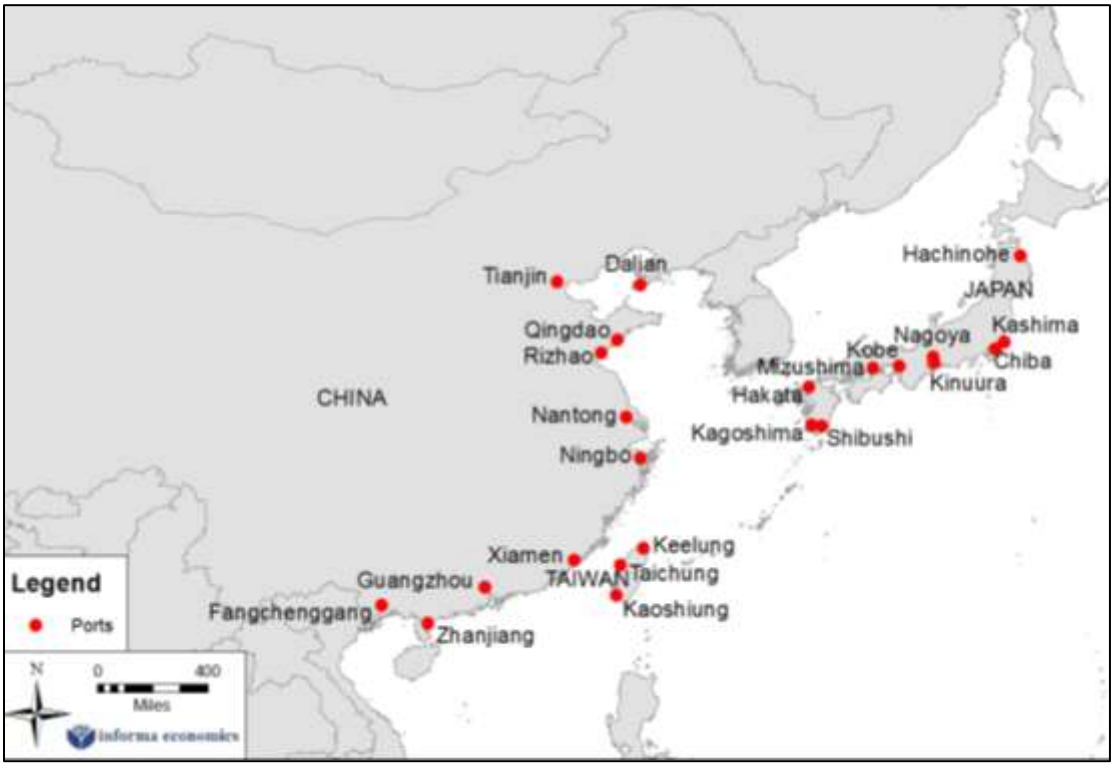


Table 28: Channel Depths of Top Grain and Soybean Importing Ports in China, Japan and Taiwan

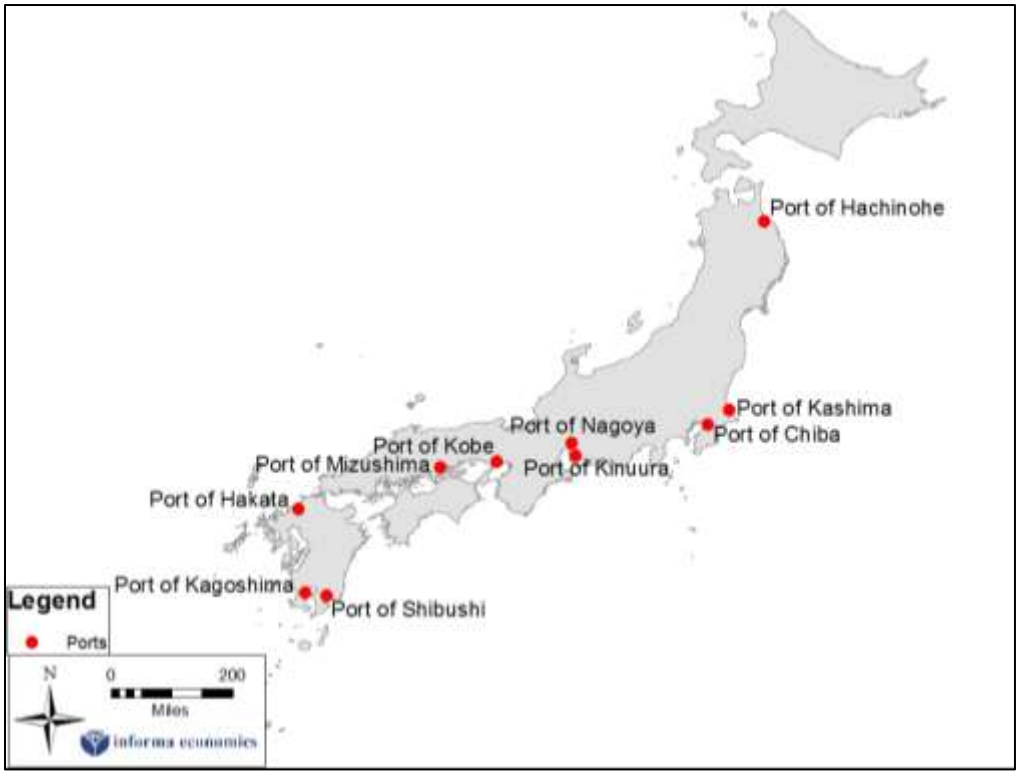
Port	Grain Terminal(s)	Current Channel/Berth Depth (meters)	Planned Depth (meters)
Japan			
Kashima	Kanto Grain Terminal Zen-Noh Silo Wharf Showa Sangyo Wharf	10-20	N/A*
Shibushi	Zen-Noh Silo Wharf Shibushi Silo Wharf	12	N/A
Nagoya	Inaei Pier Rinoru Yushi Pier Nisshin Seifun Pier Chita Futo Pier Zen-Noh Silo Pier Toyo Grain Terminal Pier	12-16	Plans to dredge, but no details available.
Chiba	Kyodo Silo Nihon Silo	N/A	N/A
Kobe	Zen-Noh Silo Dolphin Tomen Silo Dolphin Showa Sangyo Dolphin Hanshin Silo Dolphin Kohnan Futo Dolphin	14	N/A
Kinuura	NA	15-24	N/A
Hachinoe	Tohoku Grain Terminal	13	N/A
Kagoshima	Honkouku Kitafuto Wharf No. 1 Shinkou Wharves No. 5,6,8 Taniyama Wharves No. 1,2,3,5	9-12	NA
Mizushima	Seto Futo Co.	10-14	14 (for all)
Hakata	NA	13-15	N/A
China			
Qingdao	NA	13-14	N/A
Dalian	Dagang Berths No. 1, 8, 9, 27, 30 Xianglujiao Berths No. 2, 5, 6 Dayaowan Berths No. 1, 2	8.5-10	N/A
Tianjin	Detailed information unavailable, but deep water port with plans for expansion.		
Guangzhou	Huangpu New Terminal Berth No. 1 Xinsha Berth No. 6	8-15	17
Xiamen	Dongdu Berth No. 2	8-12	N/A
Ningbo	NA	N/A	N/A
Rizhao	NA	11-18	N/A
Nantong	Grain Bureau Berths (2)	9.7 (draft lim.)	N/A
Zhanjiang	NA	N/A	N/A
Fanchenggang	Fangcheng Berth No. 11	9.5	N/A
Taiwan			
Kaohshiung	Berths No. 71, 72	N/A	14
Taichung	Berths No. 1, 3	13	N/A
Keelung	NA	15.5	N/A

Source: Port websites, Informa Economics, Lloyd's List Intelligence

1. Leading Bulk Agricultural Handling Ports of Japan

In 2010, Japan's grains and soybean imports totaled 29.2 million metric tons. Specifically of the grains and soybeans, grains accounted for 88% (25.6 million MT) of total imports and soybeans 12% (3.4 million MT). According to Japanese import data by port, Japan's top ports receiving grains in 2010 (in descending order of import quantity) were: Kashima (3.8 million MT), Shibushi (2.2 million MT), Nagoya (2.5 million MT), Chiba (1.9 million MT), Kobe (2.2 million MT), Kinuura (1.4 million MT), Hachinohe (1.2 million MT), Kagoshima (1.2 million MT), Mizushima (1.4 million MT) and Hakata (1.3 million MT) as shown in Table 29. In all ten port areas, grains accounted for a larger portion of imports relative to soybeans.

Figure 29: Japan's Top Ten Grain Importing Ports



The Port of Yokohama imports the most soybeans of all Japanese ports with nearly 689 thousand metric tons in 2010 but minimal grain imports (611 thousand metric tons) relative to the top grain importing ports of Japan.

In 2010, 73% of the grains that were imported into Japan originated from the U.S. followed by Australia with 9% and Argentina with 6%. Soybeans followed a similar path to Japan as the U.S. accounted for 74% in 2010 followed by Brazil with 14% and Canada with 10%.

Table 29: Japan's Top Grain and Soybean Importing Ports (metric tons)

Port	2007	2008	2009	2010	2010 Grains	2010 Soybeans
Kashima	4,153,815	3,789,680	3,868,851	3,803,145	3,439,025	364,120
Shibushi	2,031,787	1,961,622	2,199,662	2,210,829	2,206,686	4,143
Nagoya	2,610,527	2,647,228	2,481,182	2,494,941	2,137,469	357,472
Chiba	1,678,124	1,784,727	1,559,647	1,890,632	1,562,490	328,142
Kobe	2,244,277	2,337,506	2,023,496	2,218,867	1,535,522	683,345
Kinuura	1,482,825	1,426,657	1,365,706	1,384,304	1,384,304	#N/A
Hachinohe	1,062,745	1,060,277	1,155,837	1,187,487	1,179,354	8,133
Kagoshima	1,261,940	1,249,872	1,217,881	1,185,134	1,176,086	9,048
Mizushima	1,574,965	1,475,508	1,512,307	1,434,831	1,145,453	289,378
Hakata	1,287,503	1,326,692	1,175,480	1,297,645	1,088,117	209,528
Sub Total	**19,388,508**	**19,059,769**	**18,560,049**	**19,107,815**	**16,854,506**	**2,253,309**
Other	10,758,174	10,269,916	10,315,204	10,106,231	8,733,499	1,196,144
Total	**30,146,682**	**29,329,685**	**28,875,253**	**29,214,046**	**25,588,005**	**3,449,453**

Source: Global Trade Atlas

Notes: Ports are sorted by 2010 grains. Data for 2007 - 2010 include grains and soybeans except for the Port of Kinuura.

Descriptions and future expansion efforts of the top Japanese grain importing ports are shown in the Appendix. Information was gathered from port websites, Lloyd's List Intelligence worldportsource.com and portworld.com.

2. Leading Agricultural Bulk Handling Ports of China

In 2010, China's grain and soybean imports totaled 60.5 million MT, and nearly all imports (60.3 million MT) arrived by sea as shown in Table 30. Specifically, grains accounted for 9.2% (5.5 million MT) of total grain and soybean imports by sea and soybeans accounted for the majority, or 90.8% (54.8 million MT) of the total. According to Chinese import data by customs district (where a district may include multiple ports), China's top districts to receive grains and soybeans in 2010 in descending order of import quantity were: Qingdao (12.9 million MT), Nanjing (9.0 million MT), Dalian (5.5 million MT), Huangpu (5.3 million MT), Tianjin (5.1 million MT), Nanning (4.7 million MT), Hangzhou (2.9 million MT), Shenzhen (2.5 million MT), Xiamen (2.1 million MT) and Ningbo (1.7 million MT). In all ten districts, with the exception of Shenzhen, soybeans accounted for a larger portion of imports relative to grains.

Table 30: China's Top Grain and Soybean Importing Customs Districts (metric tons)

Ports	2007	2008	2009	2010	2010 Grains	2010 Soybeans
Qingdao	6,195,343	8,523,305	8,760,753	12,881,147	753,691	12,127,456
Nanjing	6,431,376	6,863,546	7,372,080	8,973,781	658,299	8,315,482
Dalian	1,329,511	2,330,297	3,293,594	5,530,994	396,465	5,134,529
Huangpu	3,373,637	3,286,672	3,648,849	5,343,083	1,180,986	4,162,097
Tianjin	1,396,111	2,838,255	3,661,450	5,139,251	63,189	5,076,062
Nanning	2,549,210	2,835,434	4,310,318	4,704,415	16,064	4,688,351
Hangzhou	1,306,321	1,965,417	1,854,185	2,870,462	57,750	2,812,712
Shenzhen	1,394,441	1,487,944	2,765,326	2,513,108	1,423,188	1,089,920
Xiamen	1,480,965	1,766,799	2,017,915	2,104,271	25,453	2,078,818
Ningbo	1,427,238	1,433,039	1,652,487	1,719,554	320,242	1,399,312
Subtotal	**26,884,153**	**33,330,708**	**39,336,957**	**51,780,066**	**4,895,327**	**46,884,739**
Other	5,373,319	5,516,316	6,206,606	8,528,020	637,388	7,890,632
Total	**32,257,472**	**38,847,024**	**45,543,563**	**60,308,086**	**5,532,715**	**54,775,371**

Source: Global Trade Atlas
Note: Grains include wheat, rye, barley, oats, corn, rice, sorghum, buckwheat, millet, canary seed and other cereals.

China's largest soybean meal imports arrived in the same primary districts as the country's grain and soybean imports (Table 31). In 2010, soybean meal imports totaled 189,946 MT, with soybean meal shipments accounting for 189,916 MT of the total. The majority of sea imports, or 50.3%, arrived at Huangpu customs district, in Guangdong province. Qingdao customs district received 38.8% of sea imports, while Shanghai received 7.4% of China's soybean meal imports in 2010. In this same year, 95.4% of total soybean imports (all modes) were from India, followed by Denmark (1.9%), Taiwan (1.6%), and the U.S. (1.0%).

Table 31: China's Top Soybean Meal Importing Districts, by Sea (metric tons)

	2005	2006	2007	2008	2009	2010
Huangpu	154,988	262,065	41,070	69,964	59,827	95,575
Qingdao	15	122,281	26,881	65,946	57,117	73,757
Shanghai	29,155	160,242	24,453	25,084	4,894	14,118
Gongbei	0	0	717	1,258	798	2,586
Ningbo	3,406	4,575	208	278	0	1,042
Xiamen	0	880	1,668	1,302	309	969
Shenzhen	0	55,904	951	19,116	4,319	929
Guangzhou	27	0	0	280	779	760
Tianjin	3,001	5,308	4,829	28,585	3,570	100
Fuzhou	0	0	0	100	120	80
Subtotal	**190,592**	**611,255**	**100,777**	**211,913**	**131,733**	**189,916**
Other	12,902	62,224	4,137	8,611	5,590	30
Total	**203,494**	**673,479**	**104,914**	**220,524**	**137,323**	**189,946**

China's largest grain and soybean importing ports (not by aggregate customs district) include Qingdao, Dalian, Tianjin, Huangpu, Xiamen, Ningbo, and additionally Rizhao, Nantong, Zhanjiang and Fangchenggang (Figure 30).

Figure 30: China's Top Ten Grain, Soybean and Soybean Meal Importing Ports

Each of China's top grain, soybean and products importing ports are described in detail in the Appendix.

3. Grain and Soybean Handling Ports of Taiwan

Taiwan's three primary grain and soybean importing ports include Kaohshiung, Taichung and Keelung as shown in Figure 31.

Figure 31: Taiwan's Grain, Soybean and Soybean Meal Importing Ports

In 2010, bulk and container shipments of grain and soybeans to the three ports totaled 8.4 million MT as shown in Table 32. Soybean shipments totaled 2.5 million MT (29.5%), while grains shipments accounted for 70.5%, or 5.9 million MT of the total.

Table 32: Taiwan Grain and Soybean Imports in 2010, Bulk and Container (metric tons)

	Total Grains & Soybeans	Grains	Soybeans
Kaohsiung	4,809,072	3,288,479	1,520,593
Taichung	3,437,171	2,490,906	946,265
Keelung (no bulk)	141,198	133,391	7,807
Subtotal	8,387,441	5,912,776	2,474,665
Total	8,387,441	5,912,776	2,474,665

Source: Global Trade Atlas
Note: Grains include wheat, rye, barley, oats, corn, rice, sorghum and buckwheat, millet, canary seed and other cereals.

In 2010, the majority of Taiwan's total grain imports (all modes) came from the U.S. (64.0%), followed by Brazil (18.8%), Argentina (8.0%) and Australia (6.0%). Soybean imports to China in 2010 also came primarily from the U.S. (60.4%), followed by Brazil (34.4%) and Argentina (4.8%).

Taiwan's soybean meal imports generally arrive at the same ports as grain and soybean imports, and totaled 45,970 MT in 2010 (Table 33). The large majority of Taiwan's soybean meal imports in 2010 were from India (91.6%), followed by the U.S. (6.7%).

Table 33: Taiwan's Top Soybean Meal Importing Ports in 2010, Bulk and Container (metric tons)

	2005	2006	2007	2008	2009	2010
Kaohsiung	57,802	50,431	31,592	57,150	19,730	28,298
Taichung	40,777	31,157	16,661	38,700	9,089	15,816
Keelung (no bulk)	765	1,198	675	1,118	3,707	1,856
Subtotal	99,344	82,786	48,928	96,968	32,526	45,970
Taiwan Total	99,344	82,786	48,928	96,968	32,526	45,970

Source: Global Trade Atlas

The profiles of Taiwan's top three grain ports are shown in the Appendix.

E. Other Foreign Ports with MOUs, and other Expansion Efforts

Select Caribbean ports and Antwerp Belgium have signed MOUs with the ACP. Caribbean ports envision the possibility of becoming the center of a spoke and hub system that would service the U.S. market.

1. Port Authority of Jamaica

The port authority is working to upgrade their facilities to capitalize on the Panama Canal expansion; however, they have not signed an MOU with ACP as of October 2011. Expansion efforts include:

- Dredge the Kingston Container Terminal (KCT) basin and ship channel to accommodate the drafts of the largest vessels that will transit the Panama Canal. The draft will exceed 49 feet. The goal is for KCT to be a hub for draft restricted ports of the U.S. (See "Container Transloading Hub Potential" in Exhibit 1)
- Increase the stacking area at the West Berth to 3.2 million TEUs from 2.8 million. This will include paving the West Berth and other areas of the port as well as the installation of additional reefer plugs. An additional 28.8 hectares will be added to the West Terminal Yard.
- Rehabilitate equipment and infrastructure and replace operationally inefficient equipment. New gantry cranes will be added to the terminals.
- Improve the navigational equipment stock, including the acquisition of a more powerful tug.
- Undertake land reclamation in preparation for future port expansion at Fort Augusta, an additional terminal yard space of 70 hectares. The construction of the container terminal will increase capacity by 2 million TEUs, taking the total capacity to 5.2 million.

Exhibit 1: Container Trans-Loading Hub Potential

The Port Authority of Jamaica is a statutory corporation established by the Port Authority Act of 1972. It is the principal maritime agency responsible for the regulation and development of Jamaica's port and shipping industry. The Port Authority is developing a Commercial Free Zone/distribution Hub for the Americas, which involves manufacturing, warehousing, display, sale and distribution of products to identify and target buyers. Products will be moved from the Terminal to the Zone for stripping, repackaging and consolidating, and then forwarded to end users, duty free.

The Port Authority plan to upgrade the infrastructure and equipment at the Kingston Logistics Centre Ltd. is to capitalize on its strategic position in the containerized cargo market. When completed, the Canal will accommodate vessels with a maximum capacity of 12,600 TEUs with a maximum draft of 15.2 meters, a maximum ship length of 366 meters and beam of 48.8 meters. The capital works will increase capacity to 3.2 million TEUs. Land reclamation in preparation for future port expansion at Fort Augusta will increase capacity by an additional 2 million TEUs or a total capacity to 5.2 million TEUs. The projects will improve KCT's competitive advantage and enable the port to serve as a transshipment hub for draft restricted ports on the U.S. East and Gulf Coasts. The plan is already drawing interest. For example, a French ocean carrier (CMA CGM), the world's third-largest carrier, will invest $100 million by 2014, when a larger set of locks at the Panama Canal is schedule to be completed in exchange for a 35 year lease at the Kingston Container Terminal. The terminal will transship containers from large Post-Panamax containerships onto smaller ships that can call at ports on the East Coast of both North and South America.

2. Curacao Ports Authority, Netherland Antilles

Curacao Ports Authority signed an MOU with the ACP in February 2009 to jointly foster commercial activities between the two organizations. There has been no mention of port expansion efforts as a result of the Panama Canal expansion. The ports of Curacao include:

- Port of Willemstad;
- Bullen Bay;
- Caracas Bay;
- St. Michiel's Bay; and
- Fuik Bay.

3. Autoridad Portuaria Bahia De Algeciras, Spain

Algeciras Bay Port Authority signed an MOU with the ACP in October 2010 to establish a strategic alliance among the two organizations. The following port development projects are taking place:

- The Outer Isla Verde project is the most significant civil works project ever undertaken by the Port of Algeciras Bay. Execution has been divided into three phases and, upon completion, the project will provide leveled surface areas of 121 hectares, a quay line of 2,754 linear meters with 16.5 to 18.5 meter drafts, and a 2,060 meter vertical breakwater of reinforced concrete caissons anchored at a depth of 32.5 meters.
- The new container terminal at the Port of Algeciras was awarded to TTI Algeciras (a sister company of the South Korean Hanjin Shipping Co. Ltd) in 2008 making it the first Asian company to invest in the West Mediterranean. It commenced operations as a public terminal in 2010. In Phase A, a 35 hectare surface, TTI Algeciras runs two quays of 550 and 650 meters.
- Isla Verde Exterior is also set to house the new terminal for fuel and liquid bulk storage and supply from Vopak Terminal and a new ro-ro terminal.
- The global project to develop the Campamento facility, on the Northern seaboard of the Bay of Algeciras, has been divided into three phases.
    - Completion of the works will provide the Port with 71 new hectares of useable surface area, as well as quays with drafts of between 15.5 and 17.5 meters.
    - The first phase has already been completed, creating 48 hectares of leveled area. At the same time, this phase has generated three quays with 215 meter (draft of 15.5 meters), 360 meter (draft of 15.0 meters) and 285 meter (draft of 12.0 meters) berth lines.
    - Phase 2-A will provide an extra 12 hectares of leveled area, giving a total of 60 hectares for the Campamento facility, along with the construction of an outer quay with a 260 meter (draft of 17.5 meters) berth line as the beginnings of what will be the future Outer Quay. Phase 2-A is currently under way.

- Phase 2-B works include the completion of the Outer Quay and the construction of a breakwater if throughput should warrant such infrastructure.
- The Campamento project is set to conclude with the generation of 14 new hectares to add to the 60 existing ones, with a new berth line of 600 linear meters at drafts of 15.5 to 17.5 meters.

4. Port of Antwerp, Belgium

The Port of Antwerp signed an MOU with the ACP in September 2010 to share information on handling techniques of larger ships that will be unique to the port and due to the Panama Canal expansion. The Panama Canal Authority is interested in understanding the Port of Antwerp's experience in Post-Panamax lock systems with rolling lock doors that will be applied in Panama as well as ships using tugs.

The following port development projects are underway:

- Priority projects that have been made possible include the second access to the Waasland port, completion of the Verrebroek dock, development of the Waasland Logistics Park and the Hoevenen Logistics Park, and a substantial increase in the container handling capacity.
- The Structural Land Use Plan for the Flanders area provides for development of two multimodal logistics zones in the Antwerp port area, namely the Waasland Logistics Park on the left bank and the Schijns Logistic Park on the right bank.
- In the first phase of the Waasland Logistics Park include an area of around 50 hectares being developed. Further development will go ahead once the boundaries of the Waasland Logistics Park have been defined in relation to the Regional Land Use Plan and the environmental impact assessment has been carried out. Like the other port infrastructure projects, these projects will be accompanied by the development of new or replacement nature conservation projects.
- Under the terms of the agreements made in the strategic planning consultation process for the right bank, Schijns Logistic Park will be served by rail (Main Hub) and by road (A12 highway). The plans also include creation of 5% ecological infrastructure.

VI. U.S. Transportation Infrastructure

This section reviews the U.S. infrastructure system supporting agricultural movements with emphasis to export position. The segments discussed include infrastructure funding, grain elevators, barge freight, rail transport, truck, ocean, dredge containerization, labor at export elevators and vessel unloading. These are key factors used to develop the exports by port in Section IV Baseline Economic and Crop Export Outlook, Grain, Exports by Port and Soybean.

A. Public Funding for Public Infrastructure

The transportation system for the U.S. is funded and managed through the Congress. While largely the system is supported and structured by mode, the actual federal agencies that are involved cut across numerous, wide-ranging constituencies, from the Departments of Transportation, Defense, Homeland Security, Commerce, Labor, and agencies including most notably, the Environmental Protection Agency. The legislation that authorizes funding for highways is known broadly as the Transportation Bill. In recent years with increasing intermodal operations in the marketplace, some rail freight transportation funding has been included in the highway bill. The waterways system is funded under the Water Resources Development Act (WRDA).

