

# A Primer on the Effect of the Panama Canal Expansion on World Commerce

## AAPA Facilities Engineering Seminar

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*CH2M HILL*



# Areas to be Covered

**#1** Historical and Current Canal

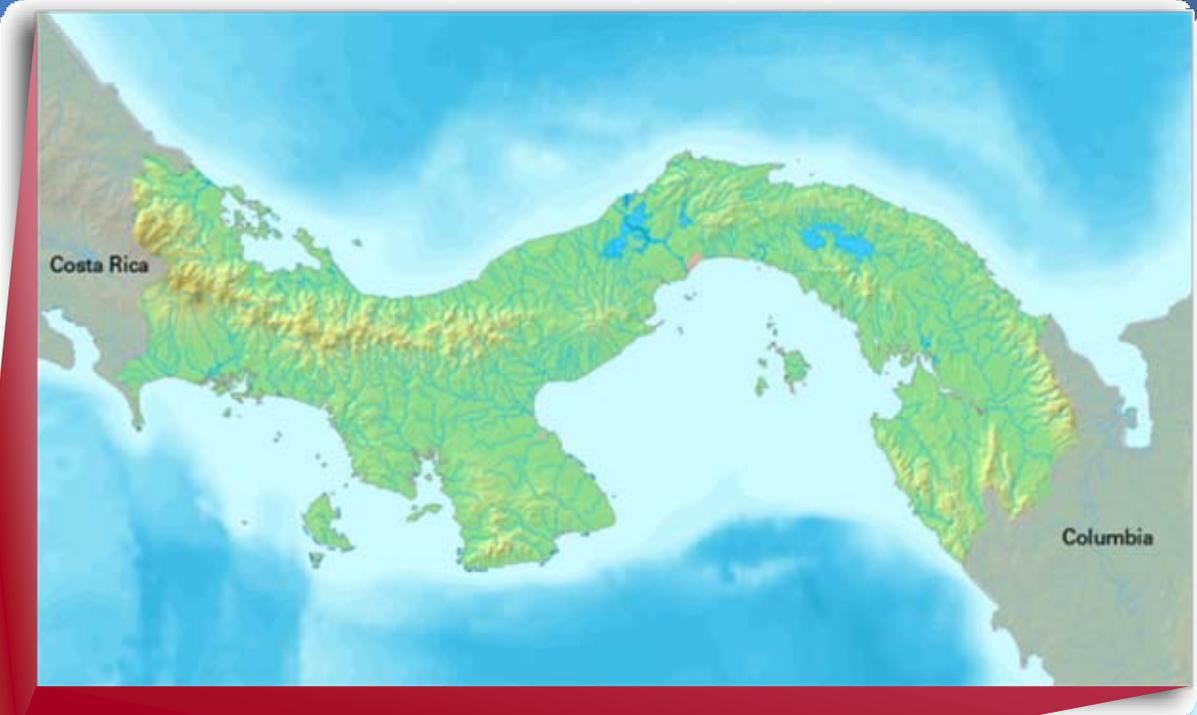
**#2** Expansion

**#3** Impact on World Commerce

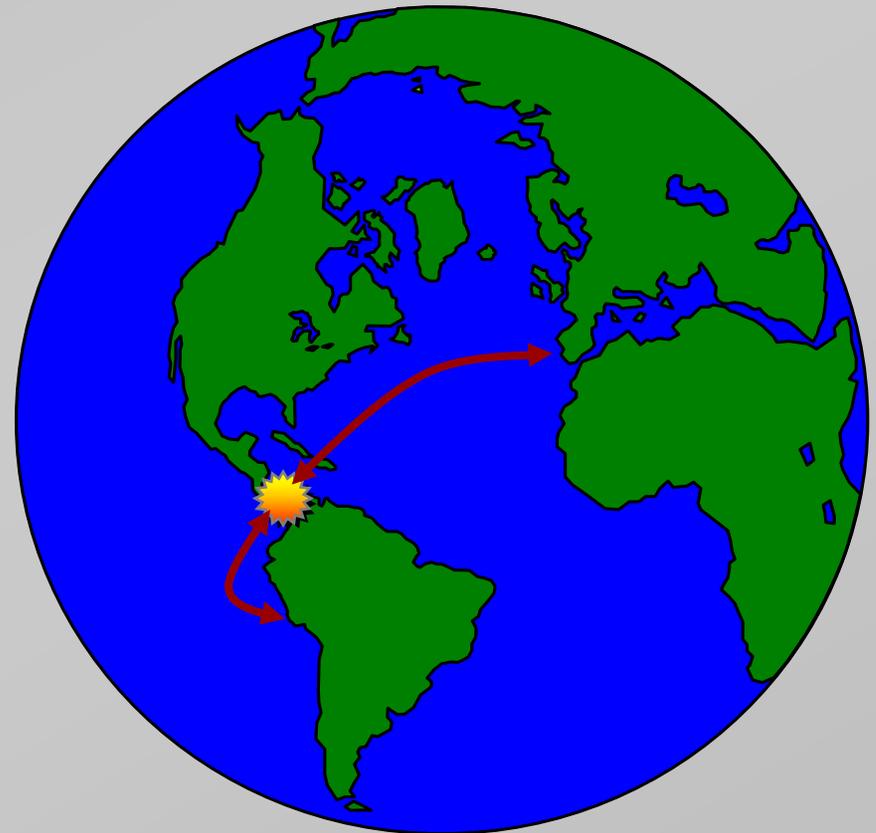
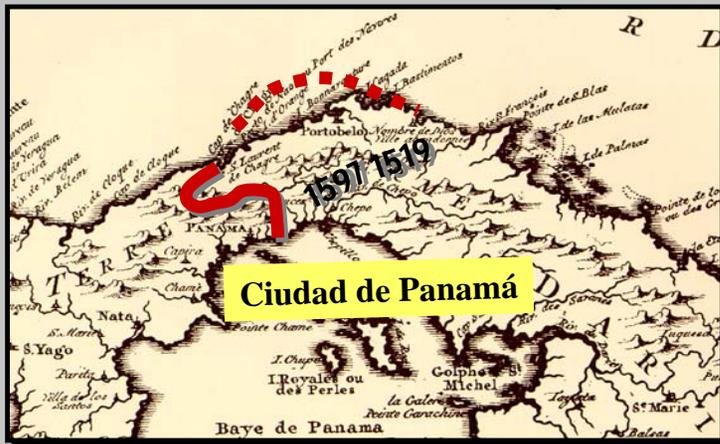
# #1 Historical and Current Canal

Republic of Panama

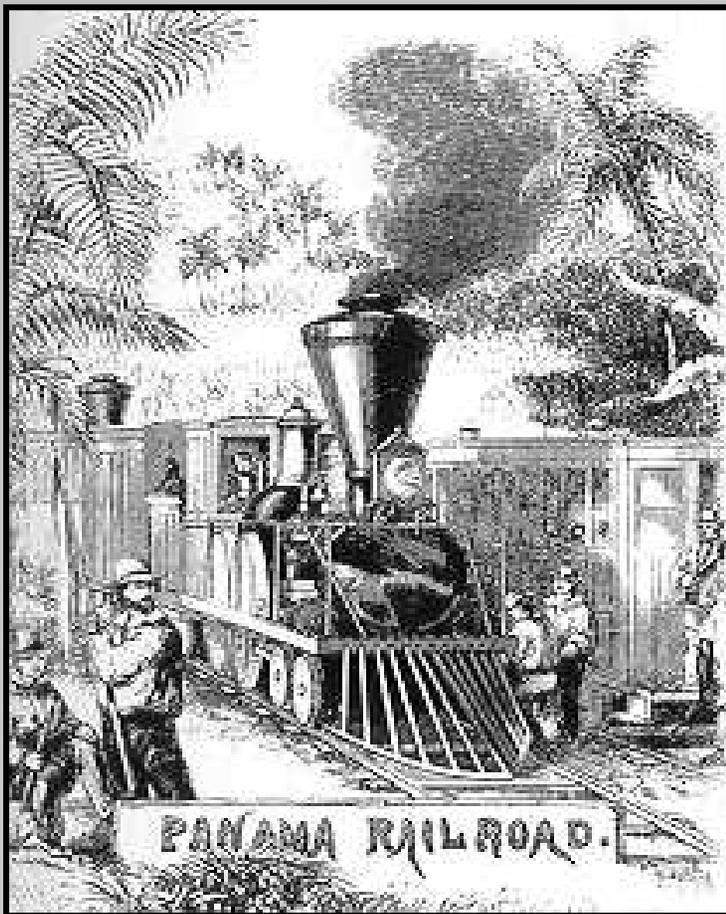
75,512 sq km - smaller than  
South Carolina



