



Panama Canal Expansion



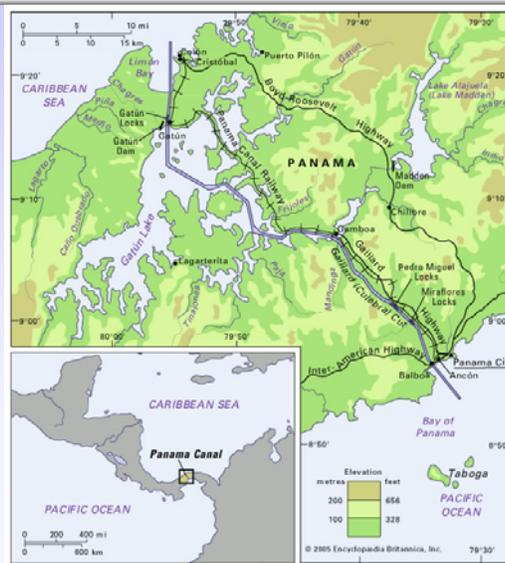
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U.S. Army Corps of Engineers, Headquarters

October 8, 2008

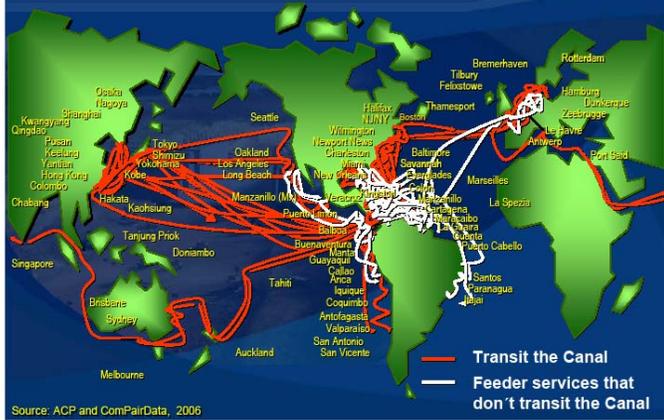


Panama Canal

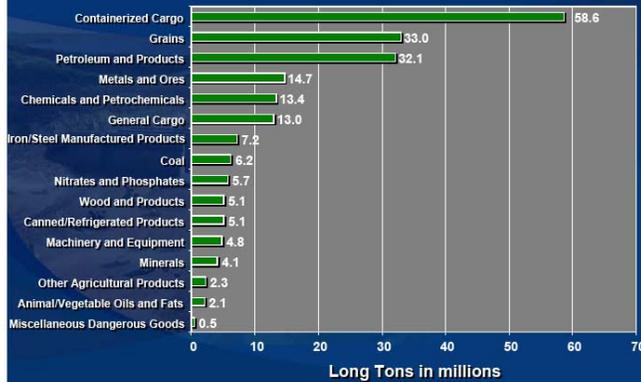




International Ports Connected through the Panama Canal

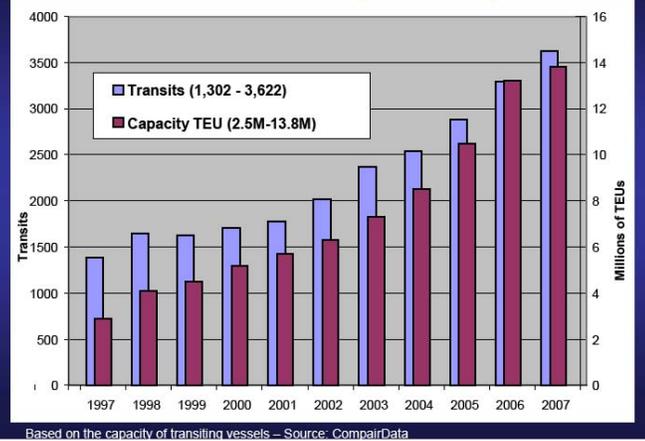


Principal Commodities that Transit the Panama Canal Fiscal Year 2007

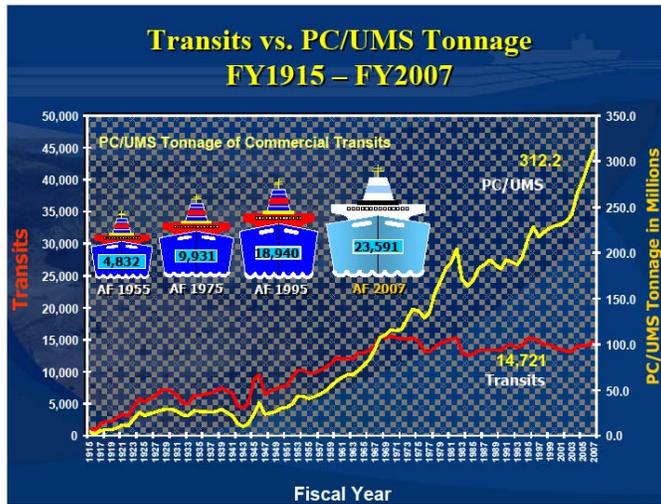




Growth of container traffic through the Panama Canal (1997 - 2007)



Transits vs. PC/UMS Tonnage FY1915 – FY2007

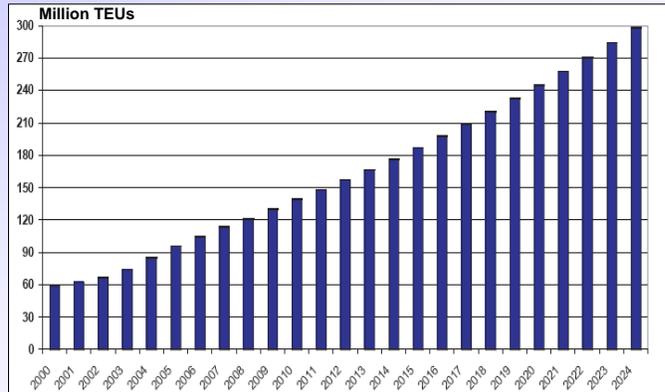




Forecast Total World Container Trade