The U.S. Government Accountability Office (GAO) in a study released in early 2011 determined that for the U.S. Department of Transportation (DOT) and rail project sponsors, the Secretary of Transportation, should, in consultation with Congress and other stakeholders, encourage effective decision making and enhance the usefulness of assessments of benefits and costs. While recent focus has been placed on high speed intercity passenger rail, an assessment recognized the need for freight rail projects. The GAO in seeking to encourage consistency in future funding grants advises that a standard methodology on developing benefit and cost information for rail projects should be established. Furthermore, more direct and consistent requirements for assessing benefits and costs across transportation funding programs should be a basis for the DOT funding awards supporting rail. That more formal structure will:

(1) Direct applicants to follow federal outlines in developing benefit and cost information for consistency in arriving at metrics for funding rail projects.

(2) Require applicants to clearly communicate their methodology for calculating project benefits and costs including information on assumptions underlying calculations, strengths and limitations of data used, and the level of uncertainty in estimates of project benefits and costs.

(3) Ensure that applicants receive clear and consistent guidance on values to assert for the assumptions upon which a project is being predicated to estimate potential benefits and costs of the infrastructure or operational investments.

The rise and advanced development of public private partnerships (PPPs) during the past decade in transportation infrastructure set the stage for creative finance of public assets. In what had traditionally been a largely public process for public assets such as

tollways, ports, bridges and former military instillations have been converted to either airports or intermodal rail terminals. These can be models for other structured finance arrangements for long lived assets, with a public enterprise establishing investment by private funding, with an underlying lease of the assets. The debt in such cases is serviced over time by means of user fees. In some cases dedicated funding sources are established, while in other cases there is an asset transfer for less than a market rate, say for land, which may include existing improvements, and in other cases account for the unimproved land value. Examples include March Field in Riverside, California which transitioned from being home to an U.S. Air Reserve Unit but became a cargo airport; Joliet Arsenal, an army munitions depot which was developed by CenterPoint Properties as a rail intermodal facility, the Indiana Tollway, a state tolled roadway which was leased by an international consortium through a governor's formal request for proposal process; the Chicago Skyway Bridge a tolled bridge leading from Indiana into the South side of Chicago, which was also leased under a long term finance structure through an international investment bank. Such examples prompt visions of a waterway lock or whole portions of the lock and dam system to be financed, leased and revenues committed under a PPP, to facilitate design, build, transfer and operations to accelerate what would in a purely public process otherwise require substantial public comment and decision-making periods, delaying the projects and adding to the costs.

B. Elevators and Capacity

This section evaluates the commercial elevators, which is the first step for grain and soybeans leaving the farm towards the end user. The elevator situation often determines how quickly grain and soybeans come to market. Additionally, export elevators are a bottleneck during peak export periods. Changes in elevator capacity directly impact grain and soybean flows. This section also includes discussion of recent trends and developments.

1. Domestic

The off-farm capacity shown in Table 34 does not include approximately 2 billion bushels of warehouse and satellite elevators that are used seasonally. Grain elevator capacity is largest in areas where production density is the greatest. Iowa and Illinois comprise the Upper Mississippi grain flow region. This region has the largest amount of static commercial grain elevator capacity with 2.08 billion bushels followed by the Central Plains with 1.69 billion. Texas and Oklahoma have the highest capacity per facility with over 1.7 million bushels per facility followed by Central Plains with 1.6 million as shown in Table 34. These two grain flow regions have high concentrations of wheat production.

Table 34: Commercial Grain Elevator Capacity by Grain Flow Region

Grain Flow Region	Number of Elevators	Total Capacity (Million BU)	Capacity per Elevator (Million BU)
Upper Mississippi	1,419	2,088	1.5
Central Plains	1,076	1,692	1.6
Northern Plains	1,298	1,557	1.2
OH, IN, MI and KY	903	1,006	1.1
Texas and Oklahoma	461	765	1.7
Lower Mississippi	548	733	1.3
Southeast	279	280	1.0
Pacific Northwest	178	224	1.3
Mid Atlantic	144	138	1.0
Southwest	65	77	1.2
North Atlantic	64	68	1.1
Total	6,435	8,629	1.3

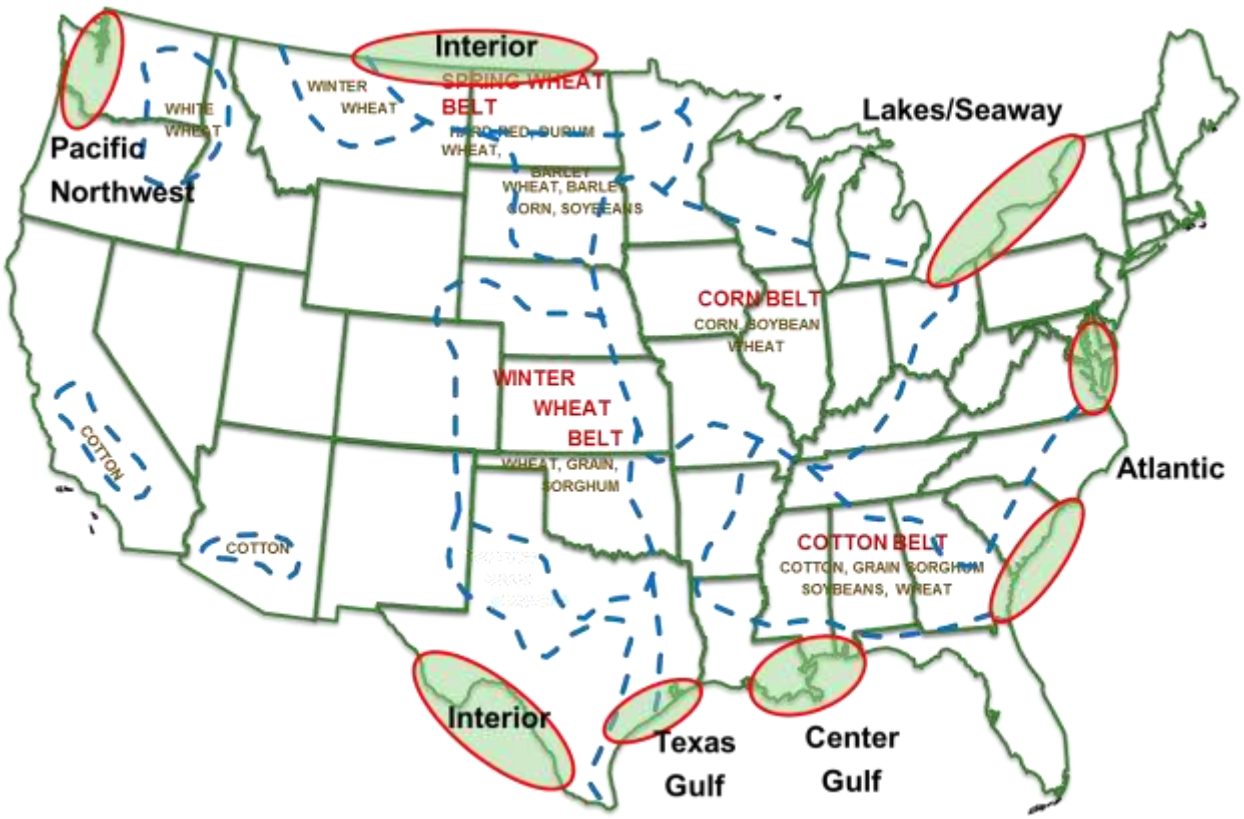
Source: Grain Journal and Informa Economics

2. Export

Export elevators are described by port range in this section. The profiles include the name, location, age, type of facility, storage capacity, rated throughput capabilities, drafts at berth and shipping channel, and co-loading operations. Dockage rates are compared between Center Gulf, Texas Gulf and PNW.

Interviews with elevator managers were used to compile profile data. Not all facilities were willing to participate in the interviews. Missing data was collected from USDA and Informa's on-going work. The port ranges include the Lakes, Atlantic Coast, Center Gulf, Texas Gulf, PNW and Interior (cross border into Mexico and Canada, and container) as depicted in Figure 32.

Figure 32: Grain Export Port Ranges and Key Grain Production Areas



3. Profile of Export Elevators by Port Range

The footprint of export elevators has not changed considerably in more than two decades, with the exception of facilities being removed from service such as on the Atlantic Coast in Baltimore, MD and Charleston, SC, and some on the West Coast. In the most recent couple of years a renaissance of investment has emerged with a new elevator being built in Longview, WA; expansion efforts in Grays Harbor, Kalama and Vancouver, WA; and Portland, OR. Another new facility will start construction in Lake Charles, LA with on-going discussions at other locations. In total, once the two new facilities are opened, there will be 64 elevators and mid-stream export operations serving U.S. grain, soybean and product exports.

The shipping draft on the lower Mississippi River has enabled operations to 45 feet. However, it has varied recently to 42 feet through the Southwest Passage at the mouth of the river. The shipping draft on the Mississippi River requires constant monitoring as seasonal changes in siltation loads from flooding and consequent deposits, shoaling and sand bars can arise. Those natural processes prompt the need for maintenance dredging to attain and achieve appropriate operational drafts. In recent reviews, the shipping drafts had been reduced due to excessive sediments building up and limitations on the allocated resources of the U.S. Army Corps of Engineers, limiting their

ability to impact drafts. The draft at terminals along the river varies as a consequence, resulting in a range of vessel capacity capabilities.

The average age of export facilities in the U.S. is 50 years. Elevators in the Atlantic North average 76 years, while elevators located in the PNW are the youngest, averaging 23 years. A general timeline of when the current elevators became operational is shown in Figure 33.

Elevators located on the Puget Sound in the PNW have the deepest terminal drafts of all the port ranges. As such the Puget Sound elevators can load more grain on a vessel. However, the draft on the Columbia River has been dredged to 43 feet.

The average terminal draft in the Great Lakes is 30 feet and the channel draft is 32 feet as shown in Table 35. The channel and terminal drafts near Maumee, OH are 27 feet.

Even though the Great Lakes elevators have shallower terminal and channel drafts compared to the other port ranges, they have the most storage capacity. Most of the export facilities around the Great Lakes store grain and export smaller volumes compared to the Center Gulf, Texas Gulf and PNW. The totals for the Great Lakes include Canadian facilities located along the St. Lawrence Seaway. These Canadian facilities include seven facilities accounting for 59.2 million bushels of storage capacity.

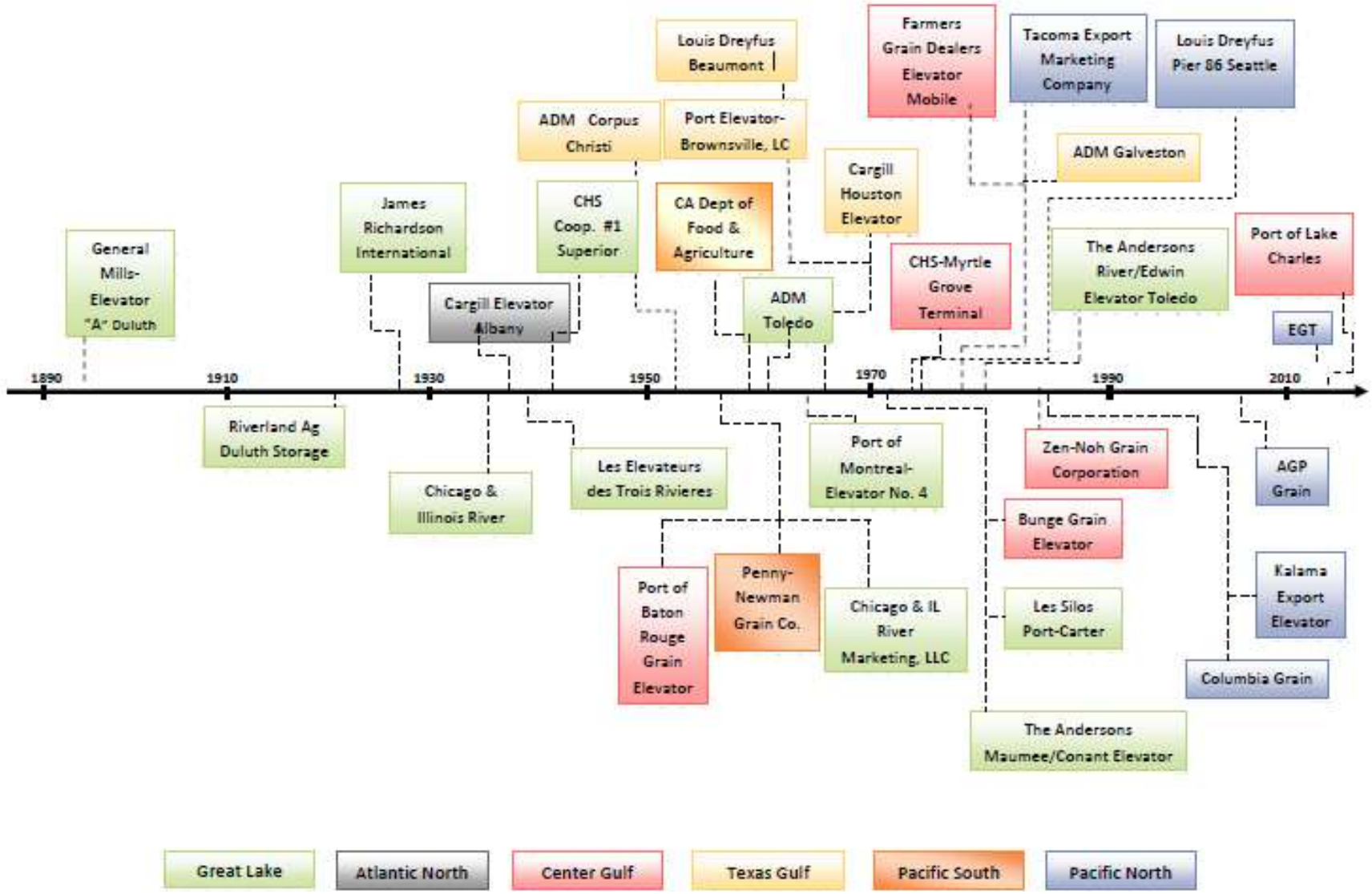
Table 35: Profile of an Average Export Elevator by Port Range

Port Range	Number of Elevators	Most Recent Year Opened	Terminal Draft (Feet)	Channel Draft (Feet)	Storage Capacity (million bu)	Loading Capacity (bushels per hour)
Atlantic North	3	1935	37	31	23.3	52,500
Atlantic South	2	N/A	38	42	5.9	35,000
Center Gulf	17	1982	45	45	54.5	71,000
Great Lakes	22	1976	30	32	174.6	81,171
Pacific Northwest	11	2011	52	43	39.3	72,000
Pacific South	2	1960	35	30	7.8	30,600
Texas Gulf	7	1976	40	43	34.1	93,571
Total	64		39	38	339.4	62,263

Source: Blue Water Shipping, Elevator Managers and Informa Economics

Note: Pacific Northwest does not include the capacity of the EGT facility, and the draft is representative of the Columbia River. In the Atlantic North, only Cargill in Albany, NY was willing to give the year their facility was built (1935). The number of elevators in the Center Gulf includes mid-stream operations.

Figure 33: Timeline of Operating and Under Construction Export Facilities



4. Profile of Announced Export Elevator Construction and Expansion

This section summarizes recent export elevator activity, new corn situation and expansion.

1. Longview, WA: EGT– This greenfield facility is owned by Bunge, ITOCHU and STX Pan Ocean. It is expected to be operating in the fall of 2011. The EGT terminal and the AGP terminal in Aberdeen, WA represent the first expansion of grain export capacity over the past two decades. EGT is expected to handle multiple grains and products with soybeans being the primary exported product with its principal destination being China. This state of the art facility will have the track capacity to handle four unit trains of 100 - 110 railcars each, per day. It is reported the facility will handle more than 6 million metric tons of annual throughput.
    a. Steelby, the Port of Longview and the International Longshore and Warehouse Union settled legal action between over who will work the facility. The Northwest grain handlers and the International Longshore and Warehouse Union in the Pacific Northwest have reportedly reached a tentative agreement on the Pacific Northwest Grain Elevator Operators contract. The contract that determines the salaries, benefits and work rules at export elevators is among six export elevator operators in the PNW including Cargill, Columbia Grain, EGT, Louis Dreyfus Commodities, CLD Pacific Grain and United Grain Corporation in Portland, OR; Kalama, Longview, Seattle, Tacoma and Vancouver, WA. Informa understands the agreement is a one year extension of the current contract that expires September 30, 2012.

2. Aberdeen, WA: AGP – The Grays Harbor facility was a joint venture between the Port of Grays Harbor, AGP and the Puget Sound and Pacific Railroad. This facility is located between Seattle and Portland. Storage capabilities are being added to the facility and will include a grain inspection office.

3. Vancouver, WA: United Grain Vancouver – An expansion project of $72 million is expected to be finished in summer 2012. The Port of Vancouver, Washington demolished three buildings to make way for the expansion project which will add an additional 2 million bushels of storage capacity, reportedly doubling annual capacity.

4. Kalama, WA: Kalama Export (KEX) – This facility is viewed as the model elevator for the PNW. Expansion for this facility consists of $36 million to construct a grain cleaner building, a new loading belt and eight shipping silos. The facility will have 12 silos for its storage capacity. The major advantage for Kalama Export is its ability to handle more trains on a daily basis, greater storage capacity for railcars. Its capacity will be increased by around 25%.

5. Kalama, WA: United Harvest Kalama – This facility expanded its rail lines to allow larger trains and increase unloading times; in addition, they are adding a new dock for grain exports.

6. Lake Charles, LA: Lake Charles – This greenfield facility is being constructed at the Port of Lake Charles. IFG Port Holdings will construct the new grain export facility. The old storage houses will be demolished and the new facility will consist of 2 million bushels of storage with the option to add an additional 2 million in the future. Union Pacific will install a loop track to fulfill the demands for a unit train. The new facility is expected to be operational in the fall of 2012.

7. Cherry Point, WA – Located in Northwest Washington near Bellingham, this location is home to Washington's largest oil refinery. Conversations are progressing to construct a grain export elevator in the area.

8. Transloaders – This is moving product from one mode to another. In the case of grain exports, it involves grain moving among and between trucks or railcars and vessels, including both inland or coastal barges and deep-water ships. The grain can be loaded into 20 or 40 foot International Standard Organization (ISO) shipping containers and placed on the vessel. The grain can be Identity Preserved (IP) or have no special qualifications. Transloading facilities have emerged along the West, Gulf and Atlantic Coasts, and in the Midwest near the Chicago, IL rail terminals and other areas.

9. Port Allen, LA - Louis Dreyfus Commodities is spending $100 million to improve the grain facility at the Port of Greater Baton Rouge that will enable the elevator to move more than 5 million tons of grain annually. Currently, the facility can annually move approximately 250 million bushels onto barges and Panamax vessels by 2014.

5. Comparison of Dockage and Total Costs for Loading Handymax and Panamax Vessels by Port Range

Each port tariff is unique with its own rules and rates. Long-term contracts are negotiable and so the actual rates could be different than the tariff market rate.

For vessels sailing to the Center Gulf, Texas Gulf and PNW, dockage is a considerable port expense component[8]. The dockage rates vary by port range. Dockage costs are based on the Gross Registered Metric Ton (GRT) of the vessel at the berth and up to a certain number of days depending on the elevator, with additional costs if the berth of vessel exceeds the allowed berth time. For the Texas Gulf and PNW, the GRT is rated for 72 hours. In the Center Gulf, the minimum stay is not specified, and a lump-sum amount is assessed on the vessel's GRT except at the Cargill Port Allen facility.

[8] When looking at the total cost of the vessel, the time charter rate would be the highest expense at times reaching over $20,000 per day.

For the third day time period of 72 hours, Texas Gulf dockage rates are lower than PNW by $1 per GRT with an average of $1.56 per GRT compared to $2.56. Center Gulf facilities average $2.95 per GRT, although the Cargill facility in Port Allen averages $0.19 per GRT per day. If an average stay is 72 hours for a vessel, the cost for Cargill in Port Allen equates to $0.57 per GRT which is 19% of the other Center Gulf facilities. This rate is lower than midstream operations which average $0.43 per GRT per day.

Within the PNW, the highest fees are at the TEMCO facility compared to all other PNW locations. The Louis Dreyfus (LDC P-86) facility in Seattle is $3.20 per GRT which is more than the highest rate on the Columbia River as shown in Table 36. Each PNW facility assesses additional charges for vessel stays longer than 3 days. These extra charges range from $0.30 per GRT for every additional 12 hours berthed at United Harvest Kalama to $0.92 for the first additional 24 hours at the CLD Pacific Irving and CLD O'Dock.

Dockage fees in the Texas Gulf are highest at the Houston and Beaumont facilities at $1.80 per GRT. Southwest Grain in Brownsville has dockage rates of $0.75 for 72 hours. Southwest Grain also has no minimum cost per day, while the other Texas Gulf facilities have minimum charges of $1,000 per day at the Interstate Corpus Christi facility to $15,000 per day at Louis Dreyfus in Beaumont.

Table 36: Comparison of Dockage Rates by Port Range

Location	Dockage Rates (Per GRT for 72 hours)	Location	Dockage Rates (per GRT per day)
Texas Gulf		**Center Gulf**	
Cargill Grain Houston	$1.80	CHS Myrtle Grove Elevator	$3.00
ADM Grain Galveston	$1.65	Cargill, Inc. Westwego	$2.92
ADM Grain Corpus Christi	$1.65	ADM Grain Elevator Ama	$2.95
Louis Dreyfus Houston	$1.80	Bunge Destrehan	$2.95
Louis Dreyfus Beaumont	$1.80	ADM Grain Elevator Destrehan	$2.95
Interstate Corpus Christi	$1.47	ADM Grain Elevator Reserve	$2.95
Southwest Grain Bownsville	$0.75	Cargill, Inc. Reserve	$2.92
PNW		ADM Grain Elevator St. Elmo	$2.95
Kalama Export	$2.80	Zen-noh Grain Elevator Convent	$2.95
United Harvest Kalama	$2.40	Cargill, Inc. Port Allen	$ 0.19 per GRT per Day
United Grain Vancouver	$2.49	Midstream Facilites: Associated Terminals	$ 0.47 per GRT per Day
Columbia Grain[1]	$2.60	Associated Terminals Myrte Grove	$2.75
Columbia Grain[2]	$2.40	Zito Anchorage LLC Bouys	$ 0.28/ GRT/ Day
Columbia Grain[3]	$2.25	Cooper Consolidated	$ 0.52/ GRT/ Day
CLD Pacific Irving & O'Dock[4]	$2.65	St. James Bouys	$ 0.45/ GRT/ Day
CLD Pacific Irving & O'Dock[5]	$2.43		
CLD Pacific Irving & O'Dock[6]	$2.27		
Puget Sound LDC P-86	$3.20		
Puget Sound TEMCO	$3.05		

Source: Bluewater Shipping

Notes: Nine of the ten Mississippi River grain export elevators assess dockage using a flat rate dockage whereby a lump-sum amount is charged based on vessels GRT. The lump-sum amount applies regardless of the time the vessel is alongside the berth for loading. Columbia Grain prices vary based on the size of the vessel, $2.60 for vessels up to and including 25,000 GRT, $2.40 for vessels up to and including 35,000 GRT and $2.25 for vessels over 35,000 GRT. CLD Pacific Irving & O'Dock follow the same pattern as Columbia Grain.

The total berthing cost for a Panamax vessel in the Center Gulf totals nearly $206,000[9]. This is slightly less than the PNW, where the estimated berthing costs for a Panamax vessel totals about $208,000. The berthing cost for a Panamax vessel in the Texas Gulf or Mobile is lower than the Center Gulf and PNW at approximately $184,000 in the Texas Gulf while Mobile exceeds $160,000.

After dockage, the next highest expense at port is pilotage, which for a Panamax vessel can range from $6,500 in Mobile to $45,000 in the Center Gulf; while in the PNW, the pilotage fees average $16,200. A pilot boards a vessel to command the navigation through a shipping channel to or from a berth or anchorage area. Pilotage is based on the type of vessel, distance from the sea, difficulty with maneuverability, etc.

Table 37: Summary of Estimated Costs by Port Range by SDW, GRT, NRT

	Handymax	Panamax
Port Range	**50,000 / 28,000 / 17,000**	**75,000 / 39,000 / 26,000**
Center Gulf	$167,000	$205,950
PNW	$164,350	$208,050
Texas Gulf	$103,175	$184,275
Mobile	$123,550	$160,217

Notes: Two sets of three numbers represent SDW, GRT, NRT

[9] The total costs is calculated by adding the cost for government fees, pilotage, tugs, linesman, launch boats, inspections, dockage, dock clean-up, dust arresting tarps, harbor fees, terminal security fee, agency fee, agency expenses and potential owner's expenses.