# 1606 – 1738: Ferias de Portobelo



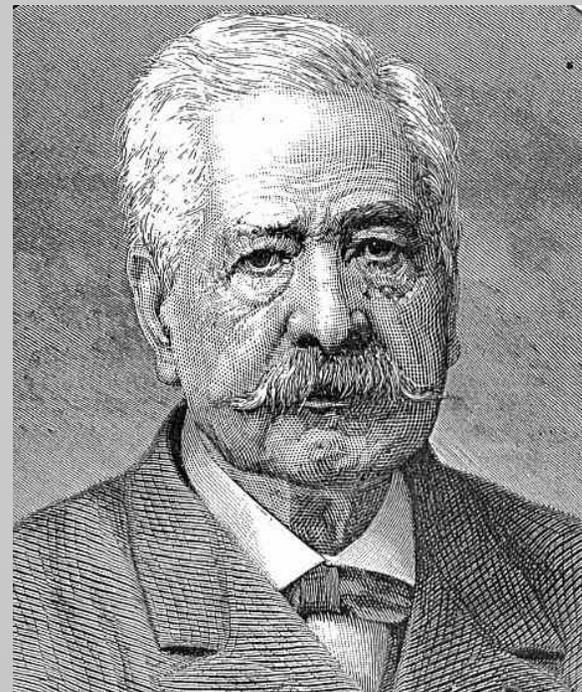
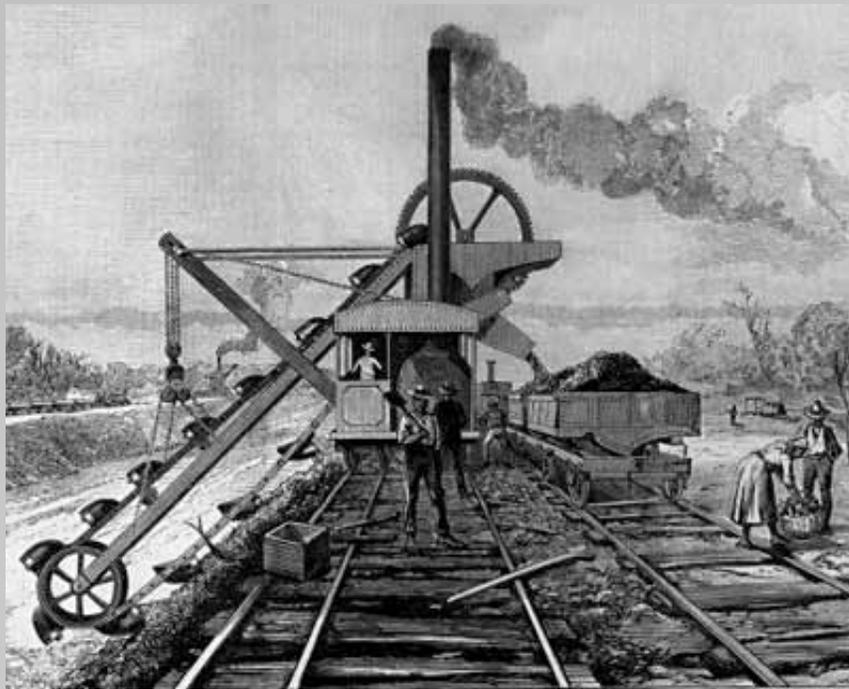
# 1855: Construction of the Trans-Panama Railroad



John Lloyd Stephens  
William Aspinwall  
Henry Chauncey

## 1882 – 1889: French attempt a sea-level canal

- Approximately 22,000 deaths

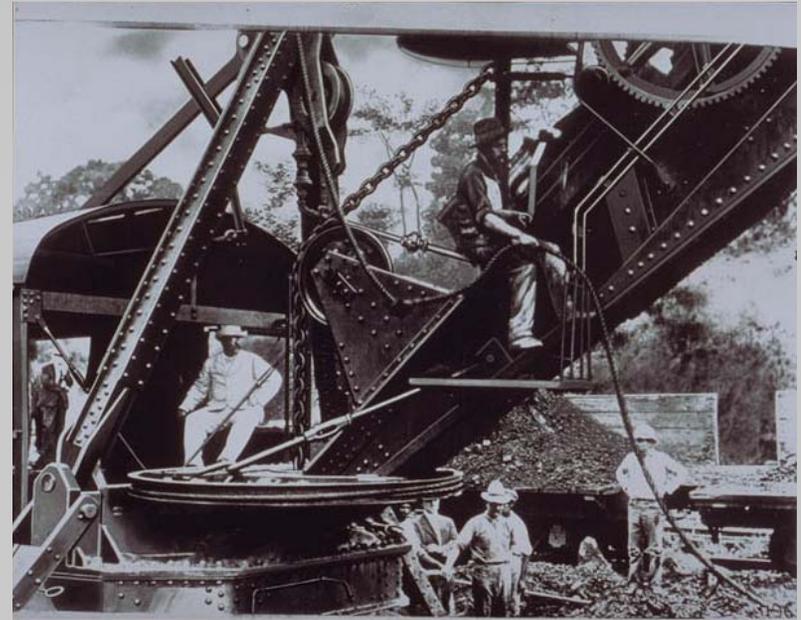


Ferdinand de Lesseps

- About 268,000,000 cubic yards were excavated

## 1904 – 1914: U.S. Construction

- Original canal cost \$375,000,000
- 56,307 people worked on the construction of the canal
- 5,609 known deaths
- 238,845,587 cubic yards of material were excavated