2000 - 2024

- More than doubles from 60 million TEUs in 2000 to 135 million in 2010
- Forecast to increase to 300 million TEUs by 2024



Source: Global Insight, Inc. Apr 2008.



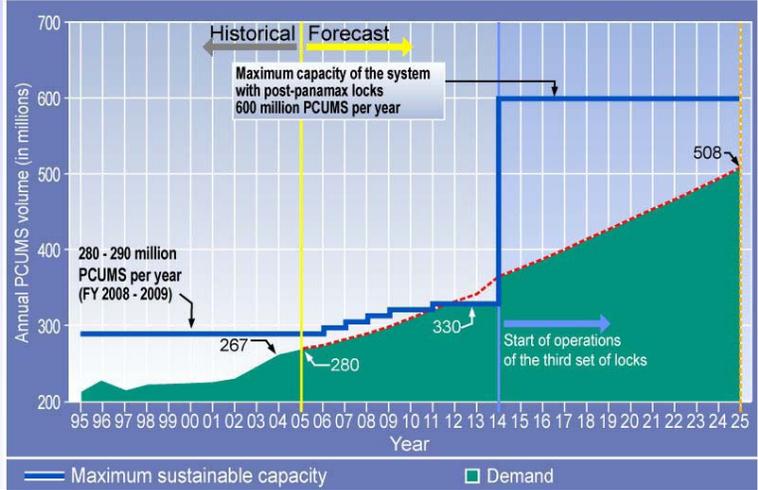
Orderbook of Post Panamax (5,000+) Full Container Ship - Dec. 2007

Range Size	Number of Vessels	Capacity	Average Vessel Size
13,000 - 13,300	37	486,672	13,153
12,000 - 12,999	43	542,840	12,624
11,000 - 11,999	10	113,800	11,380
10,000 - 10,999	28	280,536	10,019
9,000 - 9,999	34	327,470	9,631
8,000 - 8,999	124	1,044,242	8,421
7,000 - 7,999	12	89,598	7,467
6,000 - 6,999	94	612,132	6,512
5,000 - 5,999	52	278,932	5,364
Total order (5,000+)	434	3,776,222	8,701