Table 38: Breakdown of Estimated Port Costs for Panamax Vessel at New Orleans

Cost Categories	Cost
Government Fees	$2,500
Pilotage	$45,000
Tugs (Basis 2 in / 2 out)	$19,500
Linesmen	$2,475
Launch Boats	$6,500
USDA / NCB Hold Inspections	$5,000
Dockage (Basis Lumpsum Rate $2.95 per grt)	$115,050
Dock Clean-up Charge	$300
Dust Arresting Tarps	$400
Harbor Fees	$1,000
Terminal Security Fee	$2,000
Agency Fee	$3,650
Agency Expenses	$2,575
Potential Owners' Expenses	$2,500
Estimated Total	$205,950

Source: Blue Water Shipping

C. Grain Delivery Dynamics for Export Positioning

The delivery of grain to export position is based on geography and freight rates. Barge and rail freight rates develop an equilibrium based on the demarcation line at which point corn or soybeans are sent by rail to the PNW or put on a barge and moved down the Mississippi River System and exported through the Center Gulf. This equilibrium is based on elevator margins that are a function of export capacity utilization, basis and freight rates.

Since a barge is more efficient at hauling grain than a rail car, a river terminal typically has a cost advantage over an inland shuttle train facility up to 100 to 150 miles from the river. Railroads offer origin efficiency payment incentives to shuttle loading facilities for the fast loading of trains. These payments typically add up to 5 cents per bushel in savings. A similar incentive is available at destination as well. A secondary rail car market allows shippers to trade cars at a discount or premium to the tariff.

The next two sections look at the barge and rail markets for grain and soybean delivery.

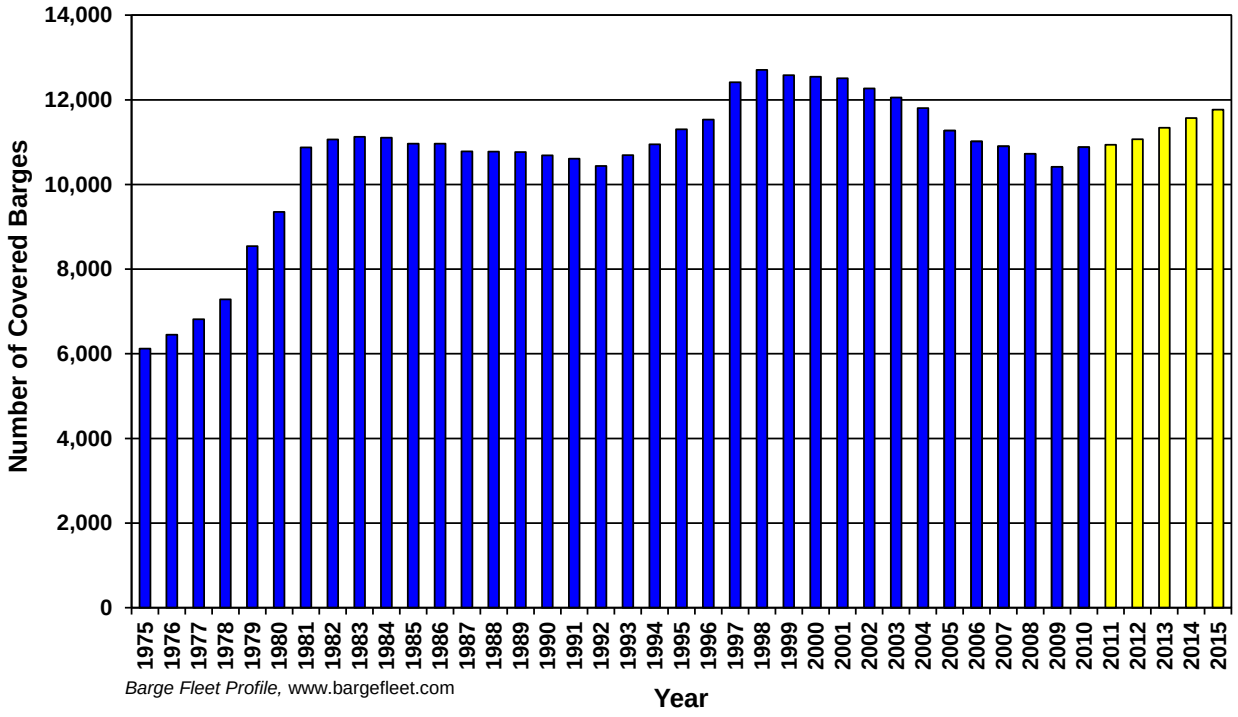
1. Barge Freight

a) Barge Fleet

Informa's *Barge Fleet Profile* reported at the end of 2010, there were 10,883 covered barges reported in the fleet, up 467 from the previous year. The covered fleet is

expected to total 11,767 in 2015 as shown in Figure 34. In 2010, the covered fleet expanded for the first time in 10 years to keep pace with expected demand for barge service. Over the next five years, approximately 1,815 covered barges should be removed from the fleet while 2,700 will need to be added for a net change of 885. The retirement pace is based on the life cycle pattern of the covered fleet, while the new build schedule attempts to moderate the pressure on the barge fleet.

Figure 34: Size of Covered Barge Fleet



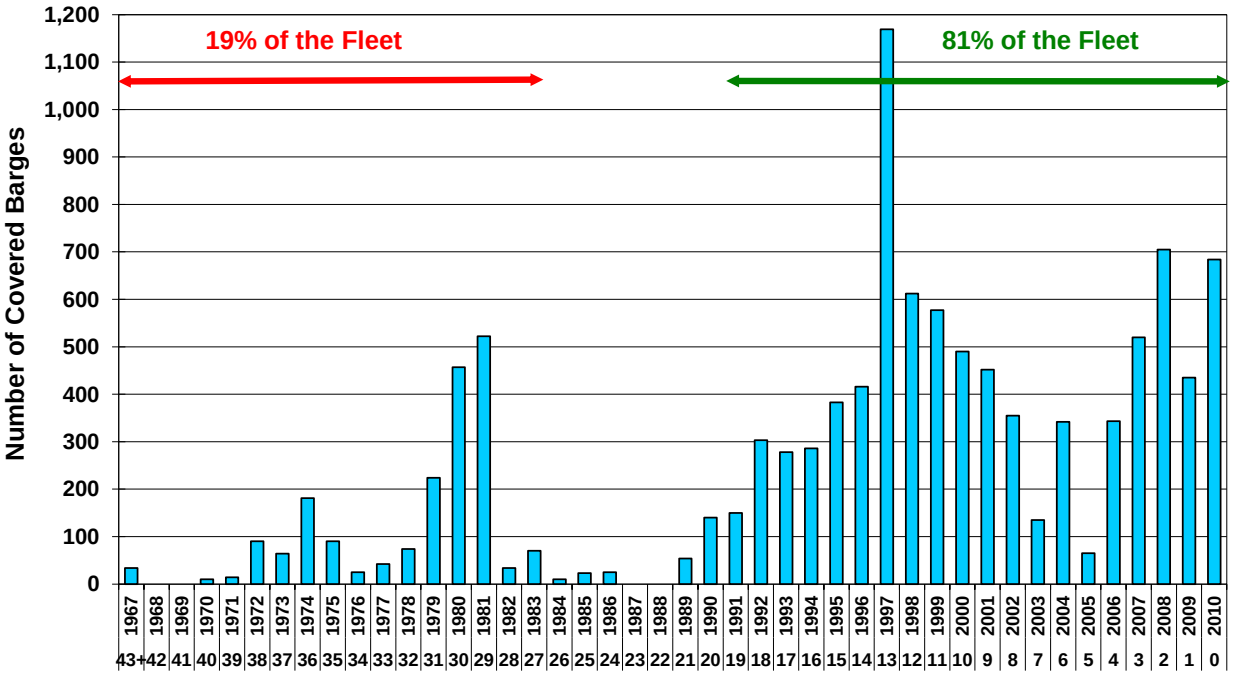
Barge Fleet Profile, www.bargefleet.com

The life cycle pattern is what percent of barges will be retired at a given age. The build schedule is based on how many barges are required to move the forecast commodity volume.

The covered barge fleet consists of a bimodal age distribution with 19% of the fleet 25 years and older while 81% is 20 years and younger. The older equipment built in the 1970s has a hull draft of 9 feet while the equipment built since 1996 have a hull draft of 12 to 14 feet. The deeper hulled equipment can be loaded upwards with 1,750 tons or approximately 15% more than the 9 foot equipment.

Increases in the size of the barges from 12 foot hulls to 14 foot hulls and more efficient tow configurations is enabling barge companies to move more commodities with fewer barges, which lowers the demand for new builds. For example, on the lower Mississippi River, 15 barges tows that are loaded to the full weight and pushed by newer more powerful tugboats are able to increase cargo by 10%. An additional benefit is the need for fewer laborers.

Figure 35: Covered Barge Fleet in 2010 by Age

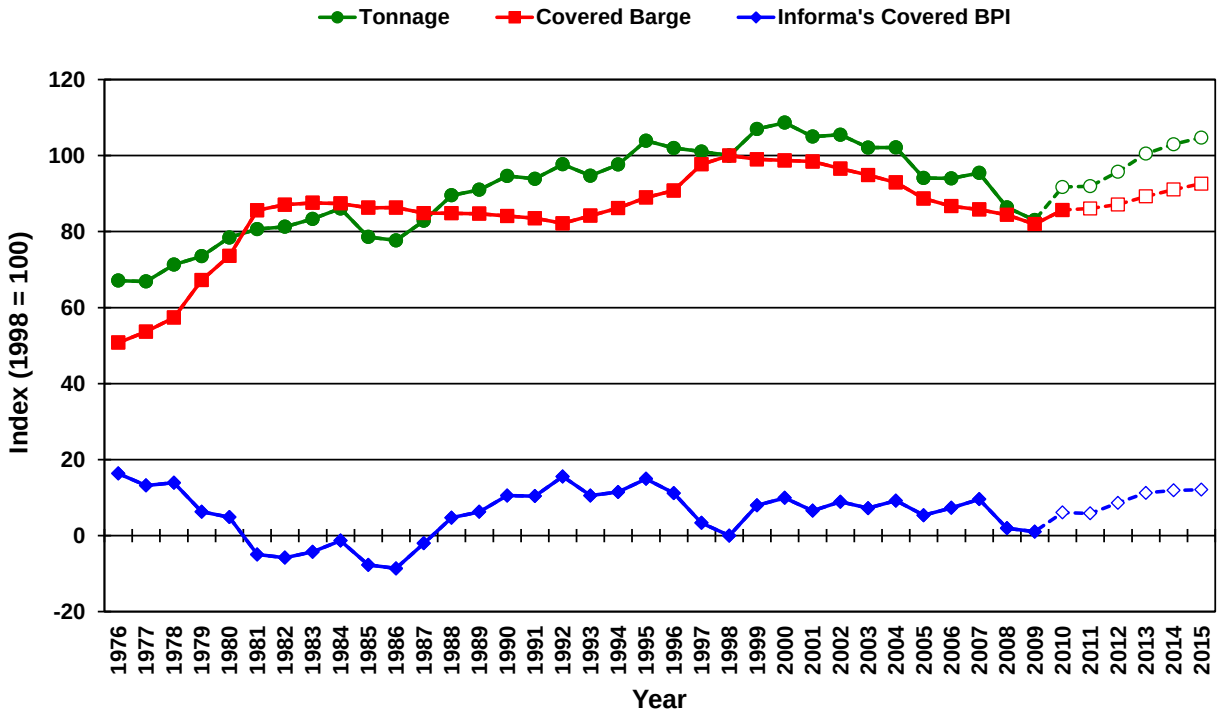


Informa Economics, Inc., *Barge Fleet Profile*

b) Barge Pressure Index

The barge pressure index is the relationship between tonnage and covered barges. Tonnage is expected to increase at a greater rate than barge capacity. An increasing BPI indicates that barge rates are expected to increase.

Figure 36: Covered Barge Utilization

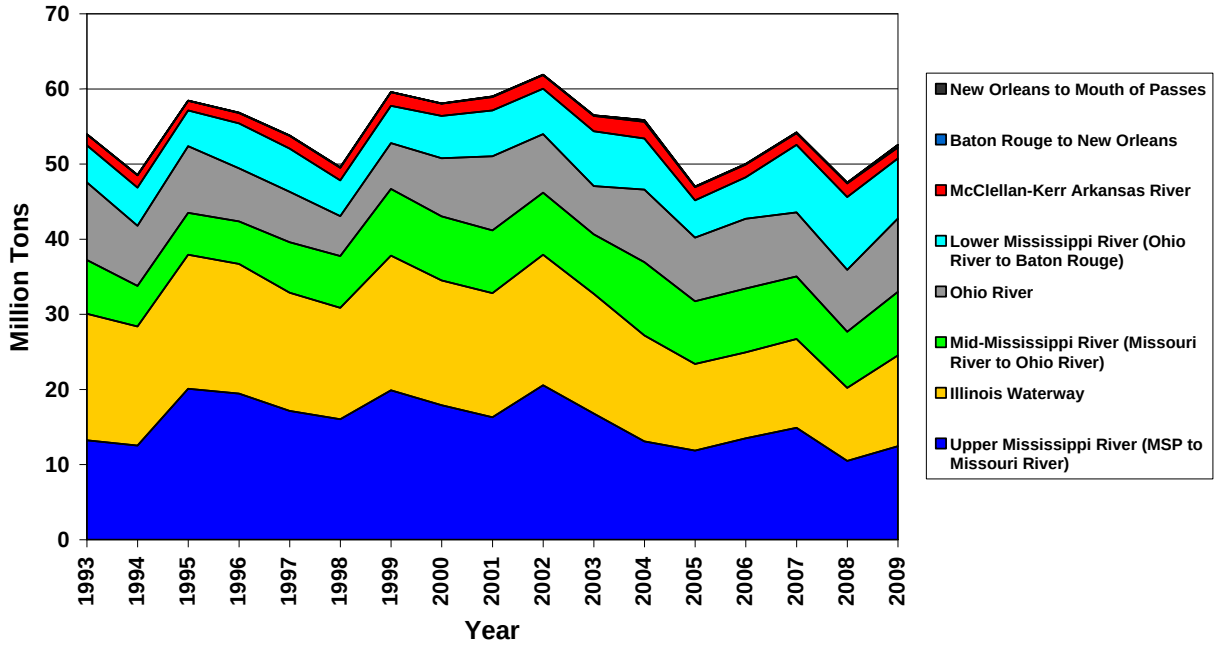


Source: USDA, Army Corps of Engineers, and Informa

c) Grain Loading Dynamics

Barge loadings of grain and soybeans have migrated downriver, away from the lower draft, locking areas of the river system. Historically the upper Mississippi River (from the Twin Cities to the Missouri River and including the Illinois River) sourced 60% of the downbound barge loadings. These segments now source about 40% of loadings as demonstrated in Figure 37. The lower Mississippi River and Ohio River have gained share on changes to crop production tributary to these river segments, and opportunities with deeper water areas to accommodate the deeper hulled barges.

Figure 37: Grain and Soybean Barge Movements by River Segment



d) Lock and Dam Situation

There are 29 locks and dam on the upper Mississippi River, 9 on the Illinois River, 20 on the Ohio River and more scattered throughout the Mississippi River System. Of the grain exported through the Center Gulf, more than 90% arrives by barge. Much of that volume then first originates upriver of a lock on the upper river system. These locks are antiquated and exceeding their designed lifespan. However, funding for construction and rehabilitation of the locks is minimal and not sufficient to keep pace with the aging system. Without persistent funding the system continues to experience more failures and shutdowns as a result, thus interrupting the flow of grain to export position.

e) Barge Freight Rates

Barge freight rates are proportionally lower the shorter geographic distance a facility is located to the Gulf. For example, the freight from Minneapolis to New Orleans is higher than St. Louis to New Orleans. The baseline covered barge freight rate outlook over the next five years is expected to average 460% of tariff for the Illinois River, mid-Mississippi River and St. Louis, weaken the next two years before rising to 470% in 2015. The outlook for barge freight rates assumes firming pressure on the fleet, but also normal weather and operating conditions. Barge freight rates the past three years have been impacted more strongly from weather and navigation issues rather than "strong" demand pressures on the fleet.

2. Rail Freight

Without a river connecting Corn Belt states to the PNW, rail is used to transport grain to market position in the PNW. A 110 car shuttle train can haul in excess of 410,000 bushels of soybeans while a 15 barge tow handles more than 750,000 bushels.

The basis at the PNW mirrors rail freight rates. A base rail freight rate includes the tariff plus fuel surcharge, or can be a negotiated contract rate. Other factors that impact the rail rate include but are not limited to applications of secondary car market differentials, loading and unloading adjustments, switching fees, industrial development allowances and other similar accessorial charges, premiums or discounts.

Railroads prefer consistent volumes because they are better able to allocate resources. The rail system does not have unlimited capacity on the network, which results in competitive pressure to operate over finite capacity. Increasing Asian demand is also creating demand for other commodities such as coal that largely moves by rail. Because grain moves are more seasonal, railroads prefer to move more ratable volumes on their limited track capacity.

Most shuttle train loaders are located at least 150 miles from the Mississippi River. The elevators for which plans have been announced for new construction west of the Mississippi River, are filling in gaps or market opportunities where grain will be originated for export positioning to the PNW, or for domestic positions in the Southwest, the Texas Panhandle and even Mexico.

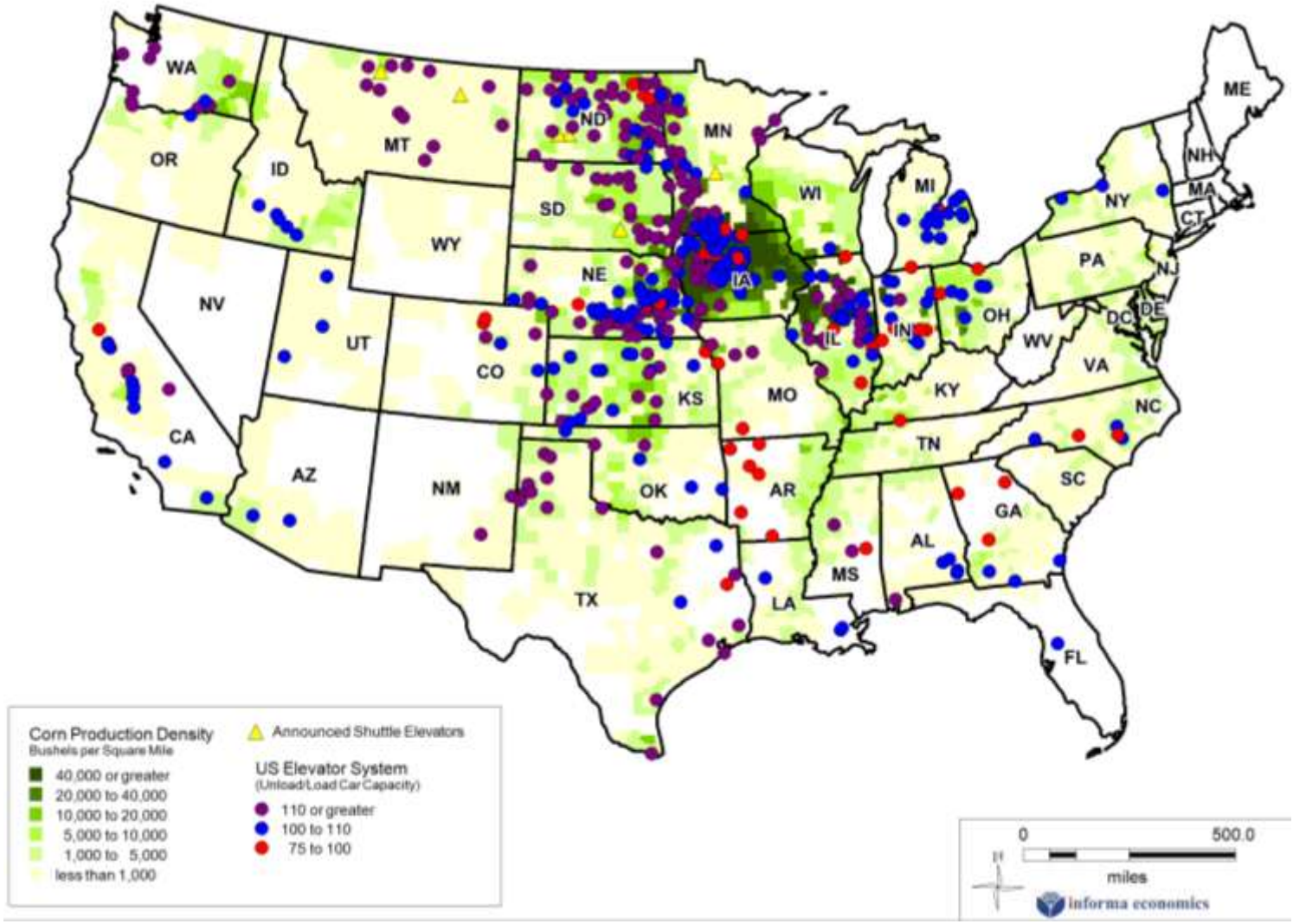
Currently there are more than 500 shuttle train elevators in the U.S. The greatest concentrations of shuttle train facilities are located in the Central and Northern Plains as shown in Figure 38. Nebraska has the most shuttle train facilities for any one state with nearly 65 locations. The Southwestern U.S. has the highest concentration of grain elevators listed as shuttle facilities with 38.5%, and nearly 49% of total capacity. This area has a large volume of cattle feeding; grain from the Midwest is sent to these shuttle unloading facilities for optimizing logistics efficiency.

Table 39: Commercial Grain Elevator Capacity and Shuttle Train Facilities

Grain Flow Regions	All Grain Elevators		Shuttle Elevators			
	Number of Elevators	Total Capacity (Million BU)	Number of Elevators	% of Total Elevators	Total Capacity (Million BU)	% of Total Capacity
Upper Mississippi	1,419	2,088	89	6.3%	362	17.3%
Central Plains	1,076	1,692	102	9.5%	381	22.5%
Northern Plains	1,298	1,557	129	9.9%	348	22.4%
OH, IN, MI and KY	903	1,006	42	4.7%	186	18.4%
Texas and Oklahoma	461	765	31	6.7%	162	21.1%
Lower Mississippi	548	733	21	3.8%	40	5.5%
Southeast	279	280	21	7.5%	47	16.9%
Pacific Northwest	178	224	20	11.2%	55	24.8%
Mid Atlantic	144	138	-	0.0%	-	0.0%
Southwest	65	77	25	38.5%	38	48.9%
North Atlantic	64	68	4	6.3%	18	26.3%
Total	6,435	8,629	484	7.5%	1,636	19.0%

Source: Grain Journal and Informa Economics

Figure 38: Shuttle Train Locations



a) Rail Metrics

Total Class I grain carloadings are expected to steadily increase over the next five years to levels that will approach 2007 carloadings of nearly 1.3 million as shown in Figure 39. The growth will be driven by export carloadings to the PNW. Annual export carloadings to the Texas Gulf will be slightly positive while the North Atlantic and Gulf will decrease from over 74 thousand to nearly 51 thousand as shown in Figure 40.