Theodore Roosevelt at Pedro Miguel 1906

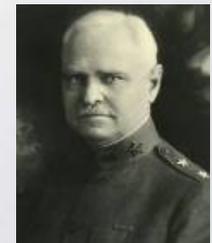
## Notable U.S. leaders

John F. Wallace, Chief Engineer, 1904-1905



John F. Stevens, Chief Engineer, 1905-1907

George W. Goethals, Chief Engineer, 1907-1914

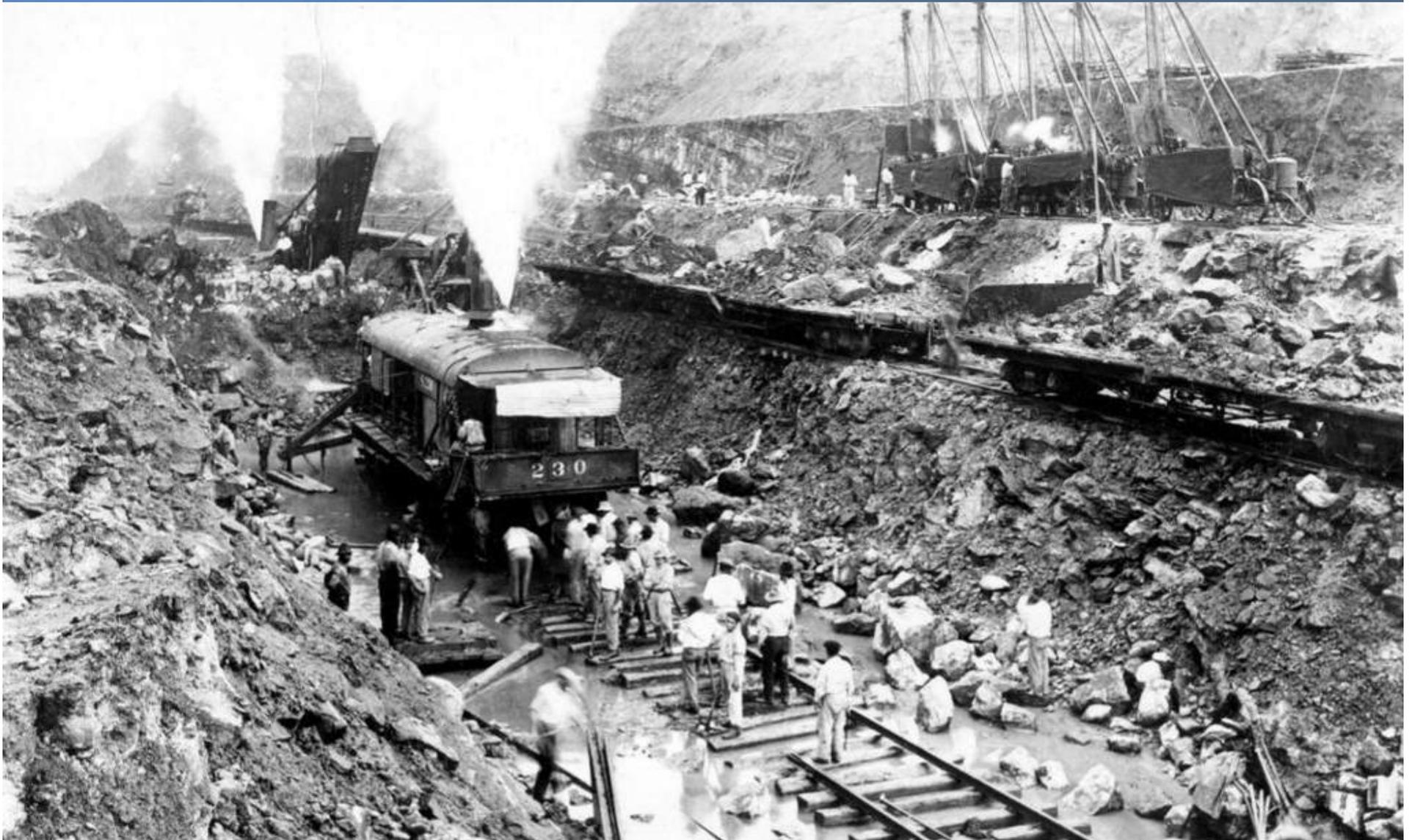


Dr. William Gorgas, 1904 - 1920

John F. Stevens was a preeminent railroad builder



# Logistics of efficiently moving materials



# August 15, 1914: First Official Transit - SS Ancon



# Confluence of technologies



GE powered electric locomotives and gates

# The Panama Canal Today



Emergence of the Panamax class vessel  
965-ft LOA; 106-ft Beam; 4,500 TEU

# Capital Investment



Dredging



Locomotives



Hydraulic Conversion



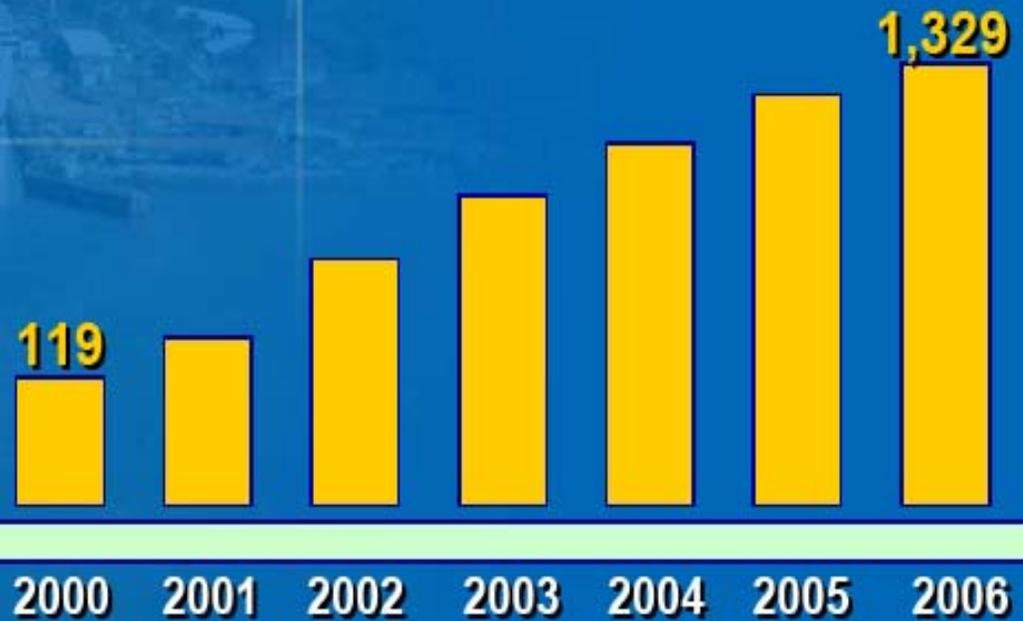
Technology



Track system



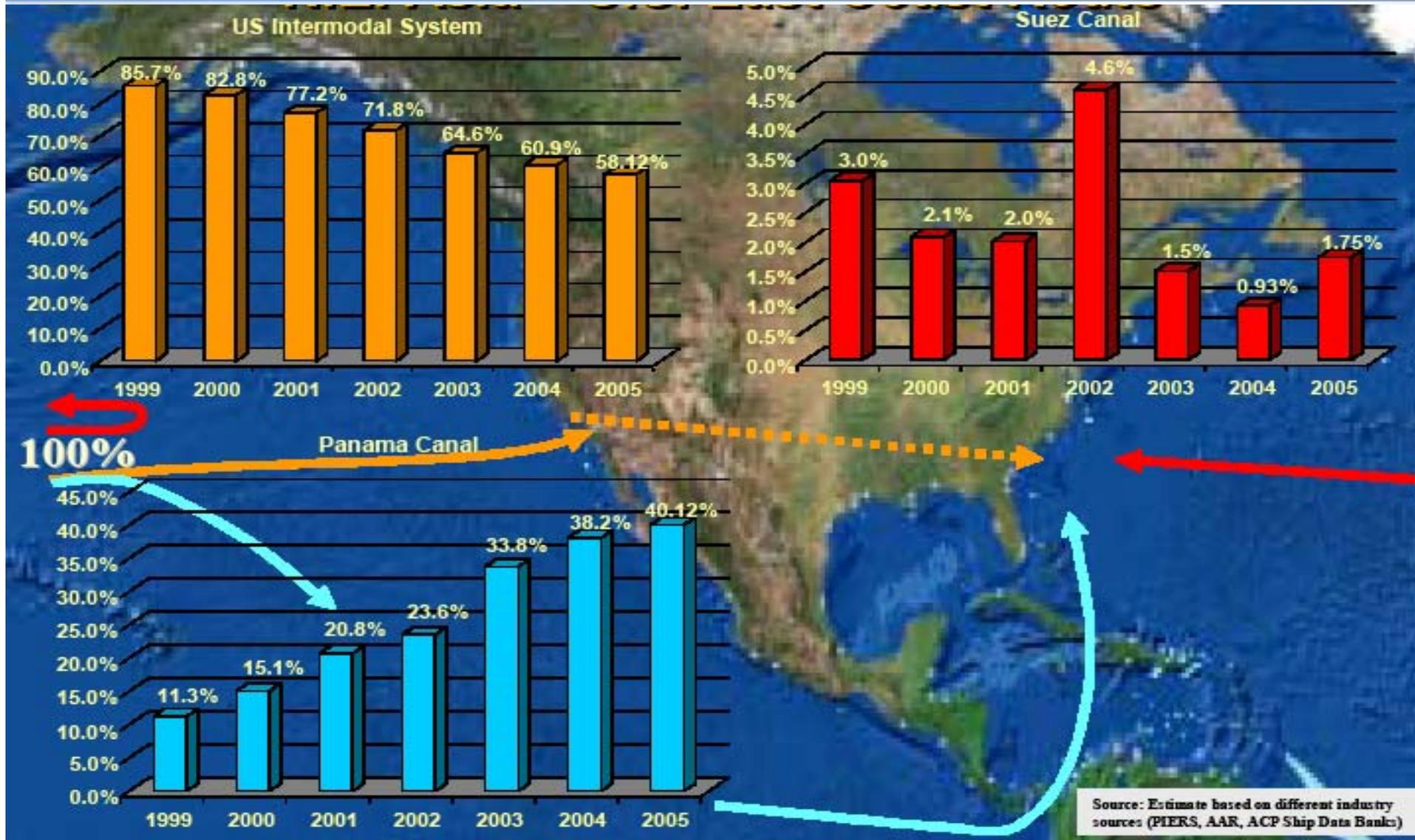
Tug Boats



# The Panama Canal Today

- Average of 36 to 38 vessels pass through the canal each day; 13,000 to 14,000 per year.
- The **highest** toll paid to date: \$274,590 by the Maersk Dellys
- The **lowest** toll paid to date: 36 cents by Richard Halliburton who swam the canal in 1928
- 943,042 vessels have used the canal since it opened in 1914 (as of FY2006)
- More than 73% of the world's cargo ships are too large to pass through the current canal
- The ACP currently employs about 9,000 people