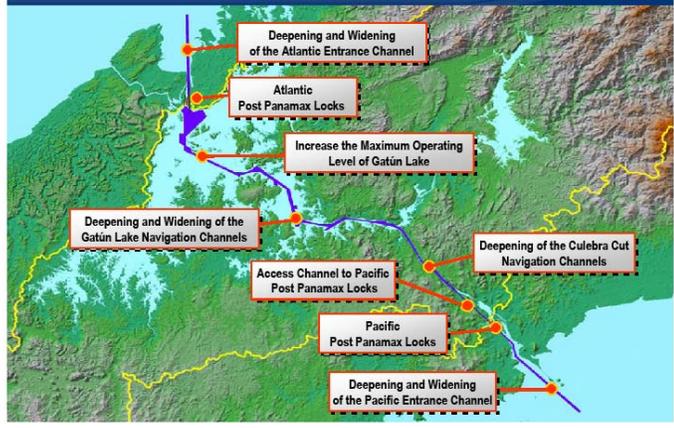
Source: Clarksons - on-line Service, Dec. 2007



Maximum Sustainable Capacity of the Canal Expanded with the Third Set of Locks



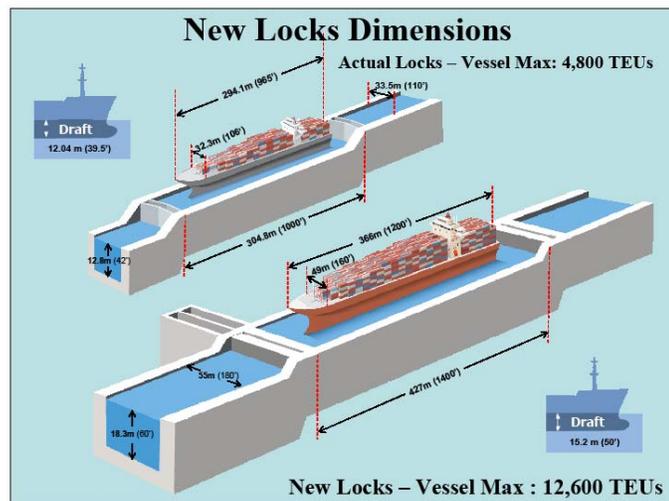
Canal Expansion Program Components





Lock Configuration Conceptual Design

- ◆ 3 Lift Locks
- ◆ 3 Water Saving Basins per Lift
 - ◆ (60% water saving)
- ◆ Approach Walls at the Entrances
- ◆ Side port Filling and Emptying
- ◆ Rolling Gates
- ◆ Vessel Positioning with Tugs

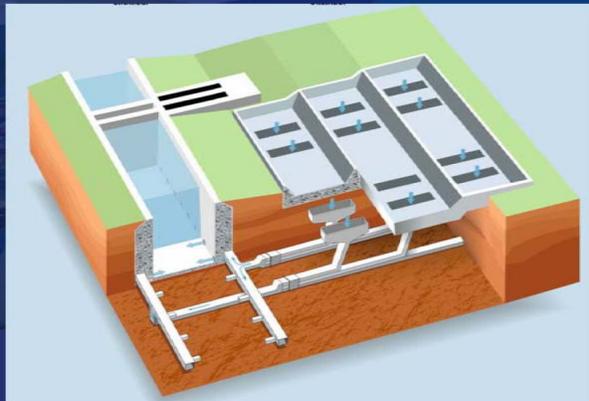




Post Panamax Lock Concept

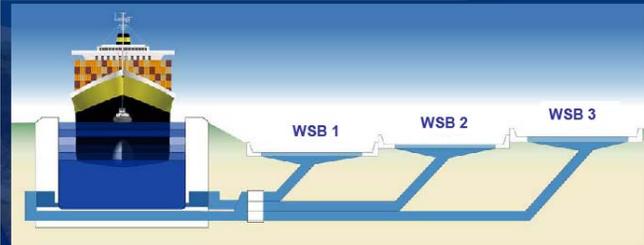


Filling/Emptying Concept Design





Operation of Water Saving Basins



With the water saving basins the new locks will use **7% less** water than the existing locks



Atlantic Locks Concept





Pacific Locks Concept



Approximate Quantities Civil Work Conceptual Design

(thousands)

Material	Pacific	Atlantic	Total
Excavation (m3)	12,000	18,000	30,000
Reinforced Concrete (m3)	1,750	1,680	3,430
RCC (m3)	260	330	590
Reinforcing bars (ton)	130	130	260
Cement (ton)	540	520	1,060
*Processed Material (m3)	7,800	5,600	13,400