Figure 39: Total Class I Grain Carloadings

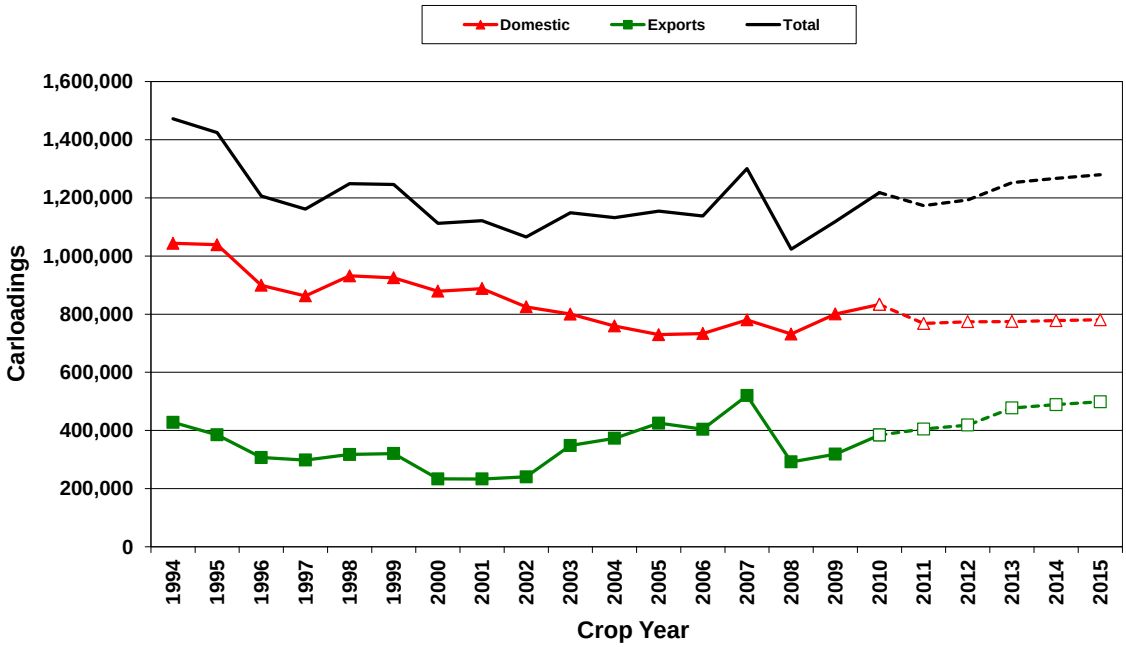
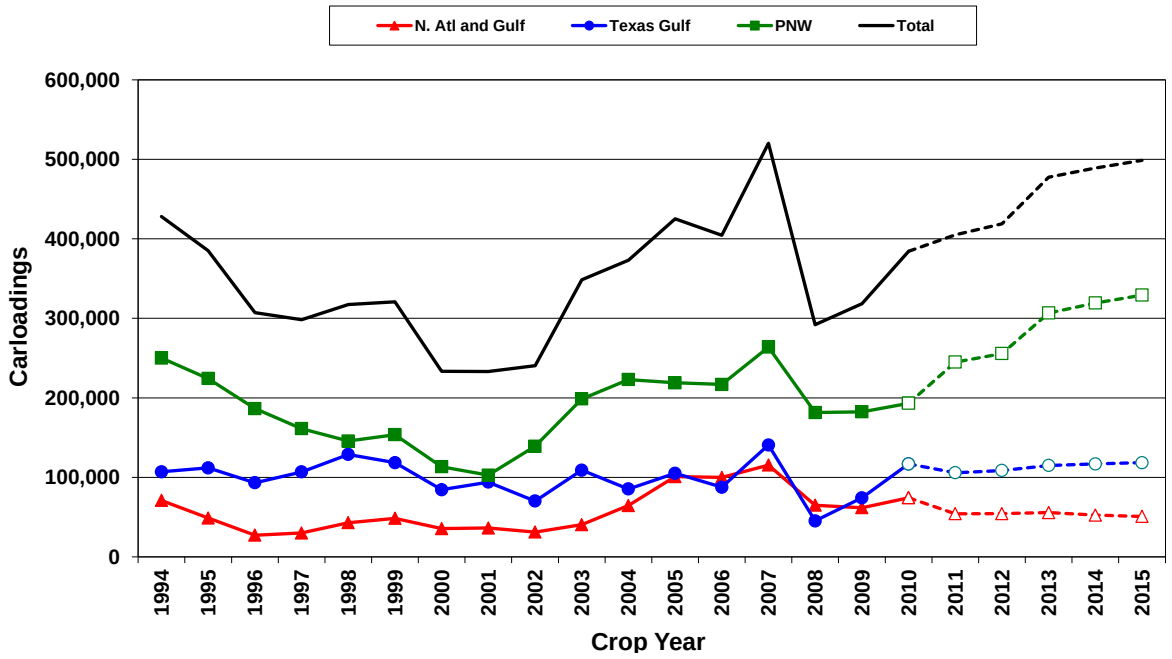


Figure 40: Export Carloadings



The size of grain and soybean carloadings has been steadily increasing. Railcars that are greater than 5,000 cubic feet have been growing since 2004/05 while carloads that are less than 5,000 cubic feet have been decreasing since 2005/06 and during 2006/07 the larger cars were used more often than the smaller cars as shown in Figure 41. Larger cars are allowing railroads to be more efficient in moving grain from origin to export positions. Additionally, grain and soybean average distance per trip has increased from slightly over 700 miles in 1995/96 to over 900 miles in 2008/09 as shown in Figure 42.

Grain and soybean transportation efficiencies have also come about through the use of shuttle trains. In 1995/96, rail moves of greater than 100 cars accounted for about 2%, while in 2008/09, these shuttle trains had accounted for over 30% as shown in Figure 43. Additionally, there has been growth in trains of 76-100 cars as the Eastern railroads typically have shuttle trains of 65-90 railcars.

Figure 41: Grain and Soybean Carloadings by Cubic Capacity

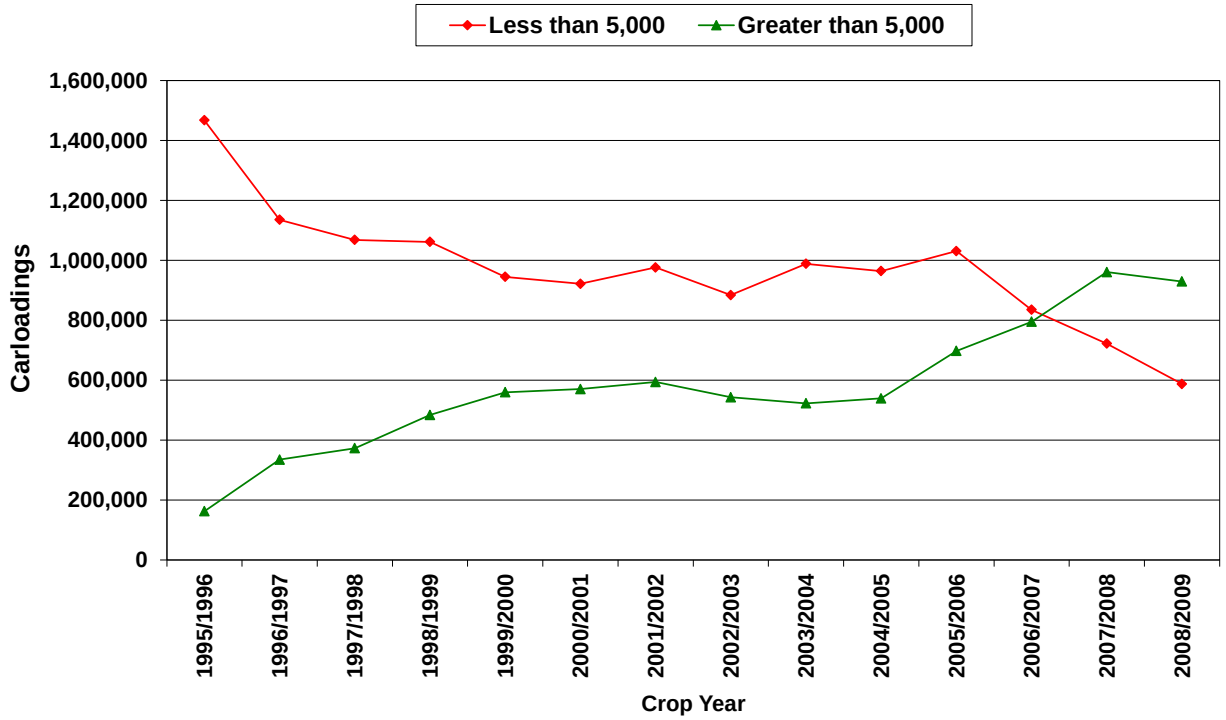


Figure 42: Grain and Soybeans Average Rail Miles

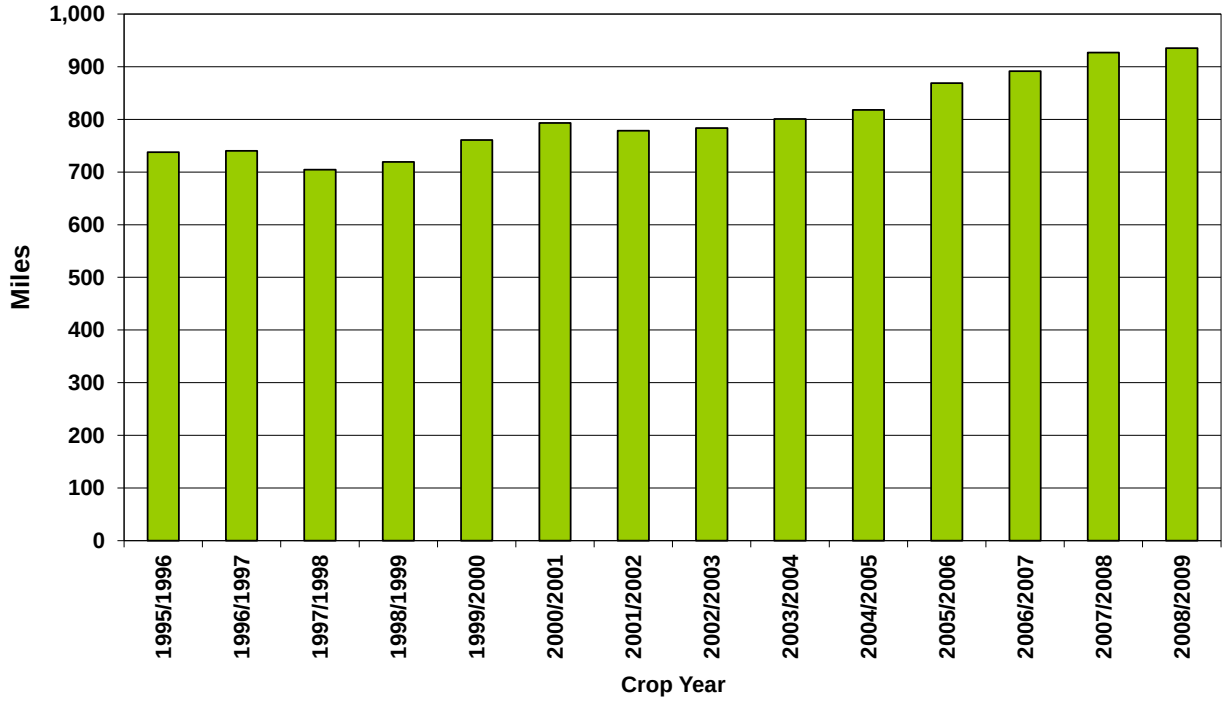
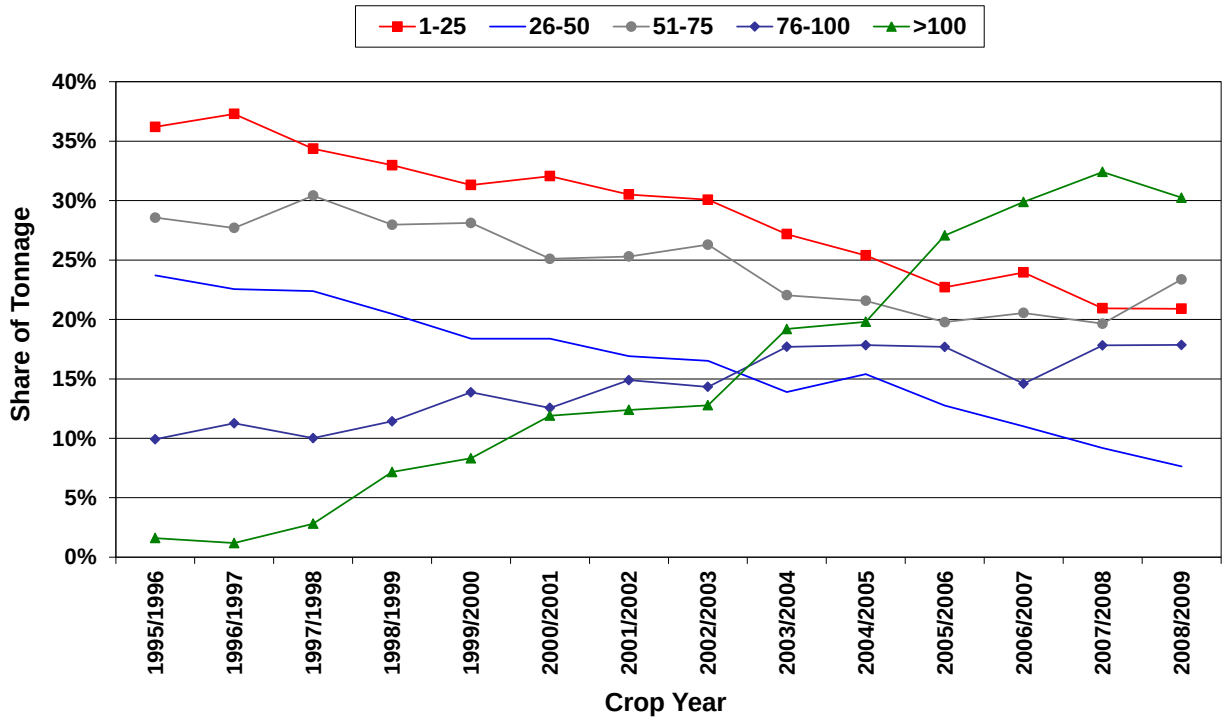


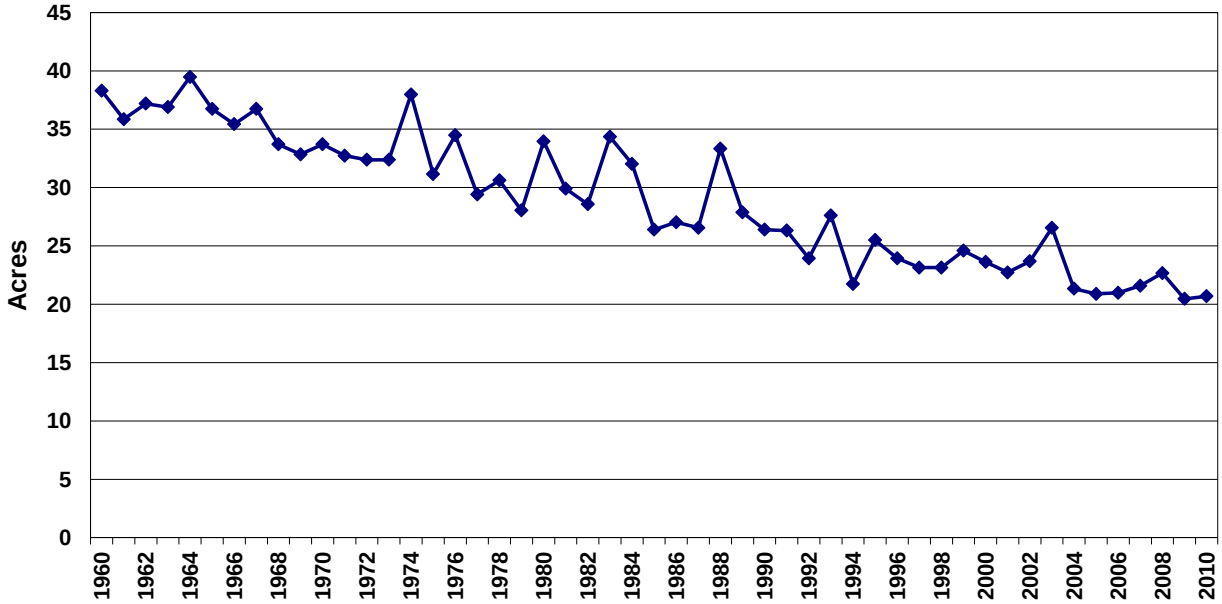
Figure 43: Grain and Soybean Tonnage Moved by Train Size



3. Truck Movements

Over time, crop yields have increased. As a result, increases in farming efficiencies have increased to meet the demands for higher crop production. These efficiencies include larger equipment and more grain storage. The average combine can hold around 200 bushels while in 1960 the average combine held around 50 bushels. In the 1980s, straight trucks and wagons were being replaced by semi-tractor trailers. However, since the adoption of the larger grain trailer, the truck weight limit has not changed. As yields have increased, the number of acres required to fill a semi-tractor trailer has decreased. For example, in the case of a soybean farm, in 1960, 40 acres of soybeans were required to fill a semi-tractor trailer, but in 2009, 20 acres are needed to fill a truck as shown in Figure 44. Delivering grain to a storage area has become a bottleneck during the crucial hours of harvest. The bottleneck is expected to be more pervasive as yields increase. The larger combines cannot fully be utilized unless a farmer has additional grain trailers or large grain carts, which add additional cost to farming operations. To meet this challenge, farmers are adding storage and trucks.

Figure 44: Soybean Acres Required to Fill a Semi-Tractor Trailer (900 bushels)



Source: USDA and Informa

Higher truck weight issues and new CAFE standards could trigger new investments in equipment. Allowing higher truck weights on the federal highway system will reduce the demand for new trucks and drivers, which will help contain transportation costs, reduce congestion and lower environmental impacts.

For industries impacted by the weight limits, those that weigh out before they cube out, the benefits from increasing the federal truck weight limit from 80,000 pounds to 97,000 pounds will be significant. If the federal truck weight limit were increased, and given that truck demand is large and will continue to grow, even a small percentage decrease in the number of trips would save significant amounts of money.

By 2025, the Corporate Average Fuel Economy (CAFE) is 55.4 mpg for cars and with light trucks having slightly less burdensome standards. Semi-tractor trailers are covered by the CAFÉ standards for the first time in history. The new standards, which will cover the years 2014 through 2018, will impact three categories of vehicles:

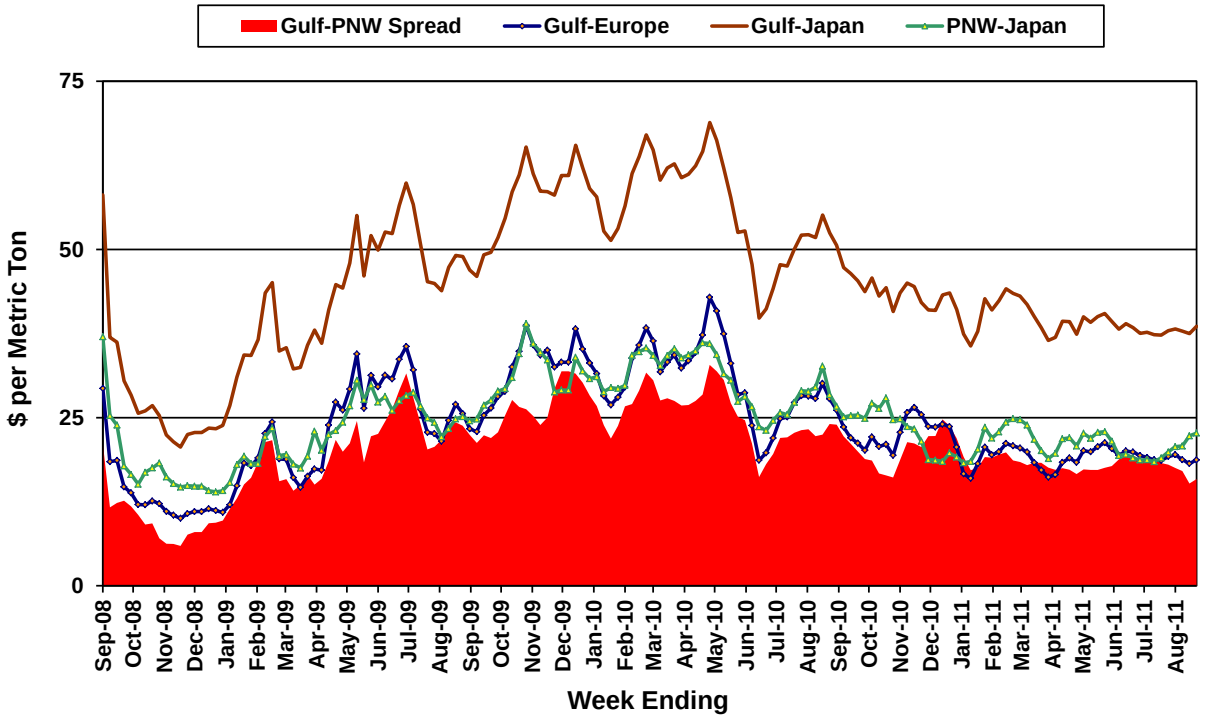
- Semis will be required to reduce fuel consumption by 23%;
- Work trucks, which include concrete mixers, buses and fire trucks, will have to target a 9% improvement; and
- Heavy-duty pickups and vans will be required to boost mileage by 10% if they run on gas, and 15% if they use diesel.

4. Ocean Freight Rates

Grain and soybean exports to Asia primarily occur off the West Coast or Center Gulf. Center Gulf exports have a further distance to travel by ship. The ocean freight spread between the Gulf and PNW to Japan impacts export decisions. Over the last year, the

spread has been less than $25 as shown in Figure 45. Because of an aggressive ship building campaign, ocean freight rates are expected to remain relatively stable into the foreseeable future, with an ocean freight spread that keeps the Center Gulf competitive to the PNW. In practice a lower ocean freight rate spread between the Center Gulf and the PNW is favorable for grain exports through the Center Gulf. Conversely, a wider spread favors grain exports through the PNW. Currently the spread between the Gulf and PNW is less than $20 per metric ton, about $9 to $10 lower from one year ago.

Figure 45: Ocean Freight Rates for Grain



5. Dredging

Maintenance dredging is essential to keep navigation channels open for vessels carrying commerce. Funding for dredging navigation channels comes from the Harbor Maintenance Trust Fund (HMTF). The HMTF is funded through an ad valorem tax on imports. HMTF is calculated at 0.125% of the entered value of the imported cargo. The HMTF has a surplus of more than $5 billion but is not being fully used as intended. Funding for dredging is being cut despite the surplus in the HMTF while the cost of dredging is increasing. Without dredging, the export capacity will effectively be lowered and the cost to ship grain increase.

a) Mississippi River System

On the lower Mississippi River from Baton Rouge past New Orleans through the South West Pass to the Gulf to the Gulf of Mexico, the project channel depth is 45 feet while maintained to 47 feet. The two feet of slack provides additional time between

necessary dredging events. These depths allow Panamax vessels to be loaded to maximum capacity.

The U.S. Army Corps of Engineers has responsibility to maintain the project depth of 45 feet on the lower Mississippi River and other navigation channels around the country. But during periods of sediment buildup in the river the Corps and the shipping industry can, and do introduce restricted drafts. For example, during June 2011 the draft on the lower Mississippi River was restricted to 43 feet, 2 feet below the project depth. The impact of a draft restriction means less cargo is loaded on the vessel.

For grain cargos destined for Asia and transiting the Panama Canal, the 2 foot cut in draft does not directly impact those moves. But for grain shipments to Europe vessels are loaded to the maximum available draft with upwards of 77,000 metric tons of grain. A 2 foot draft restriction essentially equates to loading 4,000 metric tons less grain. With less cargo the transportation cost is distributed over less cargo volume. For a 77,000 metric ton shipment that is reduced to 73,000 metric tons, the cost impact equates to a freight rate increase of $1.20 per metric ton or $0.03 per bushel.

b) Pacific Northwest

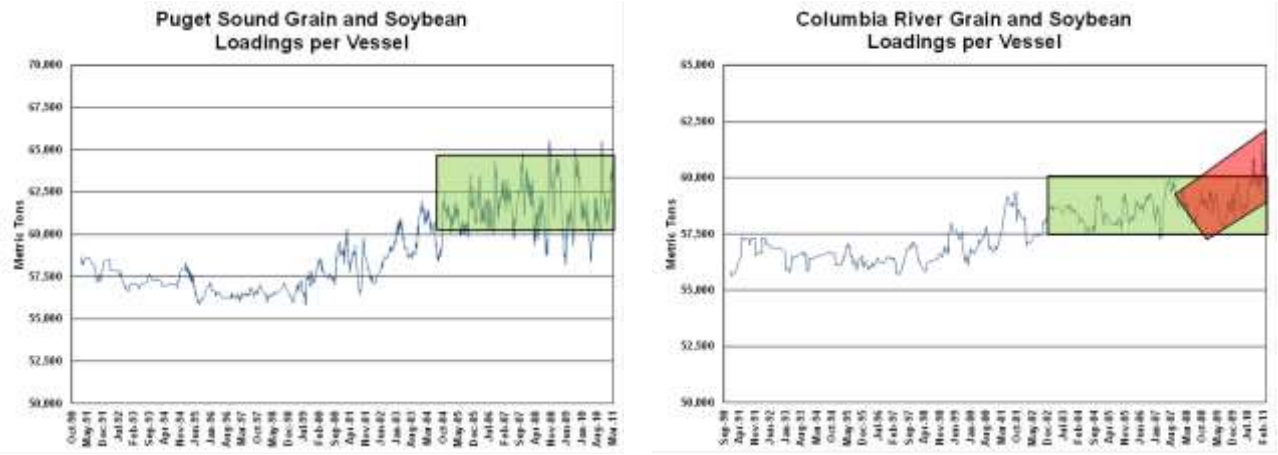
In the PNW, after 20 years of planning, analysis, reviews, approvals, and a dredging effort that started in 2005, the Army Corps of Engineers completed the deepening of the lower Columbia River by 3 feet to 43 feet during late 2010.

Having a deeper channel allows shippers and vessel operators to load more grain on a vessel. For comparison, elevators located on the Puget Sound in Washington State have no draft restrictions loading a Panamax vessel at their terminals. For vessels that called on elevators on the Columbia River and Puget Sound since January 2009, loaded with soybean for shipment to China, the Puget Sound elevators loaded vessels an average 2,386 thousand bushels, compared to the Columbia River elevators that averaged 2,187 thousand. The Puget Sound elevators loaded 9% more soybeans on average than the Columbia River counterparts.

Those vessels that were being loaded with more than 55,000 metric tons of grain on the Columbia River prior to the dredging effort can now be loaded with an additional 3,000 tons to 61,000 tons since the dredging was completed. The additional volume effectively lowered the ocean freight rate $1.65 per metric ton (more than $0.04 per soybean bushel) or a 5% savings in the ocean freight rate. The increased draft will make the Columbia River elevators more competitive loading grain for export.

A comparison of vessel loadings of grain on vessels loaded with more than 55,000 metric tons of grain on the Columbia River and Puget Sound in the PNW is depicted in Figure 46.

Figure 46: Average Grain Loadings of Grain on Vessels Loaded with more than 55,000 Metric Tons of Grain in the PNW



6. Containerization

First, multimodal freight transportation has generally been considered the standard form of movement for bulk materials. This process involves an exchange of the bulk product itself between modes of transport, which include combinations transferring between vehicles and vessels for movement by road, rail or waterway. The multimodal transfer is a conveyance of the cargo or physical material being shipped.