# Canal market share N.E. Asia – U.S. East Coast route

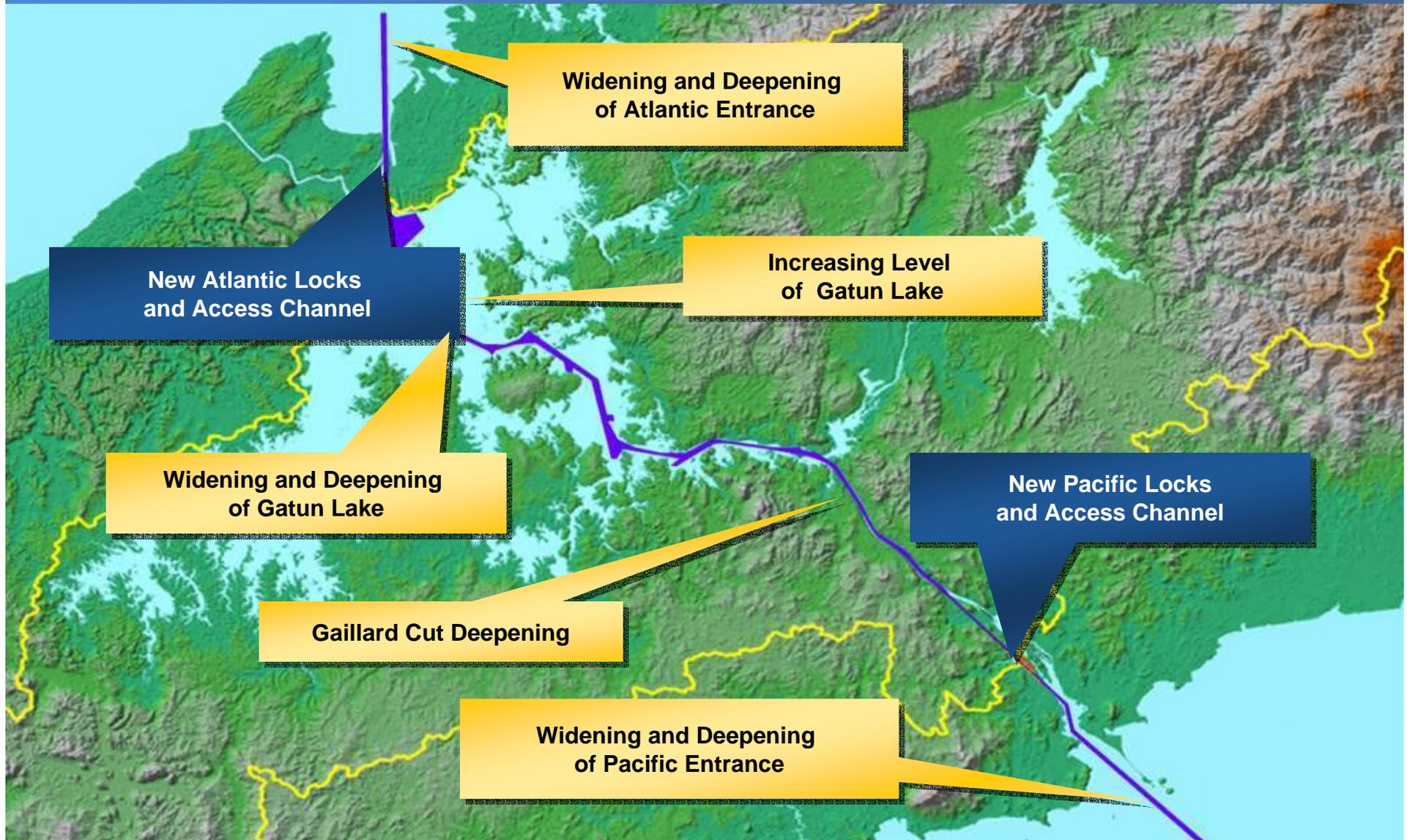


# Areas to be Covered

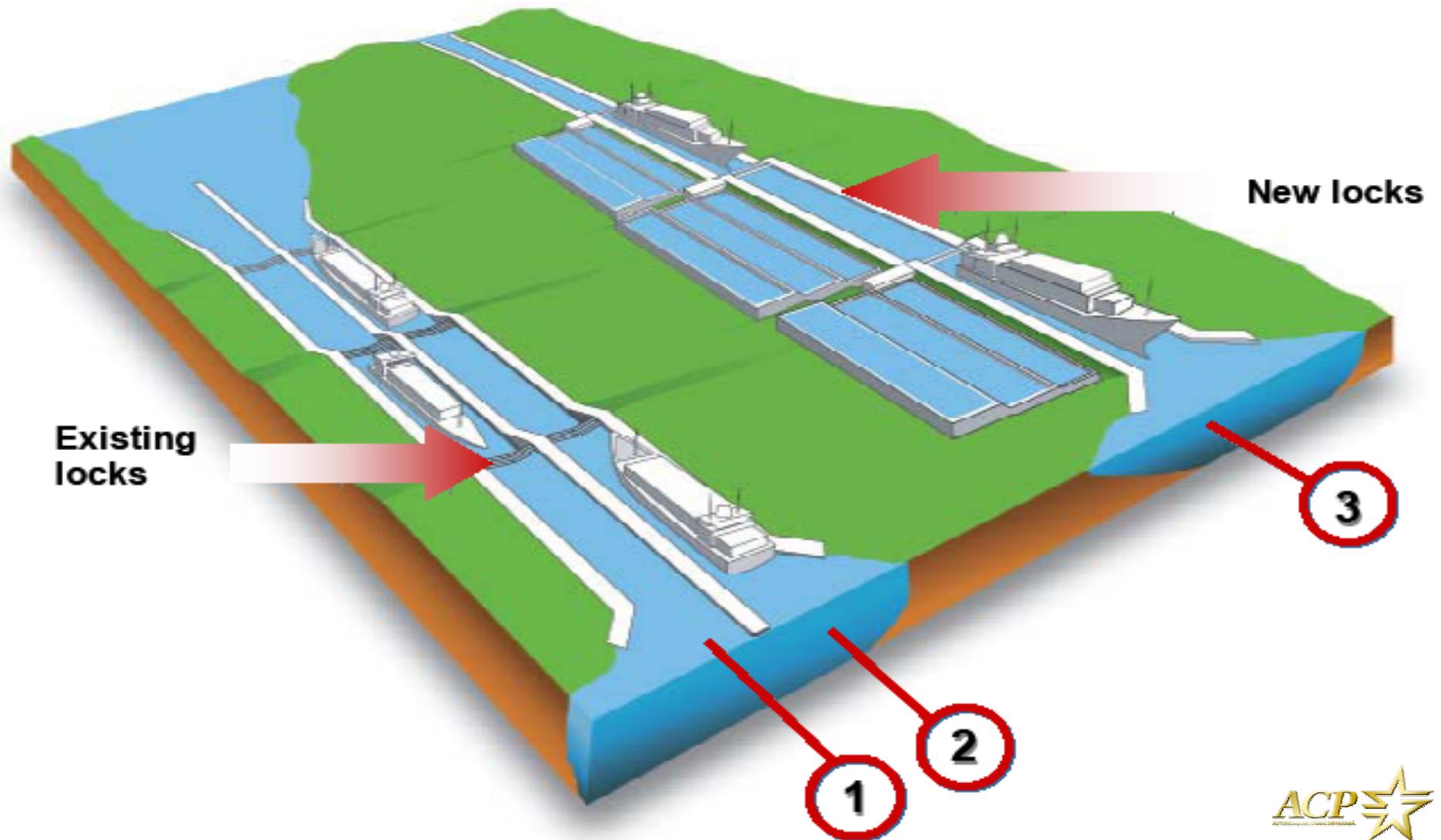
**#1** Historical and Current Canal

**#2** Expansion

# The Panama Canal Expansion



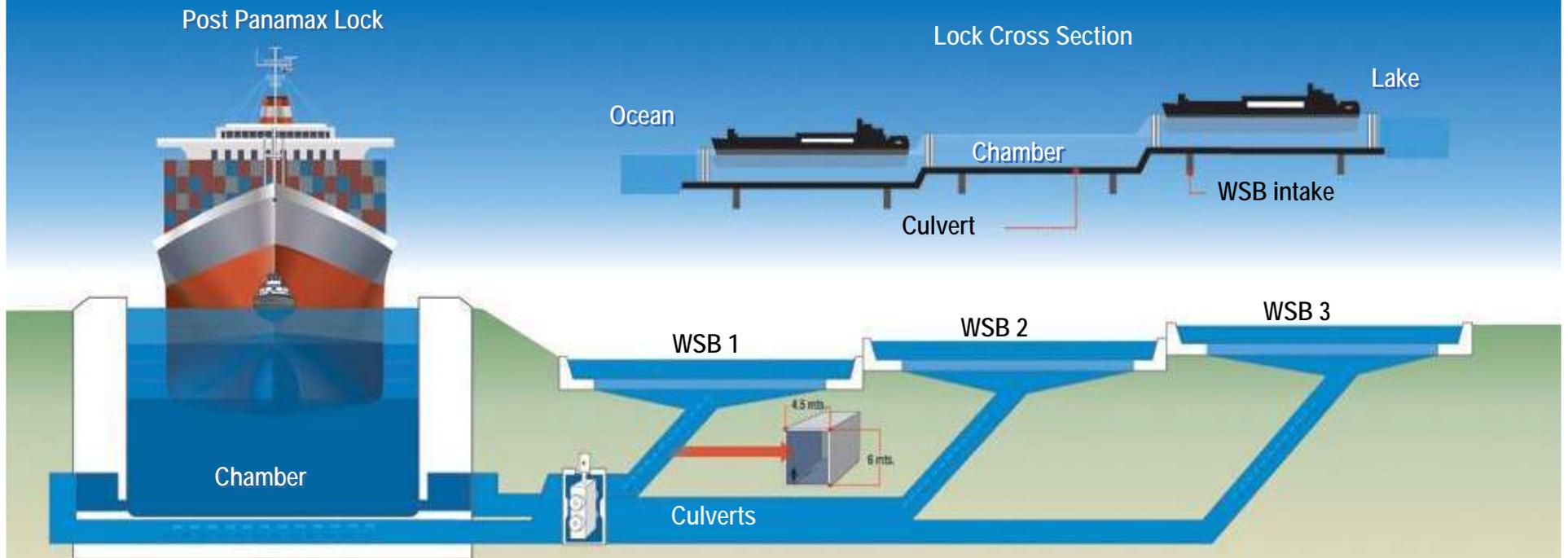
# Third set of locks



# Conceptual Design



# Sustainable Lock Design

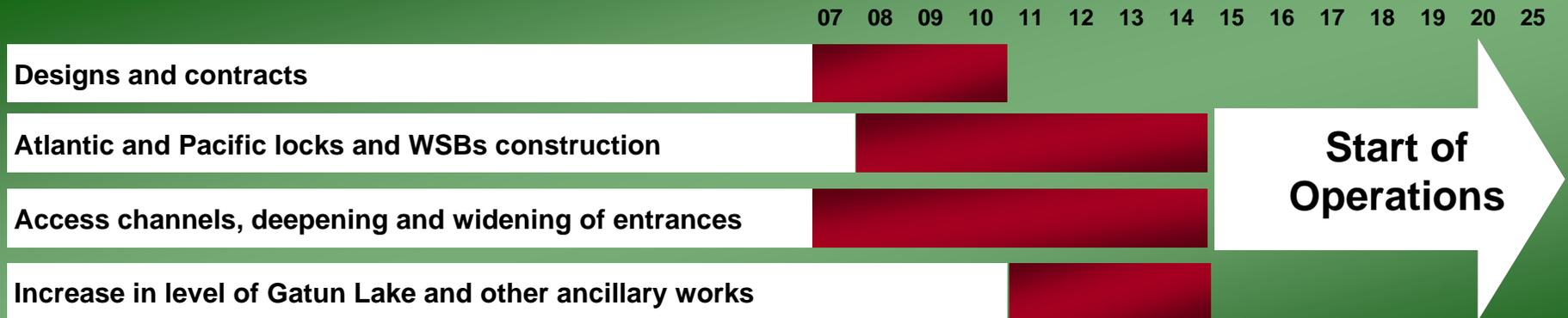


**Width: 180 feet**

**Length: 1,400 feet**

**Depth: 60 feet**

# Project Schedule



- Ground breaking ceremony on Sept. 3, 2007 at Paraíso Hill
  - 30,000 pounds of explosives
- Scheduled completion date is Aug. 15, 2014
  - Date is 100th anniversary of the canal

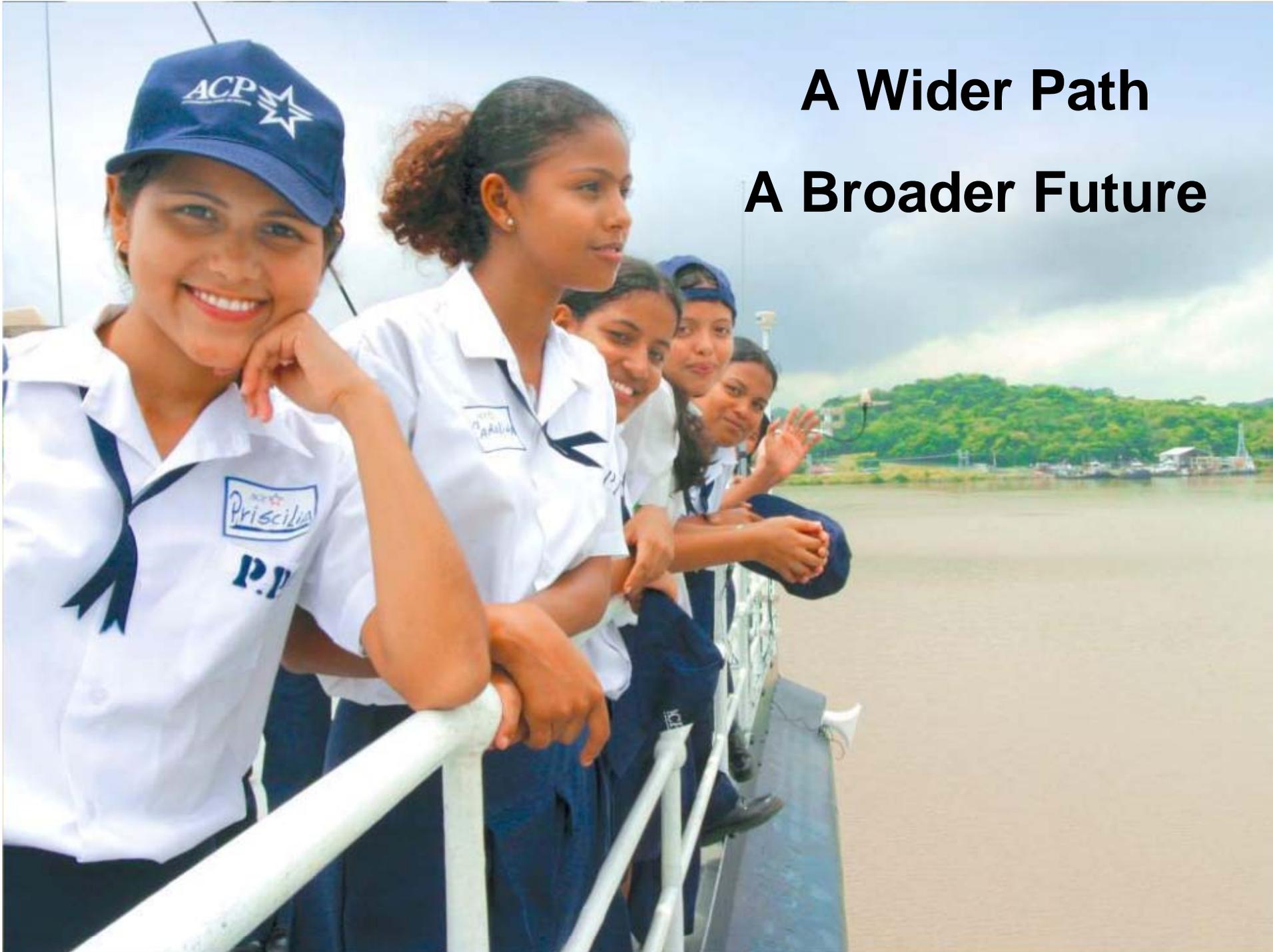