*Processed material includes fill and aggregate



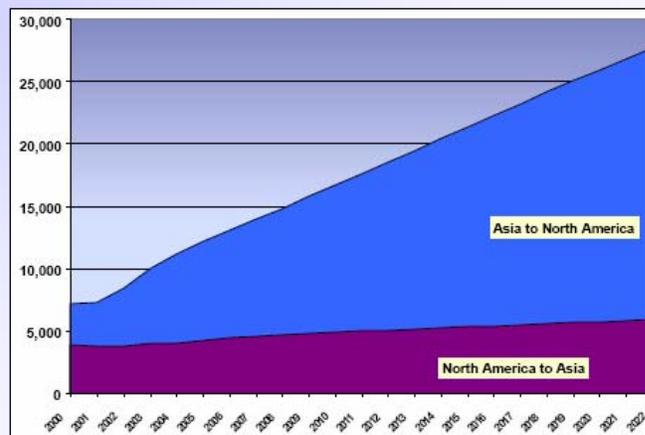
Coastal MTS

- Value of all foreign trade represents nearly 30% of nation's GDP
- Overseas waterborne trade
 - 95% of overseas trade by volume
 - 75% of overseas trade by value
 - 16 million jobs
- About \$2.3 trillion in economic activity
- Many coastal ports nearing capacity
- Cargo volumes in 2000 projected to double by 2020
- Already a generation behind in channel design – but West Coast in better shape
- Capacity constraints increase transportation costs, pollution, congestion



Navigation Future Trends North American Container Trade w/Asia

- Asia-North America eastbound flows likely passed 6 million TEU in '06
- Driven by People's Republic of China to U.S. West Coast
- May reach 28 million TEU by 2022
- Huge challenge to U.S. ports to handle this volume

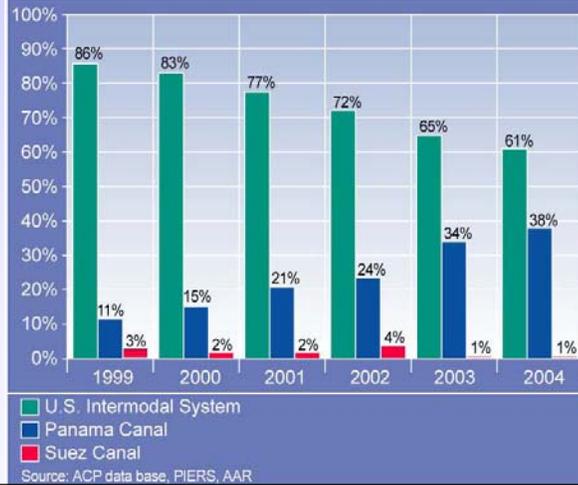


Thousands of TEU's

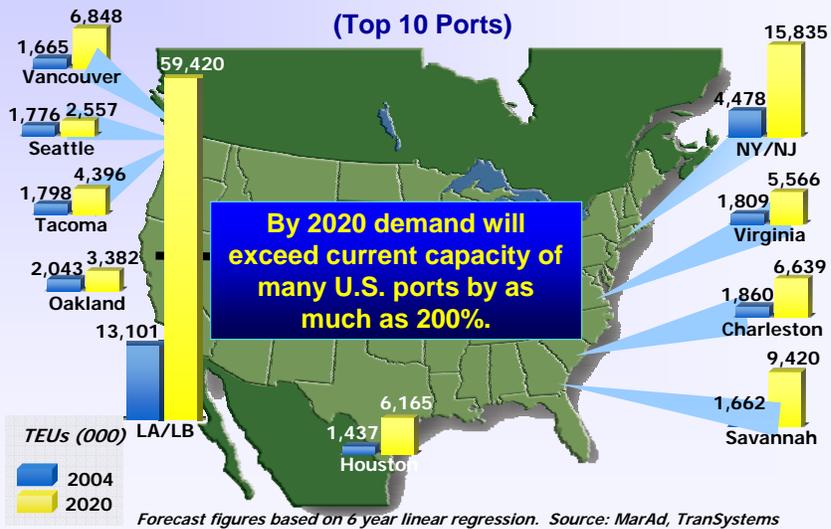
Source: Global Insight, Jun 04.