Secondarily, over the past nearly 60 years, intermodal freight transportation has come to refer to unitization, usually using standardized containers for cargo. These containers are interchanged between all modes of transport. Truckers who move the units on chassis, may interchange the unit itself with rail carriers who in turn transfer the boxes to or from specialized container railcars. The railroads using specialized container railcars, mostly well cars for double stacking to increase efficiency, but still with some single stack platform cars, deliver the freight intermodally from a terminal hub to another terminal hub. Inland rail terminals connect business to business by a process of out-shipments and in-shipments, sending and receiving the containers in and out through a terminal gate via trucks. Meanwhile, the port terminals ship and receive via vessels, with railroads and trucks arriving and departing from the same terminals, enabling interchanges without exposing the goods. The cargo essentially remains locked inside the box.

The two separate streams of goods movement, multimodal and intermodal, require a different set of operating assets, conveyors or specialized cranes, loading and other lifting equipment for the respective modal movement. As well, safety and environmental compliance investments that are involved in the particular intermodal and multimodal movements are generally of a quite different scale, style and mode of operation.

Relative increases in multimodal and intermodal international transportation infrastructure and increases of trade as a portion of GDP over the past several decades

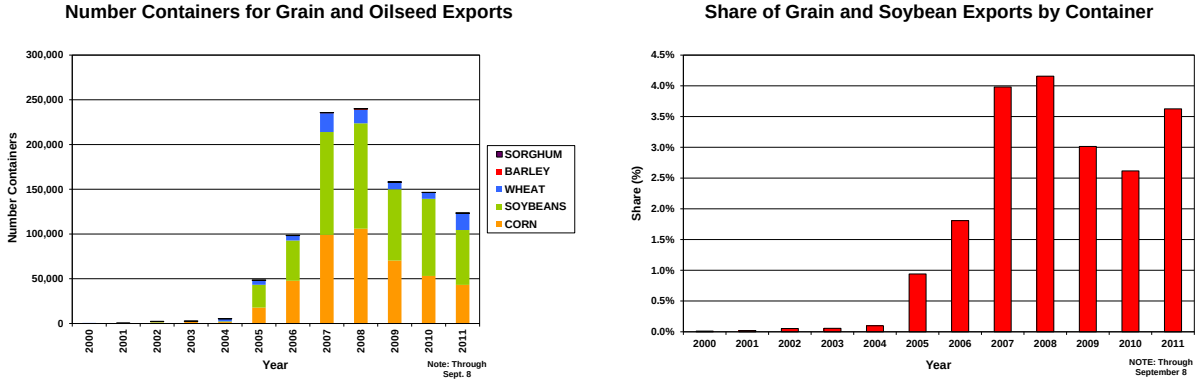
are major factors that impact the market demand for investments to support those trends. Infrastructure for movement of goods must account for international, as well as national, regional, state and local flows, for cargo in, out and through the corridors from origin to destination. The supply of infrastructure for facilitating trade is largely a public policy imperative, but increasingly there are public-private partnership opportunities for developments where shared risks and returns on investments can be achieved. Further, there are some privatized transportation assets, ranging from dedicated, usually tolled roadways, to rail and port terminals that are privately owned, developed, financed and operated for profit. These tend to exist in unique circumstances, where significant volumes will support the private investment.

Grain exports by container expanded through the end of 2008, reaching an annual high of more than 240,000 containers loaded with nearly 188 million bushels of grain and soybeans. During 2008 grain and soybean exports moved in a container represented more than 4% of total U.S. soybean exports and have been holding above 2% since then.

Over the past two years, container volumes of grain have decreased as shown in Figure 47. Since 2004, soybeans have averaged nearly one-half of total container grain volume, followed by corn.

The grain and soybeans are transloaded into 20 foot equivalent (TEU) or 40 foot equivalent (FEU) containers, and even into 45 foot (2.25 TEU) containers. The 20 foot container is used most commonly since grain weighs out before it cubes out a container due to its dense characteristics. The use of containers emerged when dry bulk ocean freight rates were at record levels. Many containers consequently were being loaded on a container ship from the U.S., returned empty to Asia. This created a backhaul opportunity for grain. Since then the use of the container has become a regular option for many buyers to import a more ratable supply of grain or to protect certain identity preservation characteristics of the grain.

Figure 47: Grain and Soybean Exports by Container



7. West Coast and Center Gulf Labor

All ports and terminals on the Pacific Coast are required to use union labor from the International Longshore and Warehouse Union (ILWU). Shippers, terminal operators and shipping lines are represented by the Pacific Maritime Association (PMA). The PMA negotiates with the ILWU for the Pacific Coast Longshore Contract. The most recent coast wide contract was effective July 1, 2008 and will be in effect for six years, through July 1, 2014. The coast wide contract covers labor requirements and wages for most shore side operations and all vessel operations.

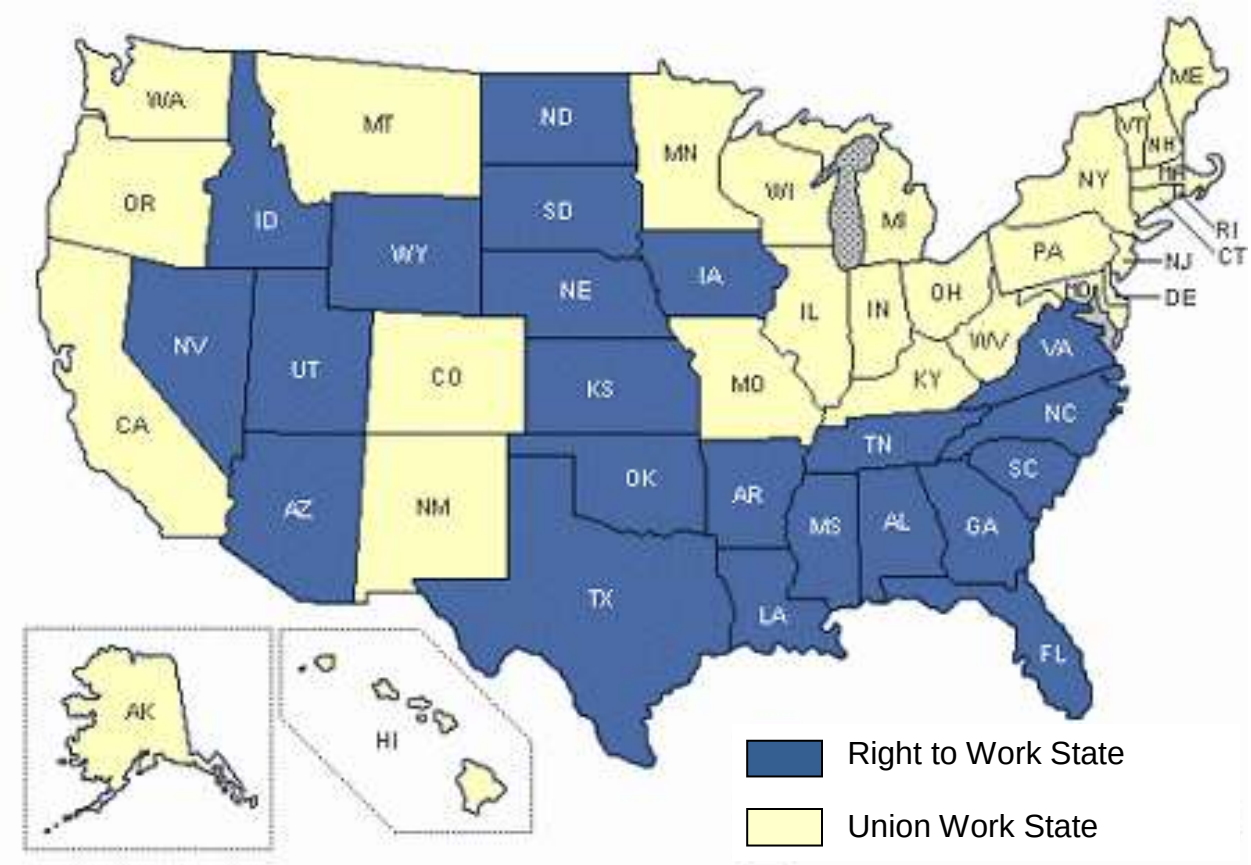
Grain elevators on the Pacific Coast negotiate the Northwest Grain Handlers Agreement with the ILWU for the shore side or house operation. The contract is negotiated by the ILWU's Longshore Division, between Locals 4 (Vancouver), 8 (Portland), 19 (Seattle) and 23 (Tacoma) and the Pacific Northwest Grain Elevators Operators, a non-PMA member employer group that includes Cargill, Inc., Columbia Grain, Inc., Louis Dreyfus Corporation, CLD Pacific Grain, LLC and United Grain Corporation. Separately, each elevator then negotiates with the local ILWU hall. The grain contract is negotiated every three years effective on October 1. The current contract expires September 30, 2011. The ILWU and grain export elevator operators reportedly settled on a contract extension of the current contract for one year. The ILWU membership within the respective local units need to vote on approving or rejecting the contract.

Meanwhile, ILWU Local 21 in Longview, WA is protesting and leading wild cat strikes against EGT for not negotiating a contract with the ILWU. EGT has hired the Operating Engineers Union to run the facility instead. The ILWU contends they are entitled to operate the new elevator. The Port of Longview is suing EGT to hire the ILWU. The case is expected to start trial in October 2011. EGT is attempting to test the new facility with trains of grain, but the ILWU has slowed down the progress. This is a fluid situation and will most likely be short term in nature, but certainly has wide ranging tentacles if EGT is successful to use the Operating Engineers Union.

In contrast, Louisiana is a right to work state. This means employees have the right to decide for themselves whether or not to join a union. According to port representatives in Louisiana, there have been few strikes throughout the state since the passage of Right to Work laws twenty years ago. Almost all export grain elevators in Louisiana employ non-union labor while container and most of the breakbulk is represented by union labor.

The states that make up the Center Gulf port range, Texas Gulf and lower Atlantic are all right to work states; however, the states along the Pacific and Great Lakes are not right to work states as shown in Figure 48. This contrast in port ranges could impact grain exports if strikes, union negotiations or arbitration arise.

Figure 48: Right to Work States

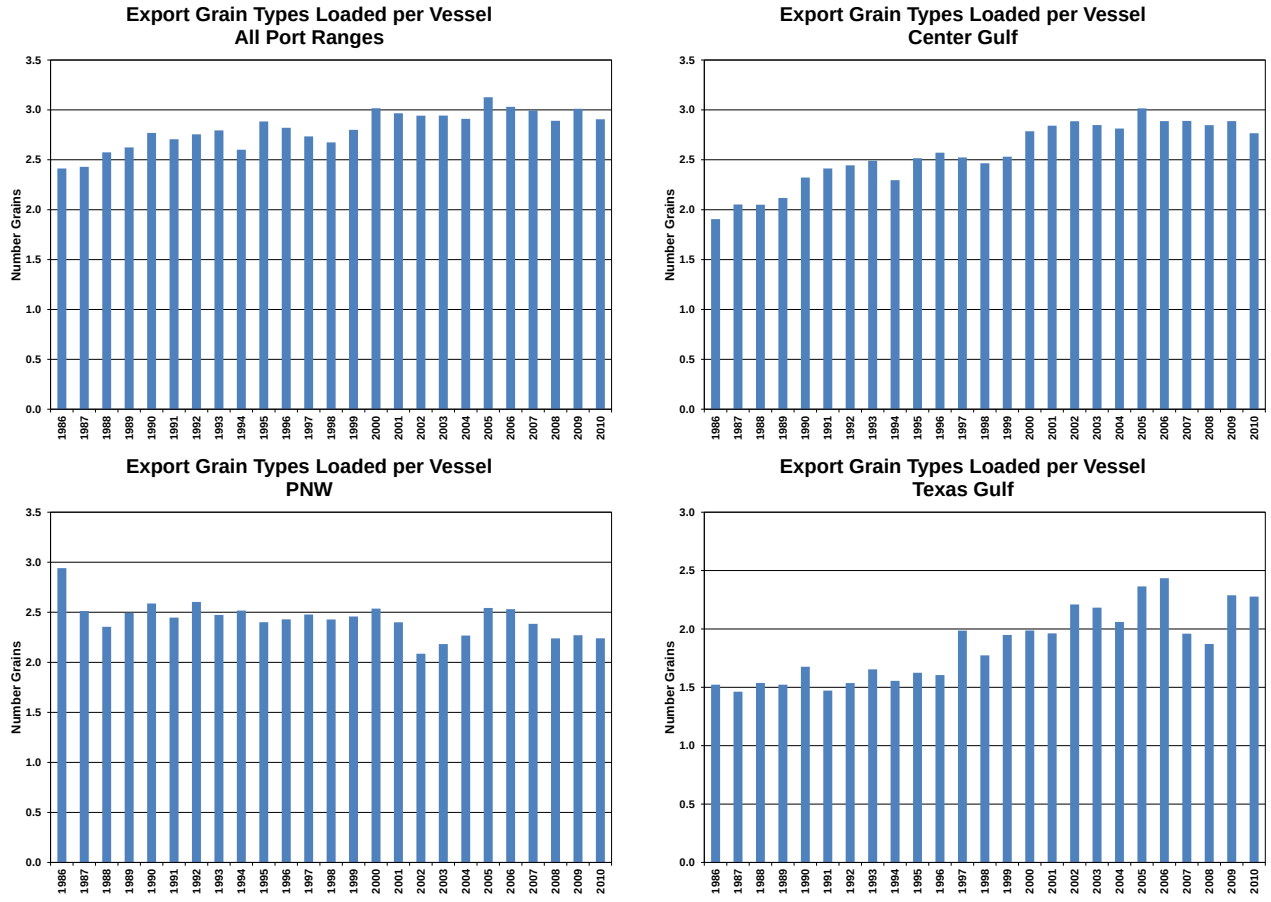


Source: http://www.nrtw.org/rtws.htm

8. Co-Loading

Co-loading is the practice of loading multiple grains or class of grains on one vessel, sometimes called a combo cargo shipment. The practice of co-loading has gained favor over time, increasing from less than 2.5 grains per vessel in the late 1980s to about 3 grains since 2000 as shown in Figure 49. The co-loading of multiple commodities increases the time it takes to load vessels to clean shipping belts between grains or classes and setting up dunnage in the vessel hold for example.

Figure 49: Export Grain Types Loaded per Vessel by Port Range



Interviews with export elevator managers indicated that co-loading of commodities can increase the time to load a vessel by half a day. Co-loading is done at the key port ranges including the Center Gulf, Texas Gulf and PNW.

The co-loading process is about as efficient as it can be according to most elevator managers, meaning there is not much that can be done to make it more efficient. However, if the customers continue to pay premium prices for co-loading, export elevators will pursue procedures to improve efficiencies. One elevator manager mentioned that areas of prospective efficiency gain were improving logistics and coordination with the railroads. Logistics efficiencies are accomplished by making proper space at an elevator available for each commodity. Alternatively, coordinating the elevator belts to load faster and having two scales available for weighing could also improve efficiencies.

Out of the Center Gulf, co-loadings have displayed a pattern similar to all exports, but increasing from less than 2 grains in the late 1980s to about 3 since the early 2000s. In the PNW co-loadings have been more consistent at less than 2.5 per vessel, but dropping during the early 2000s and again in the late 2000s to about 2.2 per vessel.

Texas Gulf elevators have experienced an increase in co-loadings from 1.5 grains during the 1980s through mid-1990s, and then running up to more than 2 grains.

VII. Company Profiles

A. Large Grain Exporter

This discussion was conducted with a large grain exporter that also ships grain in containers. The company and individual requested anonymity.

In addition to being a grain elevator and major supplier of food grains domestically and internationally, it also provides seed, fertilizer and chemical inputs for growers in the upper Corn Belt. Their main countries for export include Japan, Taiwan, Malaysia, and China.

Over the last five years, many companies have explored the idea of transloading grain into containers with limited success. The reason for the lack of success is the extra cost ($350 per 40 foot container) makes the operation uncompetitive for months at a time. The lack of cash flow results in insolvency. The other major reason for failure is the lack of a steady supply of containers.

For shipping grain in containers to be profitable, the shipper must have a reliable supply of containers, a consistent grain source and an inexpensive backhaul opportunity. A common problem is the steamship lines schedule stops based on importers demand. If the demand shifts, the available supply of containers will shift. Finding a dependable supply of containers is more difficult than it appears. Not surprisingly, the containers flow to populated areas.

A supply of grain to deliver directly to a transloading facility at an intermodal yard eliminates the repositioning cost. A location in the Corn Belt has better access to surplus, lower price grain and soybeans.

An inexpensive backhaul is tied to having a steady supply of containers. An ideal situation is to provide a backhaul for a major retailer. It should be noted that approximately two-thirds of containers shipped to Asia from the U.S. are empty and the products being shipped are low value. Products being shipped to Europe from the U.S. are higher value and at times, need to be identity preserved. As a result, shipping of grain and soybeans off the East Coast is very difficult. This is why 95% of Chicago's grain container movements are to the West Coast.

Specialty grains are shipped in containers as a method to preserve certain grain and soybean quality traits. For example, Malaysian soybean importers prefer U.S. food consumption grade and are willing to pay a premium. Another development helping containerized grain shipments is the ability to limit working capital expenses and storage costs. The smaller size of the containers improve the ability of millers and processors to manage their capital and inventory.

The ocean carrier controls the rates. The exporter receives an all-in rate from door to port. The good news is ocean carriers are giving the agriculture products a dedicated

buyer. The bad news is the dedicated buyer is more knowledgeable and is shrinking profit opportunities.

The key to making money shipping grain in containers is a relatively low local basis, minimal loading costs and an attractive backhaul rate. Even if the Panama Canal expands container traffic to the Gulf and East Coast, the lack of local grain and soybeans for backhaul is a major disadvantage.

B. Large U.S. Retailer

This discussion was conducted with a large consumer products group retailer's VP of Transportation. The company and individual requested anonymity.

As a thumbnail sketch the company has imports from some 30-40 countries all around the world. However, the large majority of the shipments originate from a set of five countries, including China, Vietnam, Indonesia, and increasingly India, as well as from the Eurozone. The European manufacturers have been shifting their origin for manufacturing to essentially these same Asian production markets, especially China.

The company markets the products under their own exclusive brand, as a private label, so they are not performing distribution to other retailers for their goods. They market 45% of their goods directly to consumers through the e-commerce marketplace. The company utilizes a distribution center on the East Coast, one in the center of the country near major transportation hubs, and they maintain facilities on the U.S. west coast, in the LA basin as well as in the PNW for the transload of goods from 20 feet, 40 feet and 45 feet long international shipping containers (ISO boxes) to 53 feet domestic containers (DomCons). The operations in the middle of the country serve as the source of the parcel shipments that go out to stores and direct to consumers. The facilities on the coasts are utilized as source locations where the freight is staged for the home delivery of ordered pieces that are too big for parcel delivery, such as furniture or large pieces that fall into the hundredweight category.

Domestic freight is moved by the means that is most efficient be it truck or intermodal truck/rail, where the company uses a set of intermodal marketing companies.

Freight through the East Coast is directed from such origins as Indian sub-continent or European manufacturing sites to Savannah or the Port of New York / New Jersey. Other freight moves via all-water routes into the East Coast through the Panama Canal. The East Coast versus West Coast split was estimated at 30% all water versus 70% transpacific to the U.S. West Coast.

The Panama Canal expansion, it is expected, will be "an evolution, not a revolution." The interesting factor that is expected to change is the increased capacity into and off of the U.S. East Coast to and from Asia. It is extremely interesting that though there is already excess capacity in the export market, the change in the flows of trade may lead to the changes in priority ports. The increases and coming investments in the ports of

Mobile, Jacksonville, New Orleans and Houston are driven by prospective development of greater connectivity to the local markets with the significantly larger ships that are to be operated.

It was not believed that there were any Beneficial Cargo Owners, Shippers, and Consignees (BCO) with any influence over the decisions of the Panama Canal, rather that was an issue that the Ocean Carriers would be addressing, as the tolling levels would be more directly a portion of their costing and pricing, and they would in turn pass those on to the BCO's.

The other implication the increased capacity will have on the freight for the easternmost destinations is likely to extend the reach of how far inland the freight can go from being discharged at U.S. East Coast as rail and trucking investments are made to increase local capacity needs.

The company does not export, so they have no knowledge of actual backhaul opportunities.

While there have been occasional points in time where the operations have prompted the company and others in the market to be "begging" for capacity on the rail, on a regular basis, there may be an occasional need for equipment that was unavailable for a particular day, but that the service providers can generally fulfill transportation requirements the next day, if there is a lack of availability of equipment. Given the long transit times between ports overseas and North American continental ports, a longer planning and inventory carrying costs in transit for the use of the all water services of 5 or 6 days is not seen as being too serious, in the proportion of overall landed costs.

Rail has been viewed as having improved in terms of customer service and rate competitiveness over the past few years. Yet there are limitations to the services the railroads provide and the intermodal marketing companies are the real wholesalers of the intermodal capacity to the domestic intermodal shipping market. Risk management is a motivating factor in distributing the routings across multiple ocean corridors, ports, inland routes, modes and distribution centers.

The port labor lockout in 2002 was eventually settled by Presidential order under the Taft Hartley Act. That took ten days to occur, and several months to unwind as the market efforts to return to normal were cumbersome, due to many limiting factors, including infrastructure capacity. That taught BCO's to watch the marketplace more closely. There will always be occasional wildcat strikes and labor unrest somewhere, but for the whole industry to get caught flat footed without viable options for shipping and receiving goods to sustain the supply chain with customers, more robust and dynamic risk management strategies have been deployed to manage against that eventuality.

The company wants to use intermodal increasingly, that there are not more avenues to go to be served by railroads is a frustration. Having only two service providers from the

U.S. West Coast, UP and BNSF for the transload of ISO containers into DomCons, precludes the company from using the CN as an alternative from Vancouver or Prince Rupert, BC. The routing and preference for the particular service provider will be driven by the individual corridor and total landed cost economics. Those must be worked out favorably for any particular routing to be sustained.

Learning from the operations inside the four walls of the warehouse environment, the product differentiation will drive the logistics and services that are negotiated with the transport and service providers in the marketplace. Whether bean curd/tofu/meats or IP beans or meal with unique characteristics, the requirements for temperature control, humidity control, synergies with nearby service providers may identify synergies to leverage carrier interests, such as matching headhauls with backhauls when bringing a container in and then utilizing that asset in an efficient way to ship that container back out.

Regarding the nature of BCO's investing in intermodal operations, there would need to be substantial volumes for any one company to invest in assets for transportation, and some unique self-interest. The expenses associated with operations of a private fleet for domestic transport is onerous enough. Developing an intermodal facility or set of metrics that would justify development of intermodal capacity might work for the auto industry but that is not going to be the case for much of anyone in the market.

In the inland barge market, while containers on barges might be viable at some point, the frequency of the schedules, the transit times that are roughly competitive, the reliability that is consistent, or if there is really a major cost competitiveness, then that might make Container On Barge interesting, but it does not appear to be a viable alternative at this point in time for this company, compared to truck or intermodal domestic transport routings.

The element that keeps BCO management up at night is trying to anticipate what is around the next corner, "not knowing what I don't know." Asking what am I missing is always foremost on a BCO's mind as the complexity of international trade logistics is fraught with potential pitfalls to be avoided and overcome.

Furthermore, oil prices are a continuing concern, along with the calculation of fuel surcharges, especially from railroads. While lower oil prices have not translated into lower fuel surcharges, truck rates appear to have been more directly responsive to decreases in the prices of on-highway diesel that has been relatively stable, especially lately, it was observed. The sense that the intermodal "FSC is outrageously high," was another notable observation.

In the course of negotiations with carriers, greater transparency regarding fuel surcharge pricing would be welcomed, and is seen to be necessary, especially with regard to intermodal services. The company negotiates with carriers to ensure that surcharges are competitive with direct cost components, in an unbundled rate structure. Ranging from terminal service charges to currency adjustment factors, the fuel or

bunker surcharges are also evaluated to ensure the costs are in line with market pricing, including inland carriage. While these are unbundled for the purposes of understanding rate competitiveness, the BCO prefers to have the all-inclusive, bundled, door to door rates for budgeting and reporting purposes. The movement and the costs are examined from one end of the logistics and supply chain to the other, "end-to-end," yet the company is constantly looking at the components as they may adjust routings, local trucker to pick up loads at terminals instead of relying on carrier routings, and for other purposes.

C. Multi-National Agricultural Exporter and Foreign Importer

This discussion was conducted with the logistics manager of a large multi-national agricultural trader. This is one of the largest companies in the world. The company and individual that were interviewed requested anonymity.

The logistics manager does not expect bulk commodity movements to be altered significantly with the completion of the Panama Canal, because the ocean carriers are in control. In order for significant changes, the ocean carriers will have to build new equipment and change established relationships with their inland transportation providers. Ocean carriers provide the rate from door to door. Ocean carriers have strong relationships with the railroads and are reluctant to circumvent the railroads. Another problem is the ability of foreign ports to accommodate larger ships. The belief is the impact of the Panama Canal expansion will take a decade to discover and resolve, and based on demands from ocean carriers and shippers alike.