## CH2M HILL's Role



### ***Program management function includes:***

- Assist ACP with management of all contracts and procurements
- Develop, install and maintain ACP Program Management Information System
- Interface with locks design/builder and with all other design and construction activities
- Provide ongoing construction oversight, including quality, safety, and operability
- Interface with local and international stakeholders
- Provide ongoing training and coaching to ACP staff



**A Wider Path  
A Broader Future**

# Areas to be Covered

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**#3** Impact on World Commerce

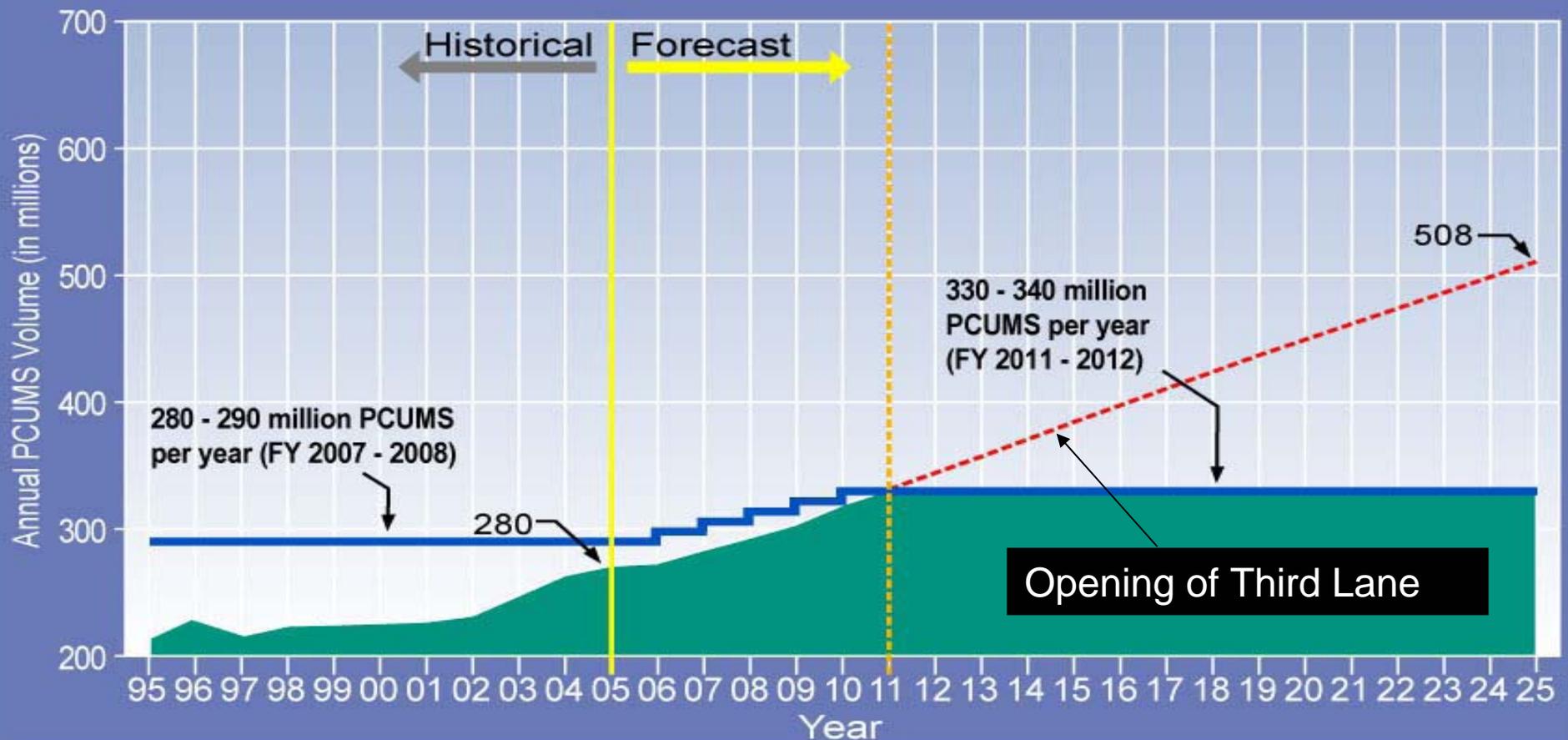
## The Effect of the Third Lane on the ACP