Panama Canal Market Share of the Container Segment on the Asia to the U.S. East Coast Route

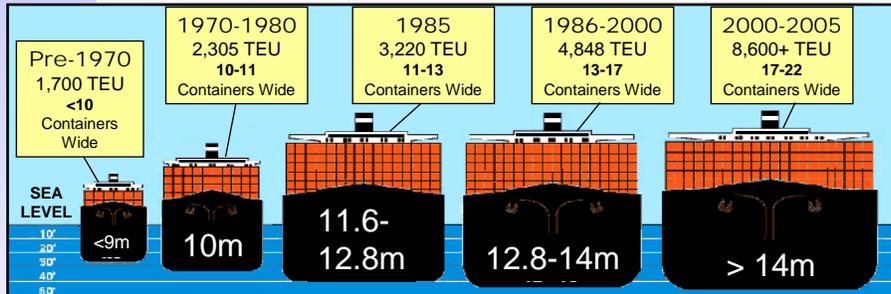


North American Maritime Container Trade Current and Future Trade Growth





Ever Larger Containerships and the Need for Ever Deeper Channels



U.S. Harbor Deepening Challenges Future Trade Volumes and Vessels

- **Study Process:** The lengthening process to study, design, authorize and fund channel improvements;
- **Funding:** The uncertainties associated with the annual federal appropriation process for projects underway;
- **Dredging:** The escalating costs of dredging and dredged material placement, and associated environmental mitigation activities; and
- **Handling Facilities and Space:** The need for vastly expanded cargo handling facilities and improved intermodal connections, coupled with limitations on port expansion and encroachment of other land uses on port facilities.



Deep Draft Challenges: Mega-ships



EMMA MAERSK

11,000 (14,000?) TEUs

- “M/S Emma Maersk” christened Aug 2006
- Capacity could be as high as 14,000 TEUs
- LOA of 397 m
- Beam of 56 m
- Draft 15.5 m
- 170,974 gt
- Speed 25.5 knots

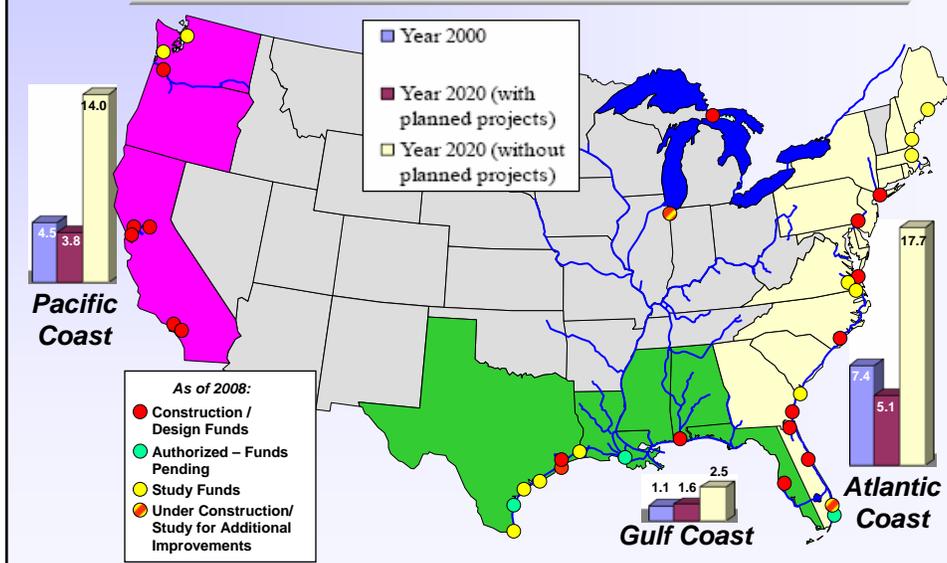


Source: Journal of Commerce August 2006, Marine Log December 2006, TranSystems 2007



Depth-Constrained Containership Calls in 2020, with and without Planned Harbor Projects

(in thousands of ship calls)