For moving product in containers, it is all about the boxes. The ability to ship large quantities of product enables the company to negotiate container agreements with ocean carriers. For example, the interviewee's Asia Pacific product that moves to the West Coast is transloaded in Dallas with the product originating in the Southwest and the containers coming from Memphis, TN. The company can also load in Memphis or bring containers in from Chicago.

Earlier in 2011, because of lower demand, ocean carriers pulled two strings, which limited port availability vessel calls and subsequent containers and slot capacity. The disadvantage of having lower priced backhaul opportunities is the backhaul is not a priority for ocean carriers, which means the containers and port availability, can quickly change.

The key is being able to match containers with supply. Mideast and European destinations are at or near capacity from the U.S., which makes shipping agriculture products to Mideast and Europe difficult. For the East Coast, backhaul opportunities are limited. However, cotton from the East Coast has a certified location in Greenwood, SC. So, if ocean carriers implement delivery strings from and to Asia, it would be possible to ship crops as a backhaul.

The ocean shipping rate to transport product is consistent among ocean carriers. The major concerns are container capacity, ports of call, shipping schedules and clear documentation.

Do ports have the capacity to handle 10,000 TEU ships? Almost all the ships loaded off the West Coast are 4,000 TEU due to the limited depth of ship channels and port capacity at most foreign ports. For example, a vessel loaded to 16,000 TEU of product shipped to Vietnam is delivered to Singapore and four feeder ships constantly supply the manufacturing operations because ships larger than 4,000 TEU cannot access ports in Vietnam. It should be noted that Japanese companies are investing in Vietnamese port expansion projects.

D. International Sugar Producer

This discussion was with an international sugar producer which is working with East Coast ports to successfully import, export and transport domestic production throughout the U.S. This company does not use the Panama Canal to ship sugar or any of their products. Their markets are in the Caribbean and North America. The opportunity for markets in Asia may open in the future and at that time they would use the Panama Canal for shipping their products.

The biggest advantage of the Panama Canal expansion for this company will be backhaul opportunities to domestic markets using the extra empty containers at East Coast ports. In Florida, there are adequate supplies of containers, and those numbers will increase due to port expansions in Florida. With more containers available, backhauls will create more competitive rates. In addition, the port expansions will create needed space for all operations.

Currently, truck is the primary mode of sugar transportation for this company but they have started to use more intermodal to gain efficiency. Their product mainly goes to interior cities such as Atlanta but they also send a large amount of product to Chicago. As a result, sugar products are put on rail in Miami or other near-by ports on the Florida East Coast (FEC) Railway to Jacksonville and placed on NS rail and sent directly to Chicago.

This company is hoping to work with Midwest soybean farmers regarding the Panama Canal expansion. The soybean farmers are anticipating port expansion at Miami to help the flow of soybeans. In addition, farmers are working with the Port of Savannah in the same way as Miami. The Port of Jacksonville is not on the same pace of completion as these two ports and may be left behind in terms of working with soybean farmers. From the conversation, the main focus of the farmers is the anticipation of increased space at the ports making soybean flows more competitive.

Ports and private companies are partnering on the new industrial park located on 850 acres off of U.S. Hwy 27 near South Bay, FL. This facility will include large distribution

centers for Wal-Mart, Target and others. These distributions centers open the door for more jobs and intermodal opportunities.

The ocean carriers want to turn the vessels around as fast as possible, limiting their time in port. Time is money and over the course of 20 years if a vessel can add one more transit to its voyage, this could mean addition tens of millions of dollars. So the ocean carriers are looking for ports that are going to give them the best opportunity to turn the vessel quicker. Shipping companies would like to use 85% of their vessels to show profits, anytime a higher percentage is achieved then more profit for the company. This leads to the idea that a vessel will go through the Panama Canal and unload some containers in a Caribbean port then pick up more volume and send to the U.S. thus creating the possibility to use over 100% of the vessel.

E. Georgia Ports Authority (GPA)

GPA is the fourth largest port in the country. The waterfront labor lock-out among the West Coast ports in 2002 helped GPA to grow as more shipping lines reallocated strings of services to port calls on the East Coast, and more consignees called for such an alternative routing. Seventy percent of the U.S. population lives east of the Mississippi River. This gives GPA an advantage over West Coast ports for reaching the hinterland cities across the eastern portion of the country. India and Southeast Asian markets have become very important to GPA over the last 4 or 5 years, as points west of Singapore are more naturally routed to the U.S. via the Suez Canal and to the East Coast.

Grain and DDGS in containers have started to move through GPA. The lack of infrastructure and grain storage in Africa is one reason for grain in container growth. The demand for DDGS in China has opened new opportunities for GPA, as well. Barriers to trade with China are holding back growth of the GPA. GPA sends approximately 1,000 containers of frozen poultry to Asia (mostly China) per week. Transload is growing quickly as well. At Colonel's Island, tenants have long term contracts for 1 million tons of exports, mostly soybean meal along with some wheat and corn. The port is loading Capesize vessels for delivery of substantial volumes to Asia.

GPA does very little trade with the West Coast of South America. In general, the primary commodities that are moving include some onions that originate in Peru and tuna from other parts of the west coast of South America that are transported to the U.S. via GPA.

One of the reasons railroads have expanded is due to growth of trade through the Suez Canal. Bigger ships have been calling on the U.S. West Coast. According to a port authority representative, railroads have not expanded much due to Panama Canal expansion to date.

GPA predicts that their expansion into the U.S. hinterland market will be stretched somewhat from the current geographic limit being the area around Memphis to the region around the Dallas market and to some extent Chicago. Ships up to 10,000 TEUs

that would call on GPA first would unload containers in significant volumes. Those containers would be able to enter more quickly to Chicago than if they were unloaded at the port of New York/New Jersey for the same destination.

Transloading containers from a trans Pacific vessel to a regional vessel with such hub and spoke operations is not considered cost competitive due to additional handling expenses, and thus is not expected to grow significantly. Direct routing inbound or outbound via GPA has an advantage over routings via small vessels that would transload to bigger ships at a place like the Bahamas due to the additional handling involved and associated transfer costs for containers. It costs approximately $250 per container to transfer a container from one vessel to another. Ships would rather deliver to the primary market. Since most of the containers that move through the Bahamian Port at Freeport would end up in the U.S. that eliminates most any advantage transloading from large ships to smaller feeder vessels through the Bahamas over direct carriage to U.S.

The value of goods is different between the U.S. West Coast and the East Coast. The West Coast receives more electronics that were produced in Asia while the East Coast receives more furniture, auto parts and agriculture products that are of lower relative value. Due to the inventory carrying cost, the West Coast attracts cargo that requires a faster transit time, even to most of the eastern region of the country than the vessels that are sailing direct to the East Coast. Containers with higher value products that enter the West Coast will be put on rail or truck and sent across the country. Agriculture products could see more growth at the East Coast ports because their inventory carrying costs are similar to furniture and auto parts which are less than electronics.

GPA will be dredging their ship channel in Savannah from 42 feet to 48 feet to take advantage of the Panama Canal expansion. It will take four years to completely dredge the 27 mile channel to that depth. Development of GPA owned port property, even though much of it is in Jasper County, South Carolina would expect to increase annual TEU additional volume for the area to a capacity with a further 3 million to 6.5 million TEUs as a bi-state port is planned. This facility is estimated to be 10 to 15 years or more away from completion.

VIII. Pre- and Post-Panama Canal Expansion

The expansion of the Panama Canal will not create additional demand, but will eventually alter trade lanes. Because the changes are dependent on previous change, the transportation system will have to evolve. The first step in the evolution was container ships increasing size. The second step is the expansion of the Panama Canal, which has given a reason for East Coast port to expand. For example, the ability to unload larger ships on the East Coast will increase the odds of a large retailer building a major distribution center in the Eastern U.S. The new distribution center enables the ocean carriers to add a string of ports to call. The new availability of containers, load out times and increased destination ports expand backhaul opportunities.

When loading more volume or larger vessels, several factors need to be considered:

1. Time to load and unload increases
2. Higher fuel consumption
3. Higher port tariffs based on volume
4. Higher land toll revenues based on volume

The expanded Canal will allow greater volumes to be loaded, but potentially minimize the time waiting to transit the Panama Canal which can be more than 4 days.

Alternatively, depending on the toll structure heavier loadings of a Panamax to 45 feet for the lower Mississippi River draft may discourage such delays and limit transit to 39.5 feet through the original locks. But, the time to wait for a transit slot could be reduced. These are addressed in this section.

A. Transportation Costs (Center Gulf versus Pacific Northwest)

- Laden bulk vessels, were the second most frequent vessel type with 2,275 transits contributing $189.1 million in toll revenue from 51 million net cargo tons or approximately 12 cents per bushel or $4.24 per MT.
- A line of demarcation depicting the line of indifference for soybeans to flow to the Center Gulf or to the PNW for export positioning was developed by estimating the landed cost of soybeans to Japan using transportation costs as the proxy.
    - The estimated landed cost for soybeans from the Center Gulf to Japan is $78 per MT, $95 from Charleston, SC, and $84 from the PNW as shown in Table 40.
        - The East Coast is not competitive for shipping soybeans out of the Corn Belt.
        - PNW and Center Gulf compete for volumes. Which direction the farmer ships soybeans depends on the proximity to the river and shuttle train elevators.

  - The cost advantage for a farmer located near the river is $6 per MT or 17 cents per bushel.
- Once the Panama Canal expansion is complete, vessels can be loaded with an additional 7,000 metric tons on a Panamax or 13,300 metric tons on a small Capesize vessel.
  - Under these scenarios, the transportation freight differential between the PNW and Center Gulf expands to $12 per MT and $19 per MT, respectively.

Table 40: Transportation Costs to Japan ($ per metric ton)

	Center Gulf (New Orleans)			East Coast (Charleston)			PNW
	56,700 MT	63,700 MT	70,000 MT	56,700 MT	63,700 MT	70,000 MT	65,000 MT
Inland Rate	$15	$15	$15	$32	$32	$32	$54
Ocean Rate	$62	$56	$49	$63	$57	$50	$29
Landed Cost	$78	$72	$65	$95	$89	$82	$84

- Assuming a truck capacity of 25 metric tons, a truck rate of $3.50 per mile and a 25 mile draw area for a shuttle train, a farmer located 70 miles from the river will receive the same price at the railroad or barge terminals as shown Table 41.
  - A shuttle train location would ideally be 95 miles from the river, or 45 miles plus 50 miles to ensure a 25 mile draw area.
  - The Post-Panama Canal expansion will expand to 161 miles from the river, which would put many shuttle trains within the river draw area.
    - Under this scenario, the railroads would have to lower rates. For example, despite Kansas City being 293 rail miles closer to Portland, the cost per ton is the same as St. Louis as shown in Table 42.

Table 41: Breakeven Distance from Mississippi River Transporting Soybeans to the Center Gulf or Pacific Northwest by Vessel Load Factor

Vessel Load Factors (metric tons)	Center Gulf less PNW Transportation Cost	Truck Capacity	Truck Difference	Truck Rate per Mile	Breakeven Distance (miles)
56,700	-$6	25	$157	$3.50	70
63,700	-$12	25	$302	$3.50	111
70,000	-$19	25	$474	$3.50	161

Table 42: Rail Rate Comparison

Origin	Destination	Tariff	Fuel Surcharge / Mile	Mileage	Total Fuel Surcharge	Total Cost	Tons / Railcar	$/Ton	$/Mile
Kansas City, KS	Portland, OR	$6,190	$0.35	2,072	$725	$6,915	110	$62.87	$3.34
East St. Louis, IL	Portland, OR	$6,090	$0.35	2,365	$828	$6,918	110	$62.89	$2.93

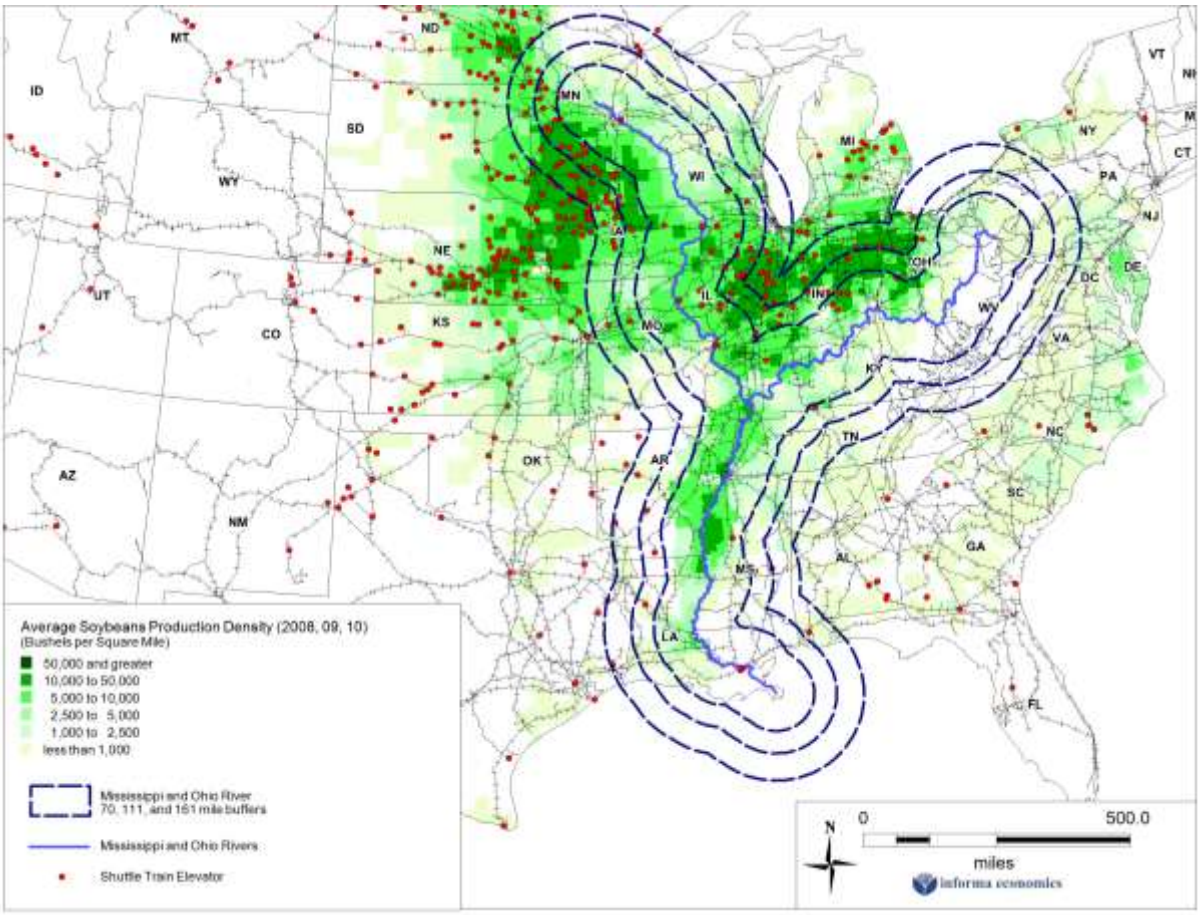
Source: BNSF

- The Panama Canal expansion will expand the Mississippi and Ohio River soybean draw area by 23 million acres to 50 million or two thirds of total U.S. soybean acreage as shown in Table 43.

Table 43: Mississippi and Ohio River Soybean Draw Area Acreage

Distance	Planted Acres	Harvested Acres	U.S. Harvested Acres	Draw Area Percent U.S. Harvested Acres
70 Miles	26,702,100	26,471,750	73,800,000	**36%**
111 Miles	37,858,000	37,513,650	73,800,000	**51%**
161 Miles	49,614,500	49,186,300	73,800,000	**67%**

Figure 50: Mississippi and Ohio River Soybean Draw Areas (70 miles, 111 miles and 161 miles)



- Expanding the demarcation line or line of indifference from 70 miles to 161 miles from the river captures a significant portion of the soybean production area as shown in Figure 51.

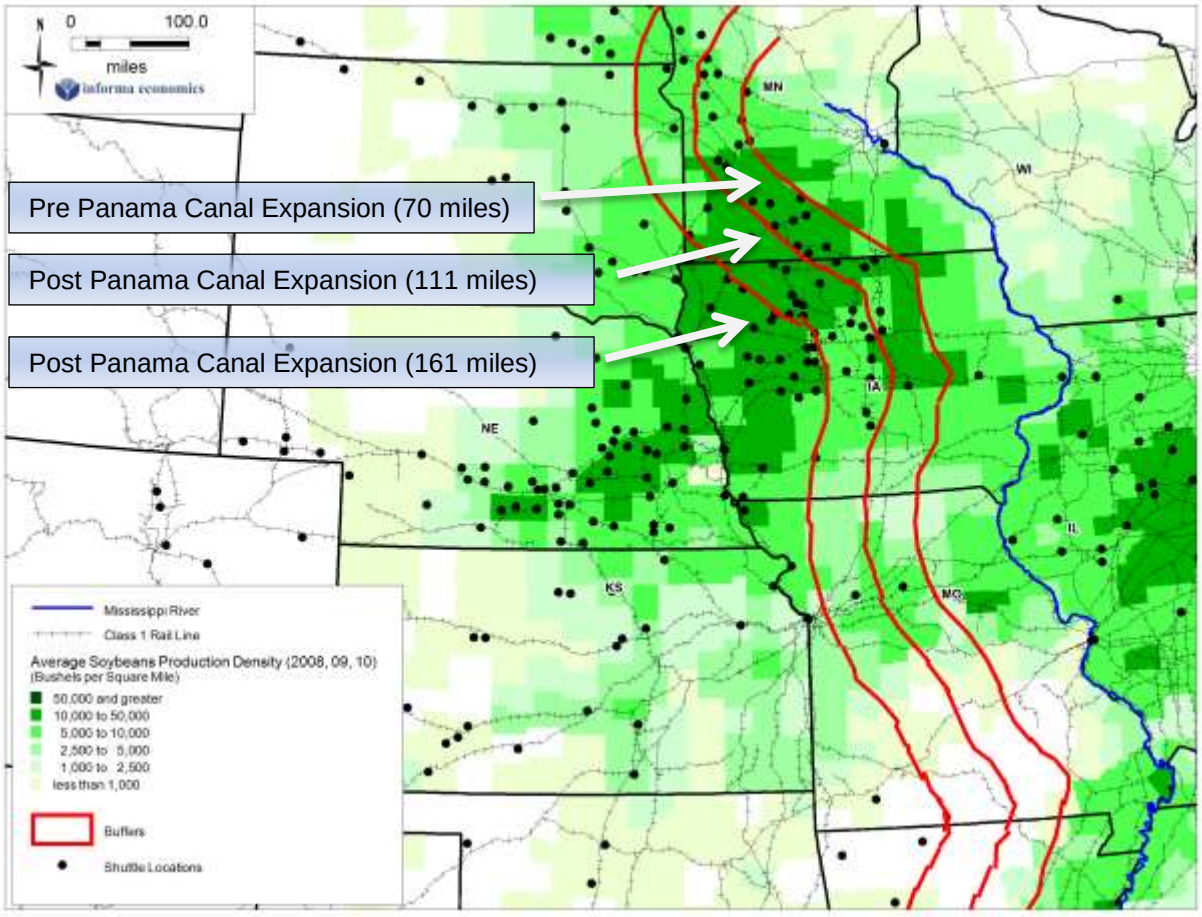
- The expansion of the Panama Canal will increase the number of soybean acres in the river draw area by 96% or 10 million harvested acres as shown in Table 44.

Table 44: Soybean Harvested Acres within the Mississippi River to the Western Indifference Line

Distance	Planted Acres	Harvested Acres	Post Panama Canal Expansion	Post Panama Canal Expansion
70 Miles	10,704,800	10,588,300	-	0%
111 Miles	15,460,600	15,285,500	4,697,200	44%
161 Miles	20,973,200	20,744,800	10,156,500	96%

Source: USDA, Informa

Figure 51: The Line of Indifference Shipping Soybeans to Center Gulf or Pacific Northwest



B. Transportation Costs (Texas Gulf versus Pacific Northwest)

- Even after the Panama Canal expansion, Omaha, NE soybeans shipped through the West Coast will be more competitive than the Texas Gulf.

Table 45: Texas Gulf and Pacific Northwest – Transportation Costs to Japan ($ per metric ton)

	Texas Gulf (Houston)				PNW	PNW
	56,700 MT	63,700 MT	70,000 MT	80,000 MT	65,000 MT	80,000 MT
Inland Rate	$32	$32	$32	$32	$35	$35
Ocean Rate	$62	$56	$49	$45	$29	$23
Landed Cost	$94	$89	$82	$77	$65	$59

C. ADM Post Panamax Ships

- ADM has ordered three ships that can maximize the benefit of the Panama Canal expansion by holding 80,000 metric tons on a 97,000 deadweight ton vessel.
- A Post-Panamax ship has an $18 per MT advantage over the current Panamax vessel.
- The Puget Sound can accommodate the larger vessels but the Columbia River cannot.

Table 46: Post-Panama Transportation Costs to Japan ($ per metric ton)

	Center Gulf (New Orleans)				PNW	PNW
	56,700 MT	63,700 MT	70,000 MT	80,000 MT	65,000 MT	80,000 MT
Inland Rate	$15	$15	$15	$15	$54	$54
Ocean Rate	$62	$56	$49	$45	$29	$23
Landed Cost	$78	$72	$65	$60	$84	$78

D. Accommodate Larger Ships

1. United States Ports

- Most U.S. ports can accommodate a 45 foot draft and many are expanding to a 50 foot draft.
    - For bulk movements, the flooding that occurred in 2011 has limited the depth at the Port of New Orleans, but by completion of the Panama Canal, scheduled dredging should return the depth to 45 feet.
    - A 45 foot draft does allow small Capesize vessels to load to 70,000 metric tons.

Figure 52: U.S. Ports with Memorandums of Understanding with the Panama Canal Authority Current and Projected Channel Depths

- To take advantage of the Panama Canal creating opportunities to service larger vessels, several Caribbean countries are building super hubs dedicated to transloading cargo.

2. Foreign Ports

- Japanese grain terminals for the most part are unable to handle bulk ships loaded beyond 42 feet depth. Japan's major focus at this time is recovering from the devastating earthquake in March 2011. Prior to the earthquake, the port of Nagoya had started to deepen ship channels to 16 meters (52.5 feet) towards their main container terminal. The process is still ongoing.
    - Japanese companies are investing heavily in Vietnamese port expansions.
    - Japan is still the largest importer of U.S. agricultural products.
- Smaller Asian countries do not need to add capacity. Many of these countries depend on larger ports for redistribution.
- By contrast, China is in the middle of a building boom. China already has five large-scale ports (Shanghai, Ningbo, Xiamen, Yantian, and Hong Kong), able to accommodate the largest-ever Triple-E class AP Moller-Maersk AS container vessels currently being constructed in South Korea. Meanwhile, China has been creating ports in locations where ports previously did not exist, in addition to

expanding existing port infrastructure to increase throughput capacity and accommodate larger vessels.

- Without the same regulatory hurdles as the U.S., China can deepen their ports within two years.
  - China is launching two domestic ocean lines, which is expected to facilitate deeper ports.

E. East Coast versus West Coast

1. Volumes

- The key for importers is an increase in demand. Gradually, as distribution systems are developed on the East Coast and port congestion returns to the West Coast, volumes will shift towards the East Coast.
  - Prior to the recession, the West Coast ports were experiencing congestion problems. Since that time, the West Coast ports have taken concrete steps to solve congestion issues.
    - Increasing imports over the next ten years should reach levels that tax the West Coast ports ability to handle the volume. Ports at or near capacity are not incentivized to lower rates to compete with other ports.
  - In anticipation of port congestion problems, Informa believes major retail chains will take steps to develop the distribution system stemming from the Center Gulf and East Coast ports. The goal is not to displace West Coast traffic, but to ensure an efficient delivery system with increased and enhanced distribution alternatives.

2. Costs

- For bulk shipments, the expansion of the Panama Canal is extremely important.
  - The possibility of lowering the Center Gulf freight rate by $14 per metric ton will expand the barge competitive draw area. The railroads shuttle train locations in the expanded barge draw area will either lower freight rates or lose modal share.
  - Unlike the railroads that are few in number and enjoy a high barrier of entry, the barge industry is extremely competitive with a low barrier of entry. As a result, the barge industry will be forced to pass on the savings instead of raising tariff rates.

- The ACP has not stated what will be the new toll structure except to say at the onset of the effort that tolls will double from 2006 to 2025.
  - Informa believes the ACP will monitor the traffic flows and change the tolls accordingly.
  - According to ACP the capacity of the Panama Canal will be doubled. The first priority is to maximize throughput and then increase the tolls.
  - The ACP has to incentivize the major U.S. retailers to develop or expand an East Coast distribution system.