- Added Capacity is 12 post-Panamax vessels per day in addition to the current 38 Panamax per day
- New locks alone will have a capacity of over 300-million PCUMS tons per year
- Added Revenue for 10,000-TEU to 12,000-TEU Post-Panama vessels is estimated at \$500,000 per transit

PCUMS = Panama Canal Universal Measurement System

In 2005, the maximum sustainable capacity was predicted to be reached between 2009 and 2012

## Maximum Sustainable Capacity of the Canal

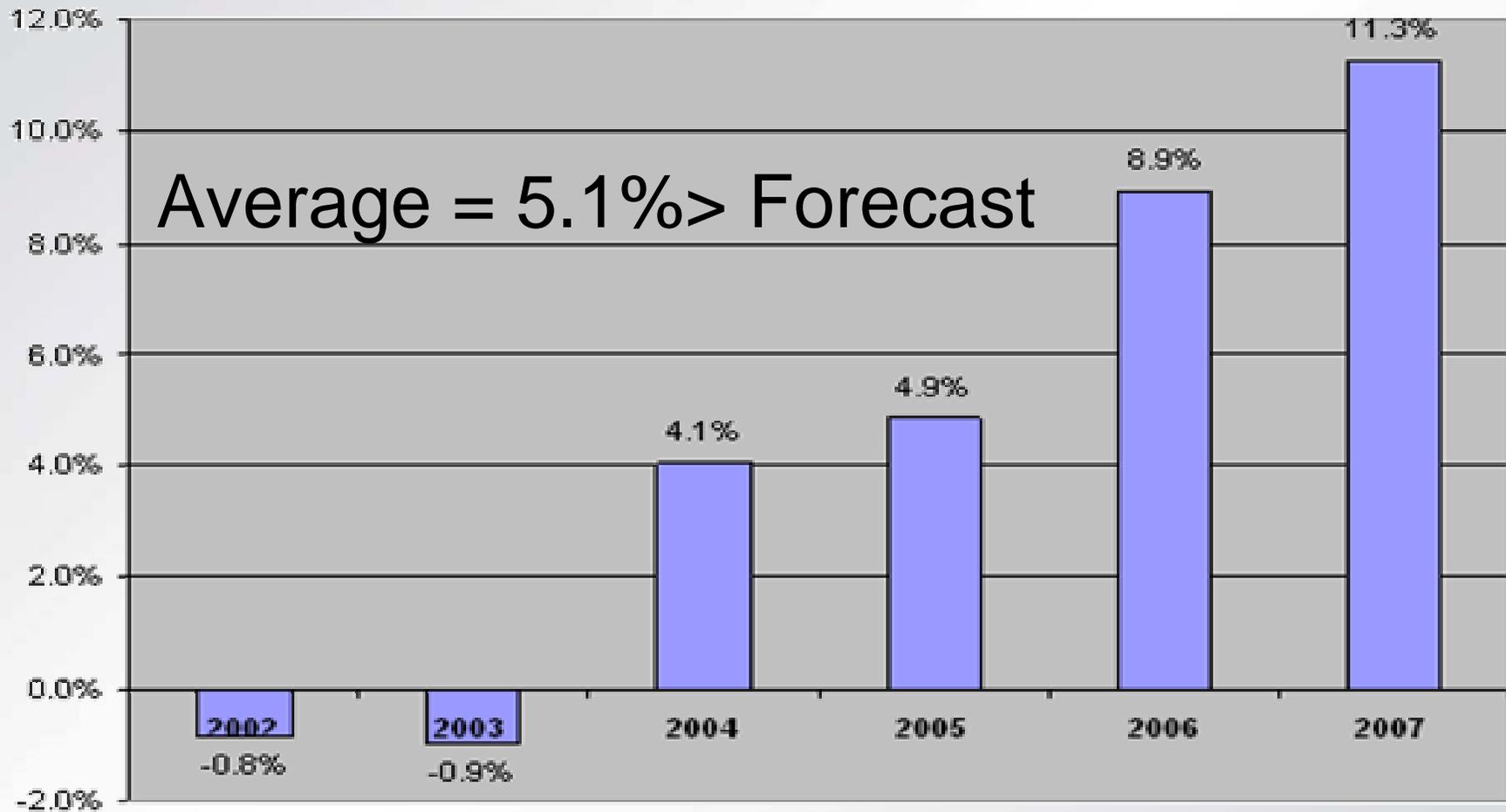


— Maximum sustainable capacity  
- - - Probable Demand

█ Manageable demand



# Variation between Real and Forecast PCUMS Tons



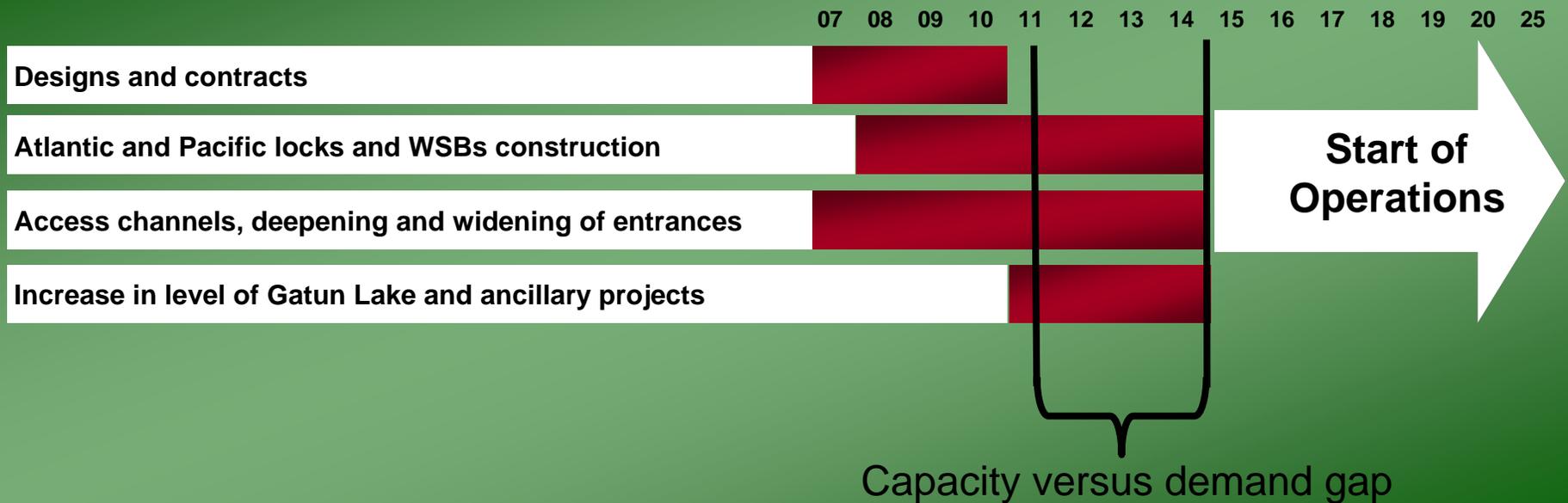
Capacity will be reached sooner than predicted based on the actual volumes



## The Third Lane revenue potential

- Revenue projections based on gradual ramp-up over time to 12-transits per day
- ACP estimated Canal revenues for first eleven-years with new locks will add \$1.15-billion per year \*
- 1-year revenue at \$6-million/day is \$2.19-billion