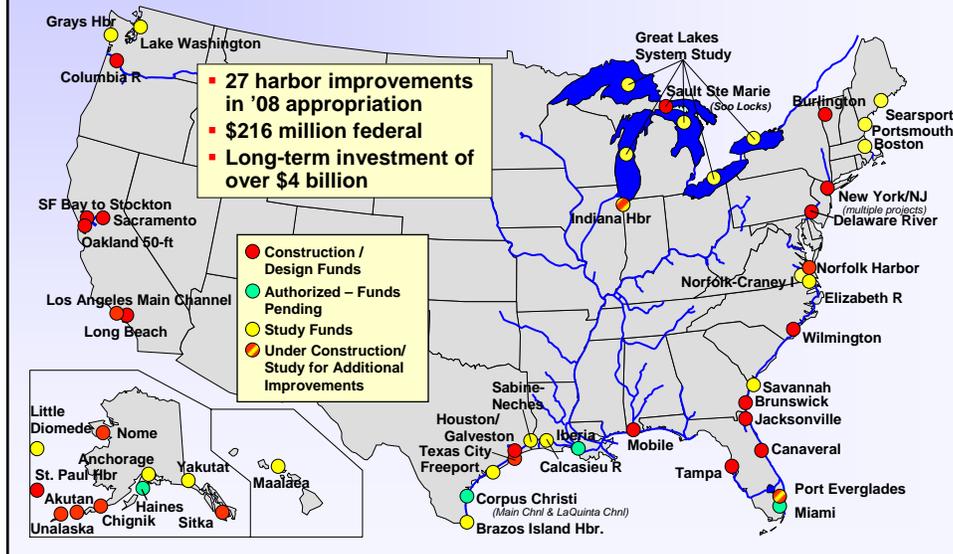


Harbors w/45' Capability

- NY/NJ (50-foot underway)
- Baltimore (50-foot available)
- Hampton Roads (50-foot available)
- Charleston
- Mobile
- New Orleans
- Freeport
- Galveston
- Houston
- Corpus Christi
- LA/LB (>50-foot available)
- Oakland (50-foot underway)
- Seattle/Tacoma (natural depth, berths to 50 feet)



Meeting the Challenge: Key Harbor Improvement Projects Funded in 08





Principal US Harbor Improvements Funded in 2008

(\$USD in Thousands)

PROJECT	STATE	FY 2008	FEDERAL COSTS	NON-FEDERAL COST	TOTAL COST	PERCENT COMPLETE	DEPTH FEET	DEPTH METERS
MOBILE HARBOR	AL	877	244,126	284,874	529,000	10%	55	16.8
LOS ANGELES HARBOR	CA	1,609	58,100	135,900	194,000	80%	53	16.2
OAKLAND HARBOR	CA	41,328	168,100	156,000	324,100	92%	50	15.2
PORT OF LONG BEACH	CA	3,545	20,140	24,600	44,740	92%	76	23.2
JACKSONVILLE HARBOR	FL	2,808	21,200	36,100	57,300	98%	40	12.2
BRUNSWICK HARBOR, GA	GA	5,992	76,298	41,083	117,381	92%	36	11.0
INDIANA HARBOR CDF	IN	17,776	63,000	60,000	123,000	21%	27	8.2
WILMINGTON HARBOR	NC	2,500	276,300	190,700	467,000	76%	42	12.8
NEW YORK & NEW JERSEY HARBOR	NY	85,192	1,165,347	1,314,698	2,480,045	56%	50	15.2
LOWER COLUMBIA RIVER	OR	14,760	101,373	58,779	160,152	57%	43	13.1
HOUSTON-GALVESTON CHANNELS	TX	15,730	459,284	204,216	663,500	78%	45	13.7
NORFOLK HARBOR & CHANNELS	VA	745	126,038	132,321	258,359	20%	55	16.8
OTHERS		36,725	N/A	N/A	N/A	Varies	Varies	Varies
TOTAL		229,587	2,779,306	2,639,271	5,418,577			



A Way Forward

- **Reliable funding stream to complete ongoing projects;**
- **Work with various government agencies, NGOs and stakeholders toward consensus on how to move forward on critical improvements;**
- **Streamline study, design and authorization process;**
- **Work with state and local port authorities to move quickly to add cargo handling facilities and improve intermodal connections; and**
- **Explore opportunities to utilize short sea shipping to shuttle cargo between load center ports and secondary ports as a way to minimize the overland move and reduce highway and rail congestion.**





Questions?

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