3. Import / Export Balance

a) Container

- The balance between imports and exports is the result of the trading partners, not the location of the ports. For example, Asian countries enjoy a large trade surplus with the U.S. for goods that are shipped by container. As a result, as much as 70% of containers return to Asia empty. The U.S. is more successful in shipping high value goods to Europe. As a result, the container trade is basically even.
    - As more Asian container traffic enters the Eastern U.S., the East Coast and Center Gulf ports will ship a higher percentage of empty containers.
- For shipping grain in a container, the keys to success are an availability of containers, lower priced soybeans, and a lower priced backhaul opportunity.
    - When the trade is equal, the lower priced backhaul opportunities disappear.
    - The UP and BNSF rail yards in Chicago provide the West Coast ports with inexpensive grain to put into the containers due to close proximity to surplus supplies of grain and soybeans.
        - The farmers deliver grain directly to the terminal, which minimizes a transloading expense.
    - Because the grain backhaul system in not in place for the East Coast or Center Gulf, this will act as a deterrent for switching West Coast container traffic to the East Coast.
        - Transloading grain from a railcar out to a port on the West Cost for example, adds approximately $350 to the landed container cost. The grain export market is extremely price sensitive.
- Soybean shipments in containers are dependent upon the distribution system of the major retailers.
    - Although the Panama Canal expansion will lead to lower transportation costs, it will not create U.S. consumer demand that is needed for increased container supply, but it will change transportation lanes.
        - The changing lanes could eventually provide new opportunities for containerized soybeans, but over the next ten years, the impact will be minimal.

b) Bulk

- The expansion of the Panama Canal will increase the competitiveness of Center Gulf versus PNW and result in increased grain shipments through the Center Gulf, as depicted in the outlook for exports by port, with the Center Gulf gaining port share of volume.
    - China is expanding imports of soybeans and corn will limit to need for ports to compete for business. From October through February, China's soybean impact demand is testing the limits of the U.S. export system.
        - The capping of the U.S. ethanol mandate in 2015 and continued yield increases will provide additional corn volume to be exported without severely increasing the corn price.

- China's steel production is expanding by double digits and exports are increasing in importance. A lower priced backhaul rate for steel to the Center Gulf would entice more grain and soybean imports from China.

F. Agriculture Benefitting versus Non Agriculture Industries

- Agriculture will benefit more than other industries by the expansion of the Panama Canal because U.S. agriculture is competing directly against other exporters.
  - The local industry is the largest other industry in this situation.
- For industries that are competing against foreign competition in the domestic market, the less expensive transportation costs will make their competitors more competitive.
  - Industries such as steel, cement, and fertilizer will be hurt by the Panama Canal expansion.

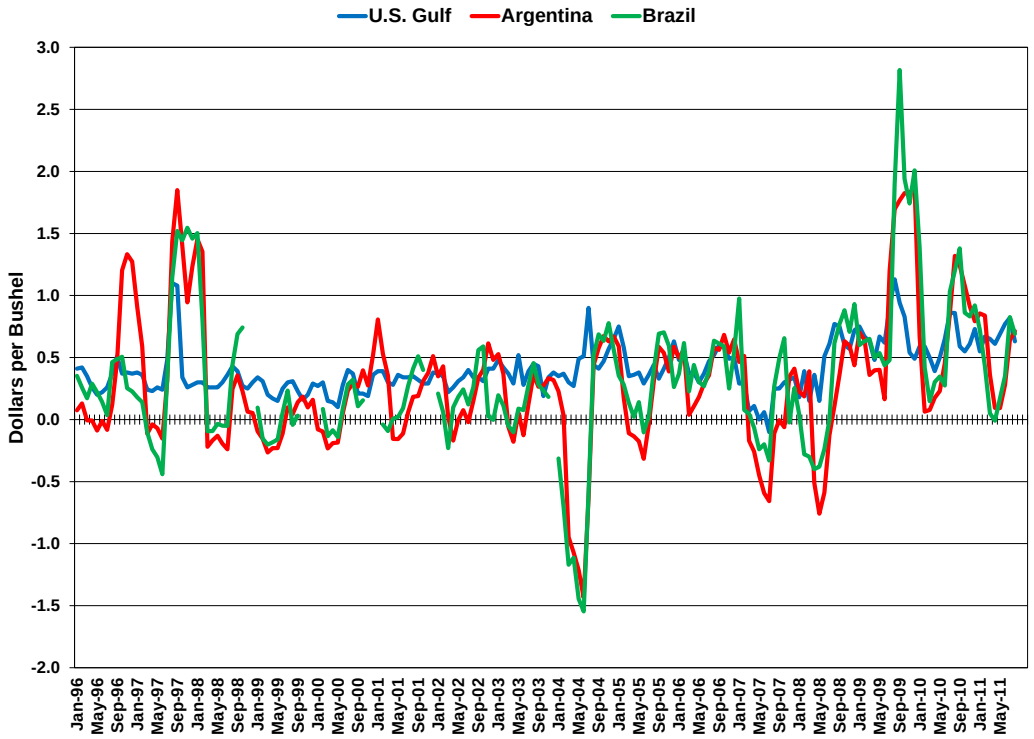
G. Gulf to Asia versus South America to Asia

- A significant opportunity will be some level of improved competitiveness with key U.S. competitors such as Argentina and Brazil. Argentina and Brazil have been improving the grain export logistics system to become more competitive.
  - The U.S. and South America compete directly for export business. As a result, the corn and soybean prices in the U.S. and South America are linked as shown in Figure 53.
  - Any improvement to South America's infrastructure will result in less expensive grain to the end user and on margin, more demand for South America grain and less demand for U.S. grain.
  - For the U.S., the Panama Canal expansion will essentially lower the price to the end user will lead to a corresponding change in grain flows to export position (e.g., more grain and soybeans flowing toward and through the Center Gulf).
- The major grain companies are multinational companies that examine where to invest money on a global basis. The U.S. is in direct competition with South America for valuable infrastructure that can have a tremendous impact on a farmer's profitability. For example, a soybean crushing facility that is built in the U.S. instead of Brazil will ensure U.S. farmers near the facility with a marketplace. U.S. will be able to export more volume of finished oilseed products.
- The impact of the Panama Canal expansion will not benefit Northern Brazil. For Northern Brazil, transporting the soybeans to Asia around the Cape of Good Hope is still more cost effective than transiting the Post Expansion Panama Canal.
- Comparing the Center Gulf and Brazil found a transportation advantage for the U.S. farmer. The comparison assumes a doubling of the Panama Canal tolls and a shorter transit time.
  - Assuming a 63.7 thousand MT shipment on a Panamax vessel, the Center Gulf has a $4.10 per MT or 9% freight advantage versus Northern Brazil transiting the Post Expansion Panama Canal, but only a $3.39 per MT

freight or 7% advantage around the Cape of Good Hope as shown in Figure 54.

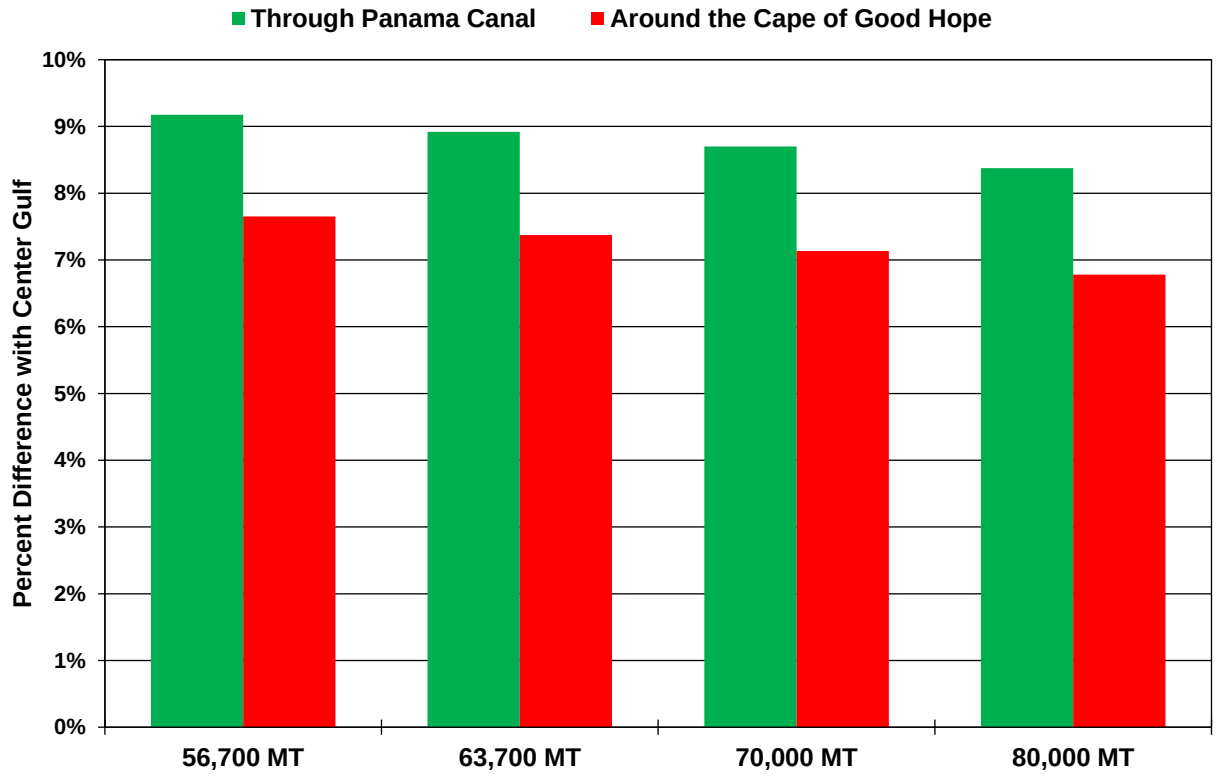
- The Center Gulf advantage improves as vessels are loaded heavier or larger vessels (e.g., loading a small Capesize vessel) are employed to transit the Post Expansion Panama Canal from the Center Gulf.

Figure 53: Monthly U.S. Gulf, Argentina and Brazilian Soybean Export Basis (local price less nearby CBOT futures, $ per bushel)



Source: CBOT, USDA

Figure 54: U.S. Center Gulf Freight Rate Advantage with Northern Brazil by Route and Vessel Size



Source: APC, BOYD, Informa

IX. Specific Actions Required to Ensure U.S. Agriculture and the Soybean Industry Fully Benefit from Expanded Panama Canal

1. Monitor ACP's Memorandums of Understanding with ports and improve relationships to show benefits of U.S. agriculture to the parties of those agreements

2. Support system dredging, maintenance and deepening, including terminal berths, harbors and channels for the benefit of potential agricultural transportation opportunities

3. Inland waterways advancing education and awareness through advocacy, encouraging support for maintenance and construction of facilities, perhaps even leading PPPs for the future

4. Communication and engagement with parties in rail, including aggregators to improve accessibility, reliability, building relationships with Class I, regional and short line railroads

5. Sustain, advance and improve leading MOU terms with the ACP

6. Engage with destination facility operators to ensure capabilities for receipt of vessels fully laden

7. Lead information exchange and keep abreast of equipment assessments and developments of transport assets for roadways, ports, railways and waterways as they pertain to agricultural commodities.

8. Engage the perspectives and input of third party logistics service providers (3PLs), non-vessel operating common carriers (NVOCCs) and other freight intermediaries to optimize operations across the supply chain

9. Follow, encourage and qualify advances in technology across the supply chain to foster value added approaches and increased sophistication of transportation, distribution and logistics in the movement of U.S. agricultural goods.

X. Appendix

Table 47: Channel Depths of Top Grain and Soybean Importing Ports in China, Japan and Taiwan

Port	Grain Terminal(s)	Current Channel/Berth Depth (meters)	Planned Depth (meters)
Japan			
Kashima	Kanto Grain Terminal Zen-Noh Silo Wharf Showa Sangyo Wharf	10-20	N/A*
Shibushi	Zen-Noh Silo Wharf Shibushi Silo Wharf	12	N/A
Nagoya	Inaei Pier Rinoru Yushi Pier Nisshin Seifun Pier Chita Futo Pier Zen-Noh Silo Pier Toyo Grain Terminal Pier	12-16	Plans to dredge, but no details available.
Chiba	Kyodo Silo Nihon Silo	N/A	N/A
Kobe	Zen-Noh Silo Dolphin Tomen Silo Dolphin Showa Sangyo Dolphin Hanshin Silo Dolphin Kohnan Futo Dolphin	14	N/A
Kinuura	NA	15-24	N/A
Hachinoe	Tohoku Grain Terminal	13	N/A
Kagoshima	Honkouku Kitafuto Wharf No. 1 Shinkou Wharves No. 5,6,8 Taniyama Wharves No. 1,2,3,5	9-12	NA
Mizushima	Seto Futo Co.	10-14	14 (for all)
Hakata	NA	13-15	N/A
China			
Qingdao	NA	13-14	N/A
Dalian	Dagang Berths No. 1, 8, 9, 27, 30 Xianglujiao Berths No. 2, 5, 6 Dayaowan Berths No. 1, 2	8.5-10	N/A
Tianjin	Detailed information unavailable, but deep water port with plans for expansion.		
Guangzhou	Huangpu New Terminal Berth No. 1 Xinsha Berth No. 6	8-15	17
Xiamen	Dongdu Berth No. 2	8-12	N/A
Ningbo	NA	N/A	N/A
Rizhao	NA	11-18	N/A
Nantong	Grain Bureau Berths (2)	9.7 (draft lim.)	N/A
Zhanjiang	NA	N/A	N/A
Fanchenggang	Fangcheng Berth No. 11	9.5	N/A
Taiwan			
Kaohshiung	Berths No. 71, 72	N/A	14
Taichung	Berths No. 1, 3	13	N/A
Keelung	NA	15.5	N/A

Source: Port websites, Informa Economics, Lloyd's List Intelligence

Profiles of Top Japanese Grain Ports

a) Port of Kashima

- The Port of Kashima is located in Honshu, Japan. From New Orleans to Kashima, the distance is 9,001 nautical miles through the Panama Canal. The distance from Seattle to Kashima is 4,145 nautical miles.
- Range of tide is 1.3 meters.
- Depth in channels varies from 10-24 meters; approach channel is 21-24 meters; general channel is 14-19 meters; north and south channels are10-13 meters.
- Grain terminals include:
    - Kanto Grain Terminal has length of 250 meters, depth of 10 meters and draught of 11.7 meters.
    - Zen-Noh Silo Wharf has length of 281 meters and depth of 13 meters.
    - Showa Sangyo Wharf has length of 280 meters and depth of 13 meters.

b) Port of Shibushi

- The port of Shibushi is located in Kagoshima City, Japan. From New Orleans to the port, the distance is 9,560 nautical miles through the Panama Canal. The distance from Seattle to the port is 4,712 nautical miles.
- Range of tide is 2.42 meters.
- Draft limitation in the channels is 12 meters.
- Grain terminals include:
    - Zen-Noh Silo Wharf has length of 205 meters and depth of 13 meters.
    - Shibushi Silo Wharf has length of 200 meters and depth of 13 meters.

c) Port of Nagoya

- The Port of Nagoya is located in Nagoya, Japan. From New Orleans to Nagoya, the distance is 9,241 nautical miles through the Panama Canal. The distance from Seattle to Nagoya is 4,393 nautical miles.
- The Port of Nagoya is the capital of Aichi Prefecture in east central Japan. It is also one of the country's busiest industrial centers. Located at the head of Ise Bay off the Pacific Ocean, the Port of Nagoya is about 20 kilometers northwest of the Port of Kinuura and almost 140 kilometers east-northeast of the Port of Osaka. Nagoya is Japan's third biggest incorporated city and its fourth most populous metropolitan area.
- The Port of Nagoya contains a total of 287 berths (with a draft depth of 4.5 meters and over) with a total length of more than 34.7 kilometers. Of those 287 berths, 127 are public, 151 are private, and nine are owned and operated by Public Corporation, NCB, Tobishima Pier South Side.
- The Port of Nagoya also contains over 275.6 hectares of warehouses, 53.2 hectares of sheds, 73.3 hectares of cargo-handling yards, 22.5 hectares of coal yards, 234.7 hectares of timber yards, and 341.1 hectares of open storage yards.

- The Port of Nagoya's six container terminals cover a total area of 151 hectares and contain 14 berths with a total length of 4,105 meters with depths from 10 to 15 meters. They have combined box capacity for 72.9 thousand TEUs and throughput capacity for a total of almost 2.9 million TEUs. They also contain a total 1,007 reefer plugs. Four of the container terminals operate at the Tobishima Pier, forming the Port of Nagoya's biggest container center.
- There are two public container terminals at the Port of Nagoya's Tobishima Pier. With throughput capacity for over 493 thousand TEUs, the south terminal covers an area of 22.5 hectares. It has two berths of 700 meters with alongside depth of 15 meters. The south terminal has box capacity for over 15.9 thousand TEUs and includes 140 reefer plugs. The Port of Nagoya's north terminal contains three berths with a total length of 620 meters and depths from 10 to 12 meters. Covering 17 hectares, the north terminal has box capacity for 6.2 thousand TEUs, 110 reefer plugs, and throughput capacity for over 349.2 thousand TEUs.
- The Tobishima Pier South Side Container Terminal in the Port of Nagoya contains two berths that can handle container vessels to 100 thousand (DWT).
- The Port of Nagoya's NCB Container Terminal is a joint venture between the Nagoya Port Authority and major Japanese shipping companies. It has three berths with a total length of 900 meters and alongside depth of 12 meters. Each berth can handle a 35 thousand DWT vessel. Covering 28.9 hectares, this Port of Nagoya container terminal has box capacity for 10.2 thousand TEUs, 189 reefer plugs, and throughput capacity of 528.4 thousand TEUs.
- The Port of Nagoya's Berth T1 serves the Nabeta Container Terminal in the Port of Nagoya and can accommodate one 50 thousand DWT container vessel. The Nabeta terminal covers 38.5 hectares and has box capacity for almost 19.9 thousand TEUs. It includes 296 reefer plugs and has throughput capacity for 841.6 thousand TEUs.
- Range of tide is 2.61 meters.
- Grain terminals include:
    - Inaei Pier has a length of 320 meters and draft of 9 meters.
    - Rinoru Yushi Pier has length of 182 meters and draft of 10 meters (2 separate piers).
    - Nisshin Seifun Pier has length of 150 meters and draft of 12 meters.
    - Chita Futo Pier has length of 185 meters and draft of 12 meters.
    - Zen-Noh Silo Pier has length of 190 meters and draft of 12 meters.
    - Toyo Grain Terminal Pier has length of 255 meters and draft of 12 meters.
- In 2010, Nagoya was the largest Japanese port in terms of cargo throughput with 185 million tons.
- Future expansion efforts include:
    - Tobishima Pier South Side container berth is looking to strengthen international competitiveness; a container berth (16 meters deep, 250 meters long, 500 meters wide) is planned adjacent to two berths already in operation. The first berth was completed in 2005 and the second berth began operation in 2008.
    - Nabeta Pier 1 container berth has a third container berth (12 meters deep, 250 meters long, 500 meters wide, reinforced earthquake-resistant

structure) currently under construction and will be put into operation in March 2012.
  - In order to meet demands placed by the increasing size of containerships of recent years, the port authority is planning to further dredge and expand the East and West Channels. The East Channel is 16 meters deep and 580 meters wide while the West Channel is 14 meters deep and 400-540 meters wide. The Central Channel is 12-16 meters deep and 350 meters wide but there are no plans to dredge or expand this channel.

d) Port of Chiba

- The Port of Chiba is the capital of Chiba Prefecture in Japan. It rests on the Boso Peninsula about 14 nautical miles each across Tokyo Bay from the Port of Tokyo and about eight nautical-miles southeast of the Port of Funabashi. From New Orleans to Chiba, the distance is 9,103 nautical miles through the Panama Canal. The distance from Seattle to Chiba is 4,255 nautical miles.
- The Port of Chiba is a major port and one of Japan's largest seaports by volume and value. The Port of Chiba is expanding its role as a logistics port for containers, and it already handles great volumes of liquid natural gas, crude oil and iron ore.
- The Chiba Port and Harbour Office is the port authority for the Port of Chiba. The port's 133 kilometers of coastline extend over six cities from Ichikawa to Sodegaura. The Port of Chiba is mainly an industrial port, and almost all of its cargo is handled at industry-owned wharves. With further land reclamation, the Port of Chiba hopes to expand the role of the public wharves.
- The Port of Chiba contains 11.6 kilometers of public wharves that contain 94 berths. Lighter wharves and facilities total 6.5 thousand meters distributed among many different wharves. The Port of Chiba maintains 398.8 thousand square meters of cargo-handling areas, 15 storage sheds covering 47.2 thousand square meters, and open storage areas of 365.5 thousand square meters. The Port of Chiba also operates a waste oil treatment plant and other facilities located in Ichihara City.
- In the 2006 shipping season, the Port of Chiba's public wharves handled a total of 10.6 million tons of cargo carried on 15.1 thousand vessels. The public wharves in the Port of Chiba served 1,403 foreign trade vessels carrying 3.7 million tons of cargo and 13.7 thousand domestic vessels carrying 6.9 million tons of cargo.
- Range of tide is 2.17 meters.
- Grain silos include:
  - Kyodo Silo has a length of 150 meters and draft of 12 meters.
  - Nihon Silo has a length of 150 meters and draft of 12 meters.
- There is no mention of future expansion.

e) Port of Kobe

- The Port of Kobe is located in Kobe, Japan. From New Orleans to Kobe, the distance is 9,387 nautical miles through the Panama Canal. The distance from Seattle to Kobe is 4,539 nautical miles.
- The Port of Kobe lies on the northwestern shores of Osaka Bay in west-central Honshu, the main island of Japan. Capital of Hyogo prefecture, the Port of Kobe is about 10 nautical miles west-northwest of the Port of Osaka and some 140 kilometers southwest of the Port of Nagoya. The combined cities of Kobe and Osaka are Japan's second largest urban area, and Kobe is Japan's sixth largest city.
- The Port of Kobe is located in an enviable location on major international sea routes that connect more than 500 ports in 130 countries and regions around the world. The Port of Kobe also has many domestic routes throughout western Japan.
- The Port of Kobe's role in international ocean borne trade is clear in the 83 routes and 346 calls per month that travel through the port. China is the port's biggest trading partner, with 77 container routes connecting the two countries with more than 81 sailings per week.
- The Port of Kobe's Rokko Island Container Terminals cover a total area of 612.5 thousand square meters and contain four berths, all of which have alongside depth of 14 meters. Three of the four berths (RC5, RC6, and RC7) are 350 meters long with terminals of 122.5 thousand square meters. The RC4 berth is 530 meters long, and its terminal covers 245 thousand square meters.
- The Port Island Container Terminals in the Port of Kobe contain six piers and seven berths. The terminals cover a total of 753.5 thousand square meters and the berths are a total of 1,050 meters in length. Each of the seven berths is 350 meters long with alongside depth of 15 meters.
- The Port of Kobe's KPTC Conventional Liner Terminals at Port Island contains a total of 2,800 meters of berths with alongside depth of 10 meters. The terminals are equipped with 14 berths, each of which is 200 meters long. The Conventional Liner Terminals cover a total area of 259.3 thousand square meters, and each berth has an average of 17.3 thousand square meters of terminal area. The terminals include a total 63.6 thousand square meters of transit sheds.
- Range of tide is 1.55 meters.
- Grain terminals include:
    - Zen-Noh Silo Dolphin has a length of 160 meters and draft of 12.5 meters.
    - Tomen Silo Dolphin has a length of 160 meters and draft of 12.5 meters.
    - Showa Sangyo Dolphin draft of 12.5 meters.
    - Hanshin Silo Dolphin has a length of 246 meters and draft of 12.5 meters.
    - Kohnan Futo Dolphin has a length of 214 meters and draft of 12.5 meters.
- There is no mention of future expansion.

f) Port of Kinuura

- The Port of Kinuura is located on Chita Bay on the southeastern Pacific coast of Japan's largest island, Honshu, in the Aichia prefecture some 32 kilometers southeast of the Port of Nagoya and 170 kilometers east-northeast of the Port of Osaka. From New Orleans to the port, the distance is 9,231 nautical miles. The distance from Seattle to the port is 4,383 nautical miles.
- The major industrial port is located in the area of major manufacturing industries, and land reclamation projects have created space for industrial facilities producing power, steel, and office machinery as well as businesses and coastal areas.
- The Port of Kinuura's Yutaka Take North Pier No 1 is 185 meters long with alongside depth of 20 meters, and it can accommodate vessels to 15,000 DWT. Yutaka Take North Pier No 2 in the Port of Kinuura is 240 meters long with alongside depth of 24 meters, and it can accommodate vessels to 30,000 DWT. Accommodating vessels of 5,000 DWT, the Port of Kinuura's Yutaka Take North Pier No 3 is 130 meters long with alongside depth of 15 meters.
- The Port of Kinuura private berths at Hekinan City also include nine berths at three Hekinan electric lift coal piers. The East electric lift coal pier is 50 meters long with alongside depth of 20 meters and it can accommodate one 3,000 DWT vessel. The North-South electric lift coal pier has two berths totaling 660 meters in length with alongside depth of 24 meters that can accommodate vessels to 70,000 DWT. Six berths handle electrical sub-materials. They are a total of 610 meters in length with alongside depth of 13 meters, and they can accommodate vessels to 3,000 DWT.
- The Port of Kinuura's West Central piers include six berths totaling 890 meters. No. 2 pier, with depth of 15 meters, are a total 520 meters long and can accommodate four vessels to 5,000 meters. West Central Pier Docks 3 and 4 are each 185 meters long with alongside depth of 20 meters, and each can accommodate vessels to 15,000 DWT. The West Central No. 5 and 6 in the Port of Kinuura are each 240 meters long with alongside depth of 24 meters, and they can each accommodate vessels to 30,000 DWT. The Handa City South Quay Pier in the Port of Kinuura is 705 meters long with alongside depth of 8 meters, and it contains 13 berths for vessels up to 500 DWT.
- Handa City is also home to the Port of Kinuura's Kamezaki Pier with three berths for vessels up to 15,000 DWT. With alongside depth of 20 meters, Berth 1 is 370 meters long, and Berth 2 is 185 meters long. Berth 3 is 190 meters long with alongside depth of 18 meters.
- Range of tide is 2.34 meters.
- There is no specific information of grain elevators' berth size and drafts.
- There is no mention of future expansion.

g) Port of Hachinohe

- The Port of Hachinohe faces the Pacific Ocean in northern Japan's Aomori Prefecture on the main island of Honshu. The Port of Hachinohe is one of

Japan's major deep-sea fishing ports. The distance between New Orleans and Seattle to Port of Hachinohe is not available.