# Importance of project schedule

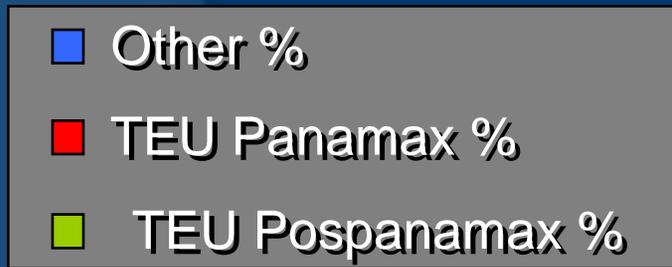
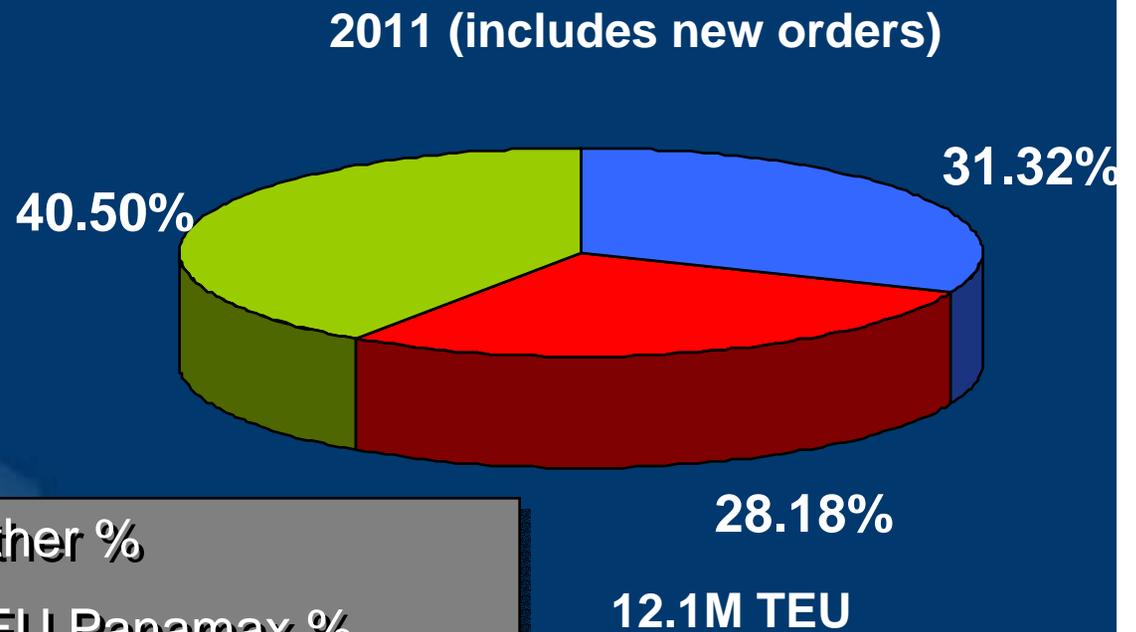
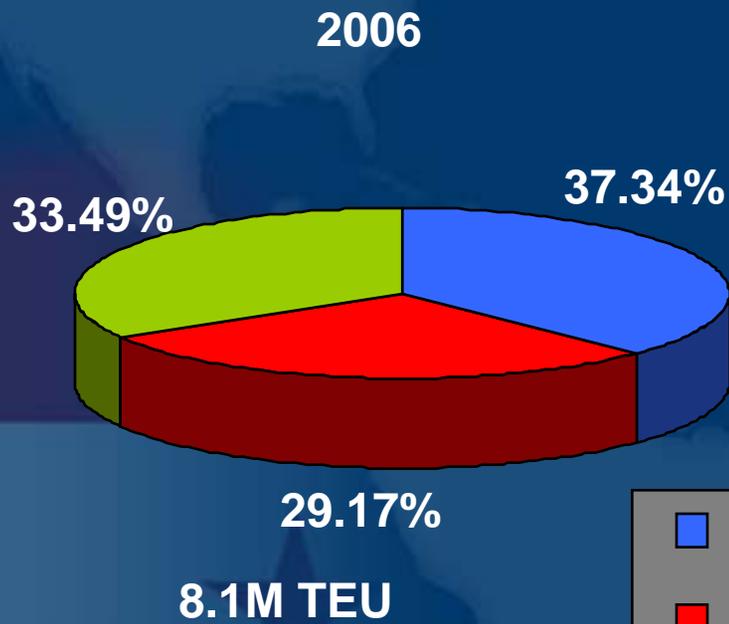
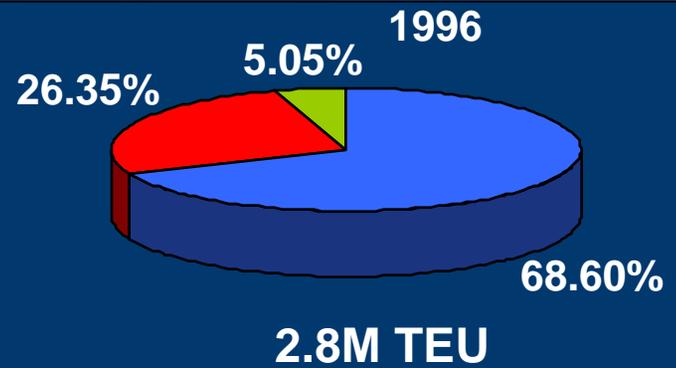
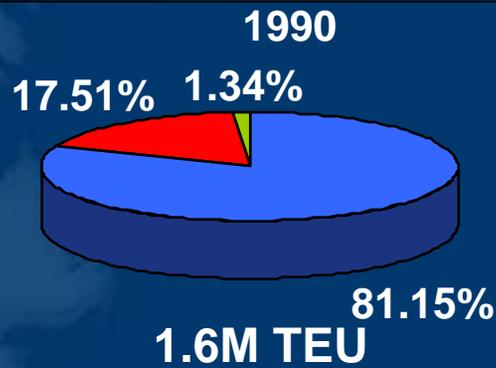
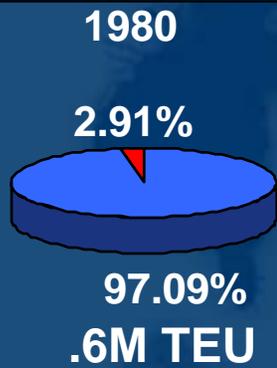


- Capacity versus demand gap = Lost ACP Revenue
- Early completion will greatly help ACP and world commerce
- Delay will have global economic impacts

## The Canal's impact on global maritime trade

- The Canal transits around 3% of world maritime trade
- Seven of the largest shipping companies in the world have offices in Panama
- Sale of bunker fuel to transit ships is the largest in the region
- More than 200 cruise ships per year stop in Panama
- Over 26 legal offices provide maritime and other international legal services
- Canal is transforming Panama from a transportation hub into a center of logistics, commercial and maritime activity

# Evolution of the world TEU capacity

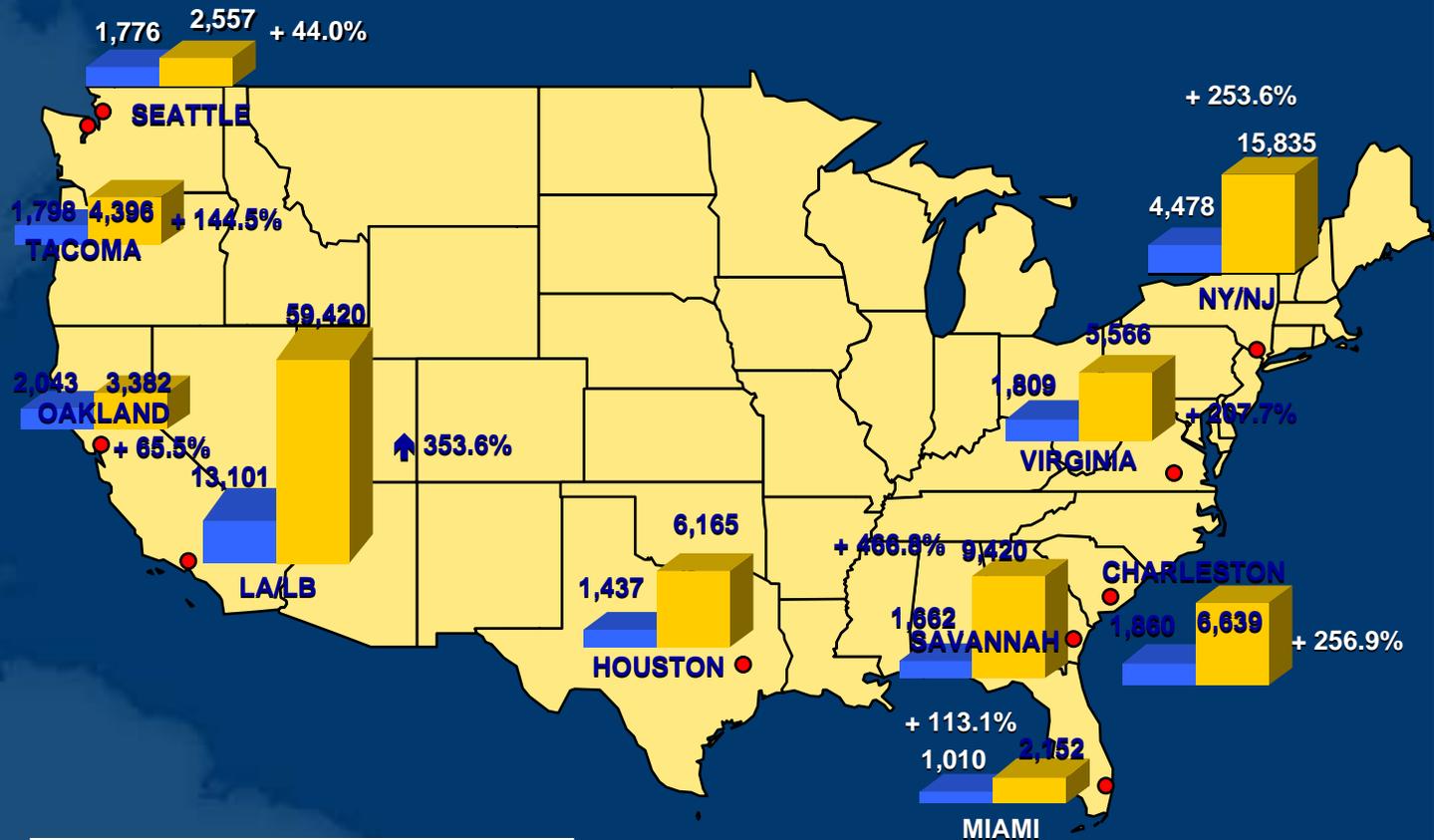


## Asia-Pacific and the U.S. West Coast

- World maritime trade dependency on container shipping is monumental
- More than 150 Post-Panamax ships move cargo between Asia-Pacific and the West Coast of the United States and are transported by train to the East Coast and other regions
- Port facilities in the Los Angeles/Long Beach are being stretched to their limits