- The Port of Hachinohe is an active marine product community, having become the biggest coastal industrial city in the Northern Tohoku region. In the past decades, new port facilities have been installed, and established facilities have been upgraded. In 1996, the Foreign Access Zone was created.
- Range of tide is 1.50 meters.
- Tohoku Grain Terminal has length of 311 meters and draft of 13 meters.

h) Port of Kagoshima

- The Port of Kagoshima is located in Kagoshima City, Japan. From New Orleans to the port, the distance is 9,612 nautical miles through the Panama Canal. The distance from Seattle to the port is 4,764 nautical miles.
- Range of tide is 2.74 meters.
- Agriculture products are received at the following terminals:
    - Honkouku Kitafuto Wharf No. 1 has length of 370 meters and draft of 9 meters.
    - Shinkou Wharf No. 5 has length of 236 meters and draft of 9 meters.
    - Shinkou Wharf No. 6 has length of 260 meters and draft of 7.5 meters.
    - Shinkou Wharf No. 8 has length of 348 meters and draft of 4.5 meters.
    - Taniyama Wharf No. 1 has length of 294 meters and draft of 12 meters.
    - Taniyama Wharf No. 2 has length of 260 meters and draft of 7.5 meters.
    - Taniyama Wharf No. 3 has length of 270 meters and draft of 5.5 meters.
    - Taniyama Wharf No. 5 has length of 400 meters and draft of 5.5 meters.

i) Port of Mizushima

- The Port of Mizushima lies on the northern shores of southern Japan's Seto Inland Sea in Okayama Prefecture about 132 kilometers west-southwest of the Port of Kobe from New Orleans to Mizushima, the distance is 9,414 nautical miles through the Panama Canal. The distance from Seattle to Mizushima is 4,566 nautical miles.
- The Port of Mizushima's container terminal covers about 33 hectares and includes two quays. One quay can accommodate container ships to 30,000 DWT with alongside depth of 12 meters, and the other serves container ships to 10,000 DWT with alongside depth of 10 meters. The harbor plan will bring all depths to 12 meters.
- Range of tide is 3.86 meters.
- Seto Futo Co. unloads grain at this berth along with vehicles has a length 285 meters and draft of 14 meters.

j) Port of Hakata

- The Port of Hakata is located in Fukuoka City, Japan on the southwestern coast on Kyushu Island about 54 kilometers southwest of the Port of Kita-Kyushu and 105 kilometers southwest of the Port of Nagasaki. From New Orleans to the

port, the distance is 8,849 nautical miles through the Panama Canal. The distance from Seattle to the port is 3,942 nautical miles.

- The Port of Hakata's Suzaki Wharf is an important grain distribution center for Kyushu. The Suzaki Wharf has 18 berths totaling 2,113 meters in length with alongside depths from 5.5 to 11 meters. The wharf covers a total of 79.1 hectares and handles about 1.5 million tons a year of wheat, corn, beans, steel products, and wood products. The Suzaki Wharf in the Port of Hakata contains 15 general cargo sheds with a total area of 43.1 thousand square meters, a freight sorting yard of 15.3 thousand square meters, and an open storage yard of 16.8 thousand square meters.
- In 2008, the port of Hakata imported nearly 397 thousand tons of wheat from the U.S. and over 369 thousand tons of corn.
- The Port of Hakata's foreign trade container terminals at Kashii Park Port and Island City are state-of-the-art facilities that can accommodate the latest container vessels and cargo. The facilities are near the Fukuoka Airport and the Fukuoka Urban Expressway. The Kashii Park facility contains 600 meters of berthing space with alongside depth of 13 meters.
- The berths at the Port of Hakata's 22.3-hectare Kashii Park Port can accommodate 50-ton container ships, and they are equipped with four Post-Panamax gantry cranes. The Kashii Park Port handles about 410 thousand TEUs of containerized cargo per year. The Kashii Park facility in the Port of Hakata has storage capacity for 9,684 TEUs. It has 2,964 dry container slots and 300 reefer points. The terminal building has a floor area of almost five thousand square meters, and the maintenance shop covers 1,193 square meters.
- With alongside depth of 14 meters, the international container terminal at the Port of Hakata's Island City is one of the biggest container berths west of Kobe. The berths can accommodate vessels to 50,000 DWT and are equipped with the latest container cranes and transfer cranes. The Island City Container Terminal in the Port of Hakata covers a total area of 172.3 thousand square meters. The overall berth length is 330 meters. The maximum permitted load is 40.6 tons. The Island City container terminal has storage capacity for 9,120 TEUs. It contains dry container slots for 2,280 TEUs and 240 reefer points. The terminal building has a floor area of 850 square meters, and the maintenance ship covers over one thousand square meters.
- In late 2008, expansions to the container terminal at Island City in the Port of Hakata added 56.2 thousand square meters of overall area and 350 meters of berth with alongside depth of 15 meters. The new facilities added storage capacity for 784 additional TEUs.
- Range of tide is 2.09 meters.
- There is very little mention of grain at this port except that wheat is a large import.

Profiles of Top Chinese Grain Ports

a) Qingdao Port

- From New Orleans to the Port of Qingdao, the distance is 9,981 nautical miles through the Panama Canal. The distance from Seattle to the Port of Qingdao is 5,061 nautical miles.
- The Port of Qingdao currently consists of four main areas: the Qingdao old port, Huangdao oil port, Qianwan new port and Dongjiakou port areas
- It currently has 70 berths, 24 of which are deep water.
- Qingdao Port has a maximum tidal range of 4.66 meters and a minimum tidal range of 0.28 meters.
- Approach channel depths: Dagan Channel has a draught of 13 meters and Qianwan channel has draught of 14 meters.
- In 2007, Qingdao opened a new container port, a liquid chemical wharf, and launched a large cold store. Since 2009, the port changed its development strategy to become less export-oriented and focus more on iron ore and oil imports. Consequently, in 2010 the port announced that it would triple its annual investment from 3 billion yuan ($452.2 million) in 2010 to 10 billion yuan ($1.5 billion) in 2011. The investment announced in 2010 is expected to result in an increase of 8% total throughput and 10% container throughput from 2010 to 2011, and would include the following projects:
    - Construction of a 300,000 MT oil dock and a 250,000 MT coal dock;
    - Possible further dock construction for the Chinamax ship (domestically manufactured and has a 400,000 DWT capacity);
    - Construction of Dongjiakou port area, including four docks for ships with a 400,000 DWT capacity, two for ships with a 200,000 DWT capacity, five docks for ships with a 100,000 DWT capacity, and 112 berths, with a capacity totaling 40 million MT and covering an area of 70 square kilometers.
        - Construction began in May of 2009, and annual throughput capacity of the harbor is expected to reach over 310 million MT by 2020;
    - Construction of an 8.7-square-kilometer bonded port area at Qianwan, consisting of eight container (deep water) berths and two multifunctional (deep water) berths; and
    - The Dagony Company of Qingdao Port operates an adjoined grain terminal. Its berth is 280 meters long with alongside depth of 14 meters, allowing 70,000 tons or two 50,000 bulk grain ships. The company is constructing additional capacity with throughput capacity at 5 million MT in the short run and 10 million in the long run

b) Port of Dalian

- From New Orleans to the Port of Dalian, the distance is 10,016 nautical miles through the Panama Canal. The distance from Seattle to the Port of Dalian is 5,097 nautical miles.
- The port's average tidal range is 2.5 meters.

- Draft limitations in Dagang Channel and Ganjingzi Channel are 10.0 meters and 8.5 meters, respectively.
- The port has numerous grain and soybean-handling berths that can accommodate between 7,000 and 25,000-DWT vessels.
- The Port of Dalian is a naturally deep port and can accommodate vessels in a range of sizes, including the 550,000-DWT ultra large crude carrier (ULCC), and fifth generation carriers and larger, all of which require deep berthing channels. In 2000, the Port of Dalian constructed the following:
    - Ten new berths, including five container berths (annual capacity of 1.5 million TEUs of containerized cargo);
    - Four bulk berths (annual capacity of 4.9 million MT of cargo); and
    - One grain berth (annual capacity of 4.5 million MT of cargo).

As of 2008, the port consisted of six major cargo-handling centers, including a(n):

- Oil and liquid chemical distribution center;
- Container transshipment center;
- Food transit center;
- Professional roll-on/roll-off vehicle and tourist center;
- Groceries and coal transshipment center; and
- A distribution center for mines in the region.

In July 2011, the China Transport Construction Group completed the expansion of Dalian's port capacity to handle 400,000 MT class ore dry bulk vessels. This was an increase from 300,000 MT.

c) Port of Tianjin

- From New Orleans to the Port of Tianjin, the distance is 10,168 nautical miles through the Panama Canal. The distance from Seattle to the Port of Tianjin is 5,248 nautical miles.
- The port's primary navigational channel is 35 kilometers long and 19.5 meters deep.
    - 250,000-DWT ships can currently enter and leave the Port of Tianjin freely, and 300,000-DWT ships can enter the port at high tide.
- The port has 151 berths and its total quay length is 32,000 meters.
- As of 2009, the Port of Tianjin was the largest artificial deep water port in China, and in 2010 cargo throughput totaled 413 million MT and container throughput reached 190 million TEU. Over the years, the port has undergone a number of expansion efforts, including:
    - Renovating its container terminal to a capacity of 1.6 million TEUs in 2001, capable of docking and handling container vessels of 10,000 TEUs;
    - Converting two non-container terminals into one container terminal with a capacity of 320,000 TEUs and incorporating the use of advanced container terminal production and management software in 2002;
    - Completing the second phase of a grain terminal construction project in 2004 to increase grain storage capacity to 110,000 MT;

- Investing $1.87 billion in 2009 to build new berths, upgrade facilities, and to construct a coal and a crude oil terminal; and
- Expanding capacity under China's 12th Five Year Plan (2011-2015) to increase cargo and container handling to 550 million MT and 190 million TEUs.
- Undertaking structural reinforcement and reconstruction of berth terminals 19 and 20 during the fall of 2011 to reform two 10,000-MT bulk cargo terminals into one 50,000-MT bulk terminal in order to increase the annual throughput of the terminals.

d) Port of Guangzhou (formerly Huangpu Port)

- From New Orleans to the Port of Guangzhou, the distance is 10,707 nautical miles through the Panama Canal. The distance from Seattle to the Port of Tianjin is 5,801 nautical miles.
- Huangpu Port, specifically, is one of China's primary grain and soybean-importing ports, and has been incorporated into the larger Guangzhou Port.
- Guangzhou Port has an average tidal range of 2.22 meters.
- Its navigational channel totals 115 kilometers in length, and as of 2007, its individual channels had the following dimensions:
  - Guishan channel: 18.5 km length, 10 meter depth;
  - Linding channel: 45 km length, 10.5 meter depth;
  - Chuanbi channel: 13 km length, 9 meter depth;
  - Dahu channel: 8.6 meter length, 9 meter depth;
  - Nizhou and Lianhuashan channels: 20.6 meter length, 9 meter depth;
  - Chisha channel: 5.5 meter length, 9 meter depth, and;
  - Dahazhou channel: 3.3 km length, 8 meter depth.
- Following dredging work over the last few years, the channel now has a depth of 15.5 meters, allowing vessels over 100,000 DWT to enter the port by riding the tide. Meanwhile, it allows for two-way traffic of vessels over 50,000 DWT.
- The port has two grain berths, both of which can handle vessels of 35,000 DWT.
- Guangzhou Port has undergone expansion by way of the following projects:
  - Navigational Chanel Phase III: Increasing the width and depth of the Guangzhou Port navigational channel to 243 meters and 17 meters, respectively, which at high tide will accommodate one-way traffic of 120,000 DWT bulk carriers, and 100,000 DWT vessels at low tide. The project included the excavation of 71.8 km, was completed in 2011;
  - Nansha I: Constructing four multi-purpose berths of a 50,000 DWT capacity (100,000 DWT berthing capacity in hydraulic structure), an investment totaling 2.6 billion yuan. The project was completed in September 2004;
  - Nansha II: Constructing six container berths of berthing capacity over 50,000 DWT (100,000 DWT berthing capacity in hydraulic structure), an investment totaling 4.8 billion yuan. The project was completed in September 2007;
  - Shazai Island Terminal Project: Constructing two roll on/roll off berths with 30,000 DWT capacity and one multi-purpose berth with 30,000 DWT berthing

capacity at Nansha Port Area, an investment totaling 535 million yuan. The project was completed in June 2006;
  - Xiaohu Petrochemicals Terminal Project: Constructing two berths with a 50,000 DWT capacity (one with a 80,000 DWT berthing capacity and another with a 100,000 DWT berthing capacity in hydraulic structure), one berth with a 20,000 DWT berthing capacity, and ten berths with a 1,000 DWT berthing capacity in the Nansha Port Area, an investment totaling 538 million yuan. The project was completed in August of 2006; and
  - Gangfa Petrochemicals Terminal Project: Constructing one berth with a 50,000 DWT berthing capacity, three berths with a 3,000 DWT berthing capacity, and three berths with a 500 DWT berthing capacity in Nansha Port Area, an investment totaling 180 million yuan. The project was completed in February 2004.

e) Port of Xiamen

- From New Orleans to the Port of Xiamen, the distance is 10,370 nautical miles through the Panama Canal. The distance from Seattle to the Port of Xiamen is 5,462 nautical miles.
- The Port of Xiamen has an average tidal range of 3.98 meters.
- The approach channel (Houyu Channel) at Xiamen is 8 meters deep.
- The Port of Xiamen is a natural deep water port with a depth of 12 meters and consisting of 81 berths, 16 of which are deep water berths (of which six are dedicated to handling containers). Xiamen's inner port can accommodate vessels of 100,000 DWT, and 50,000-DWT vessels can enter and dock for full loading and unloading.
- The port has one grain berth that can handle vessels of up to 50,000 DWT.
- In 2004, the port sought investment for the construction of two new ports to reduce reliance on Xiamen's Dongdu Port, which at the time was handling 75% of the city's total shipping volume. As a result, Xiamen Port constructed Songyu Container Terminal, which opened in 2007 and was a joint venture between A.P. Moller-Maersk and Xiamen Port Holding Group. The terminal has a capacity of 1.8 million TEUs.

f) Port of Ningbo

- From New Orleans to the Port of Ningbo, the distance is 10,008 nautical miles through the Panama Canal. The distance from Seattle to the Port of Ningbo is 5,089 nautical miles.
- Ningbo is a deep water port capable of accommodating 300,000 DWT vessels at high tide. The port consists of six harbor areas: Yongjiang, Zhenhai, Beilun, Daxie, Chuanshan, and Meishan port areas. It hosts 315 berths that total over 50 km in length, and 74 of the 315 berths can accommodate vessels of 10,000 DWT.
- The maximum tidal range at the Port of Ningbo is 3.62 meters, while the minimum tidal range is 0.92 meters. At the Port of Zhenhai, the maximum range

is 3.51 meters, and minimum range is 0.02 meters. At Beilun, the maximum tidal range is 3.36 meters and the minimum range is 0.4 meters.

- The port is a transport and storage center for containers, iron ore, crude oil and liquefied chemicals, and a transfer base for coal, grains and bulk cargo.
- In 2006, Ningbo expanded its port to Zhoushan Island, to increase its competitiveness and vessel-handling capacity. As of 2009, cargo throughput reached 380 million tons, making Ningbo the second-largest port in Mainland China, and the fourth-largest port in the world. During this same year, Ningbo ranked fourth in Mainland China in terms of container cargo, with a throughput of 10.4 million TEU.
- In October of 2011, it was announced that Ningbo would receive 14 40-tonnage, 43-meter gantry cranes for the Laotangshan area of Zhoushan Port before 2012.

g) Port of Rizhao

- From New Orleans to the Port of Rizhao, the distance is 10,016 nautical miles through the Panama Canal. The distance from Seattle to the Port of Rizhao is 5,096 nautical miles.
- The Port of Rizhao has an average tidal range of 2.98 meters and a maximum range of 4.9 meters.
- The Coal Wharf Channel at the Port of Rizhao has draught limitation of 15 meters, while the port's General Cargo Wharf Channel has a draught limitation of 11 meters.
- The port's approach channel is divided into two sections. The first section is connected elliptically to the turning basin that is located southwest of the coal wharf. It is 2,400 meters in length, 200 meters wide, and dredged to 15 meters. This section has a 500-meter-wide ancillary channel on either side. The second section of the channel begins where the dredged section ends and runs to the anchorage. This section is a natural waterway 4,300 meters in length, 3,000 meters wide, and 15-18 meters deep.
- Rizhao Port is a deep water port with a total of 49 productive berths that are able to accommodate 300,000 DWT vessels and handle 150 million MT of cargo.
- Rizhao consists of two port areas, Shijiu and Lanshan and has a large grain and oil processing and transfer base at its north end. Rizhao Port also contains a significant transfer base for bulk cement, a distribution base for liquefied chemicals. It is also a base port for domestic container trade and provides feeder services for international trade. In 2010, the port had a cargo throughput of 227 million MT and a 1 million TEU container throughput via a container terminal built jointly with Qingdao Port. In terms of long term development, the port plans to construct 230 deep water berths to achieve a throughput capacity of 600 million MT.

h) Port of Nantong

- From New Orleans to the Port of Nantong, the distance is 9,993 nautical miles through the Panama Canal. The distance from Seattle to the Port of Nantong is 5,073 nautical miles.

- The Port of Nantong has a maximum tidal range of 4.01 meters.
- The port's approach channel, Tongzhousha East Waterway, is a deep, fresh water channel near the north bank of the port, with a depth ranging from 10 to 50 meters. The channel has a draught limitation of 9.7 meters.
- Nantong has two grain berths that can handle vessels up to 25,000 DWT.
- The Port of Nantong handles bulk cargo including iron ore, non-metallic ores, sulphur, non-ferrous metal ores and grains, in addition to other cargo including steel products, chemical fertilizers and industrial chemicals, scrap metal and asphalt. It has a shoreline of 4.2 km with five major terminals. The terminals operate a total of 24 berths, including two berths for vessels of 150,000 DWT, five berths for vessels of 70,000 DWT, four berths for vessels of 50,000 DWT, and three berths for vessels of 10,000 DWT.
- As of 2007, plans were underway at the port to double container capacity by 2010 to relieve bottlenecks at its inland ports. In addition to adding container berths, the port was also looking to increase cargo capacity 8 million MT (from the existing 45 million MT in 2007). In 2008, the port completed the six-lane Sutong Bridge to make it easier to cross the Yangtze River and travel quickly between the Port of Nantong and Shanghai.

i) Port of Zhanjiang

- From New Orleans to the Port of Zhanjiang, the distance is 10,852 nautical miles through the Panama Canal. The distance from Seattle to the Port of Zhanjiang is 5,946 nautical miles.
- The Port of Zhanjiang has a natural deep water harbor and has trading relationships with over 100 countries. The port contains a terminal devoted to grains, general and breakbulk cargoes, passengers and ship repairs. A second terminal handles only iron ore, while a third terminal contains a production berth, ship repair area, a landing craft wharf, a coal berth, a mineral ore berth, and a breakbulk berth. The port's harbor can accommodate ships up to 280,000 DWT, and major cargoes handled by the port include grains, mineral-ores, petroleum, chemical fertilizers, agricultural fertilizers, medical products and lumber, among others.

j) Fangchenggang Port

- From New Orleans to the Port of Fangchenggang, is the distance is approximately 10,900 nautical miles through the Panama Canal. The distance from Seattle to the Port of Fangchenggang is approximately 6,000 nautical miles[10].
- Fangchenggang Port has an average tidal range of 2.25 meters, with a maximum range of 4.5 meters and a minimum range of 0.79 meters.
- The approach channel is 6.1 nautical miles, and consists of three sections: Sanya, Xixian, and Niutou. The channel is 125 meters wide and 9.5 meters deep.

[10] All distances for voyage routes were obtained from portworld.com distance calculator. The Port of Fangchenggang was not found with the calculator; as a result, the distance was approximated based on the Port of Zhanjiang.

- Fangchenggang Port, located in China's Guangxi Zhuang Autonomous Region, has 35 berths, 21 of which are deep water berths. The port has one grain berth that can accommodate vessels up to 50,000 DWT.
- As of 2003, the port was expanding its infrastructure, which included plans to construct a port to accommodate vessels of 200,000 DWT. Other projects under construction have also included the construction of a navigable sea channel, a 150,000 DWT berth, and a highway connecting Dongxing to the China-Vietnam border.

Profiles of Top Taiwanese Grain Ports

a) Port of Kaohshiung

- From New Orleans to the Port of Kaohshiung, the distance is 10,373 nautical miles through the Panama Canal. The distance from Seattle to the Port of Kaohshiung is 5,491 nautical miles.
- Kaohsiung Port has an average tidal range of 0.88 meters during high tide and 0.49 meters during low tide.
- The port has two grain berths and two grain silos with a combined storage capacity of 298,000 metric tons.
- In order to "maximize the utilization of limited resources within the harbor," the Port of Kaohshiung established a formal development plan in April 2001. Port improvement projects within the April 2001 plan involve developing both the port's inner water and land area and its outer sea area, and specifically include the following projects, among others:
    - Increasing depth and/or width of inner waters/wharves, multiple wharves to a depth of 14 meters;
    - Constructing wharves and reconstructing others;
    - Constructing an outer sea container center;
    - Increasing the Talin Commercial Port area;
    - Improving roads in and near certain harbor areas;
    - Building a ship transportation management system; and
    - Establishing an environmental protection plan.
- Grain terminals have drafts varying from 11.5 meters to 14 meters

b) Port of Taichung

- From New Orleans to the Port of Taichung, the distance is 10,263 nautical miles through the Panama Canal. The distance from Seattle to the Port of Taichung is 5,381 nautical miles.
- The Port of Taichung has an average tidal range of 3.7 meters.
- The port's approach channel has a depth of 13 meters.
- The Port of Taichung currently consists of fifty berths, including eight container, one passenger, two grain, four coal, eight liquid, three cement, twenty-two general cargo, one LNG, and one waste steel. The port also hosts numerous warehouses including 22 cement silos, eight goods yards, three container yards, 255 liquid tanks and 13 miscellaneous goods warehouses.

- The port's two grain berths have a capacity of 90,000 metric tons and 60,000 metric tons.
- In addition to current facilities, the Port of Taichung has established the following general targets for future development:
    - Expand the capacity of container-ship handling;
    - Develop the port as a distribution center and a transport center for processing and for export warehouses;
    - Develop the port's west wharf into a chemical and petroleum transport center;
    - Accumulate diverse equipment for handling the international freight market; and
    - Expand Taichung's business and industrial ports to have 83 berths offering diverse services.
- Wharf 1, with two grain terminals, each has a berth length of 250 meters and draft of 13 feet.

c) Port of Keelung

- From New Orleans to the Port of Keelung, the distance is 10,178 nautical miles through the Panama Canal. The distance from Seattle to the Port of Keelung is 5,303 nautical miles.
- The Port of Keelung has a tidal range of 0.73 meters.
- The port's main channel is dredged to a depth of 15.5 meters and the diameter of its turning basin is 650 meters.
- The Port of Keelung is Taiwan's largest harbor, and handled 76.6 million MT of cargo and 1.8 million TEUs of container cargo in 2010. Thus far in 2011 (January through August), the port has handled 50.5 million MT of cargo and 1.2 million TEUs of container cargo, a decrease of 0.87% and an increase of 0.19%, respectively from the same period in 2010. To maintain a competitive edge, the Port of Keelung has outlined five primary expansion and improvement projects, among other related sub-projects:
    - Extending the Eastern Jetty to accommodate post-Panamax vessels;
    - Leasing four, 12-meter-deep berths on the east bank to the United Logistics International Co., Ltd, a private terminal operator in Keelung. The lease was renewed in 2008 through 2028;
    - Rebuilding the West Bank Wharf Area for cargo handling; and
    - Improving the port's transport infrastructure, including constructing outbound roads and renovating the West Bank viaduct.
- In March of 2009, two new container docks went into service at Taipei Harbor, which functions as an auxiliary port to Keelung harbor. The two new docks have a total length of 716 meters and a depth of 16 meters.
    - The construction of the two docks was part of a larger project to build seven container docks in Taipei harbor. The project began in 2003 and all docks are expected to be completed in 2014.