# Growth of container traffic in the U.S.

- Container imports will double by 2020
- Rail freight tonnage will increase by 50% by 2020
- The majority of U.S. ports are not dredged to accept the 10,000 TEU now under construction

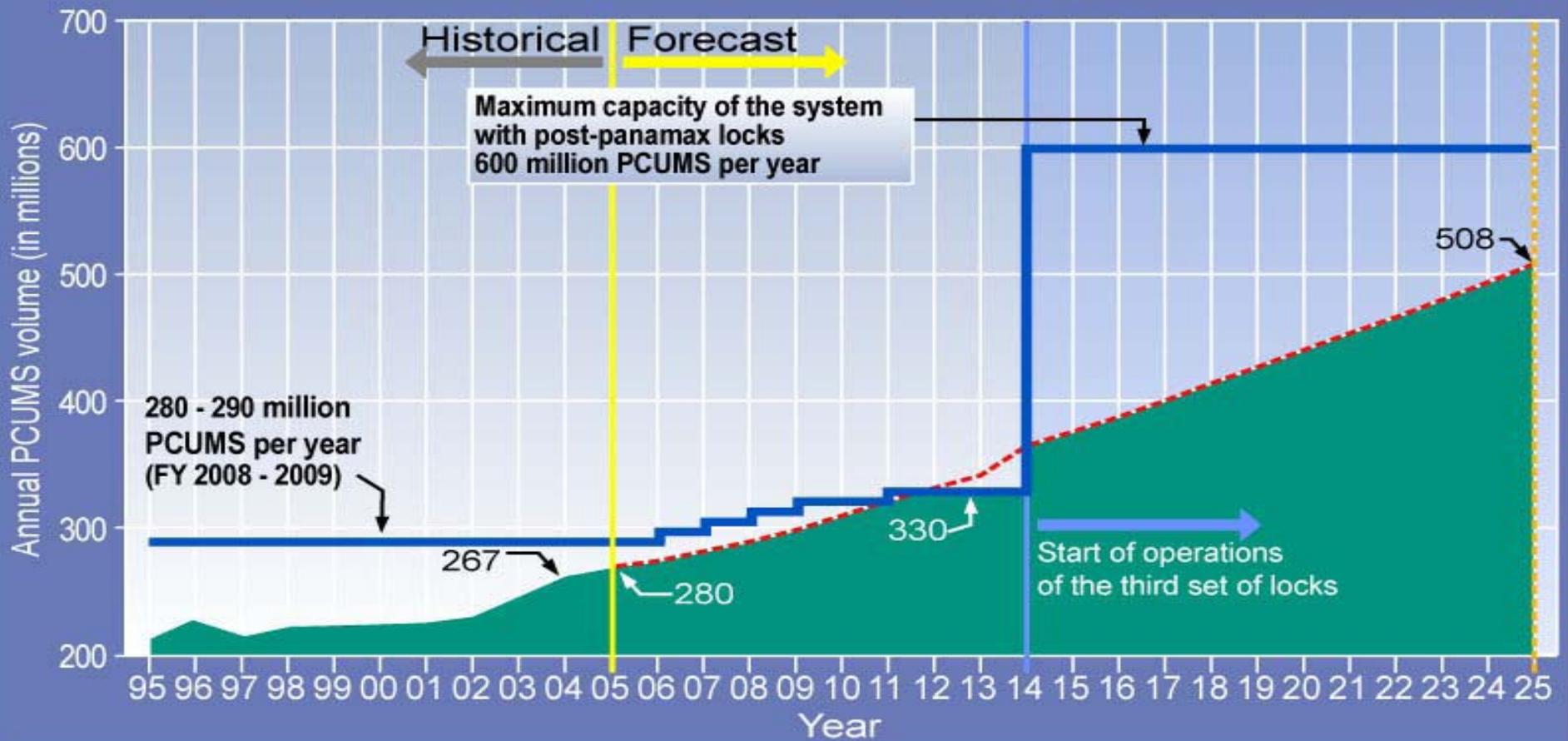


**Legend:**

- Volume 2004 ('000 TEU)
- Volume 2020 ('000 TEU)

# Expanded Canal can transit 600 million PCUMS tons annually

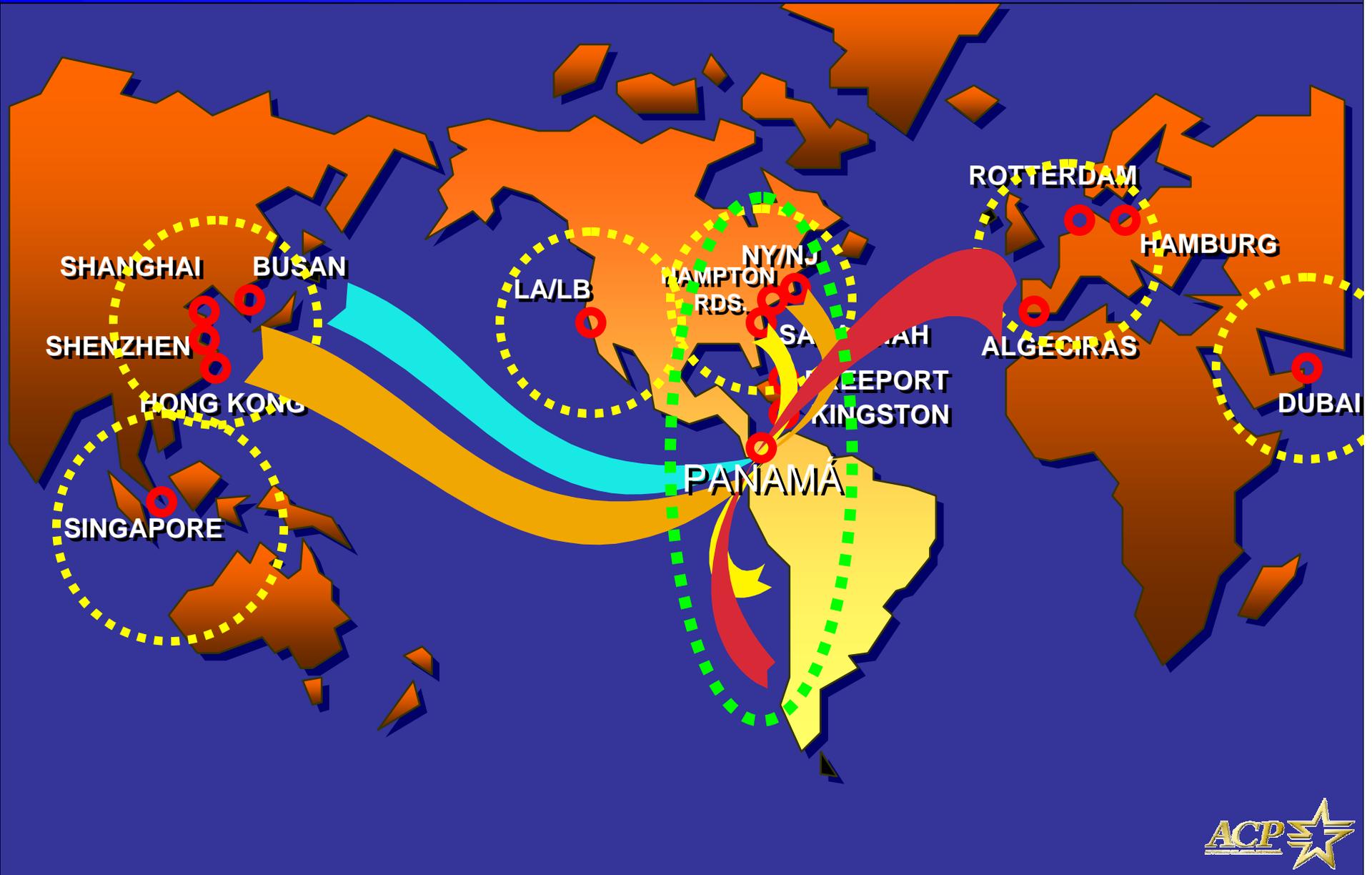
## Maximum Sustainable Capacity of the Canal Expanded with the Third Set of Locks



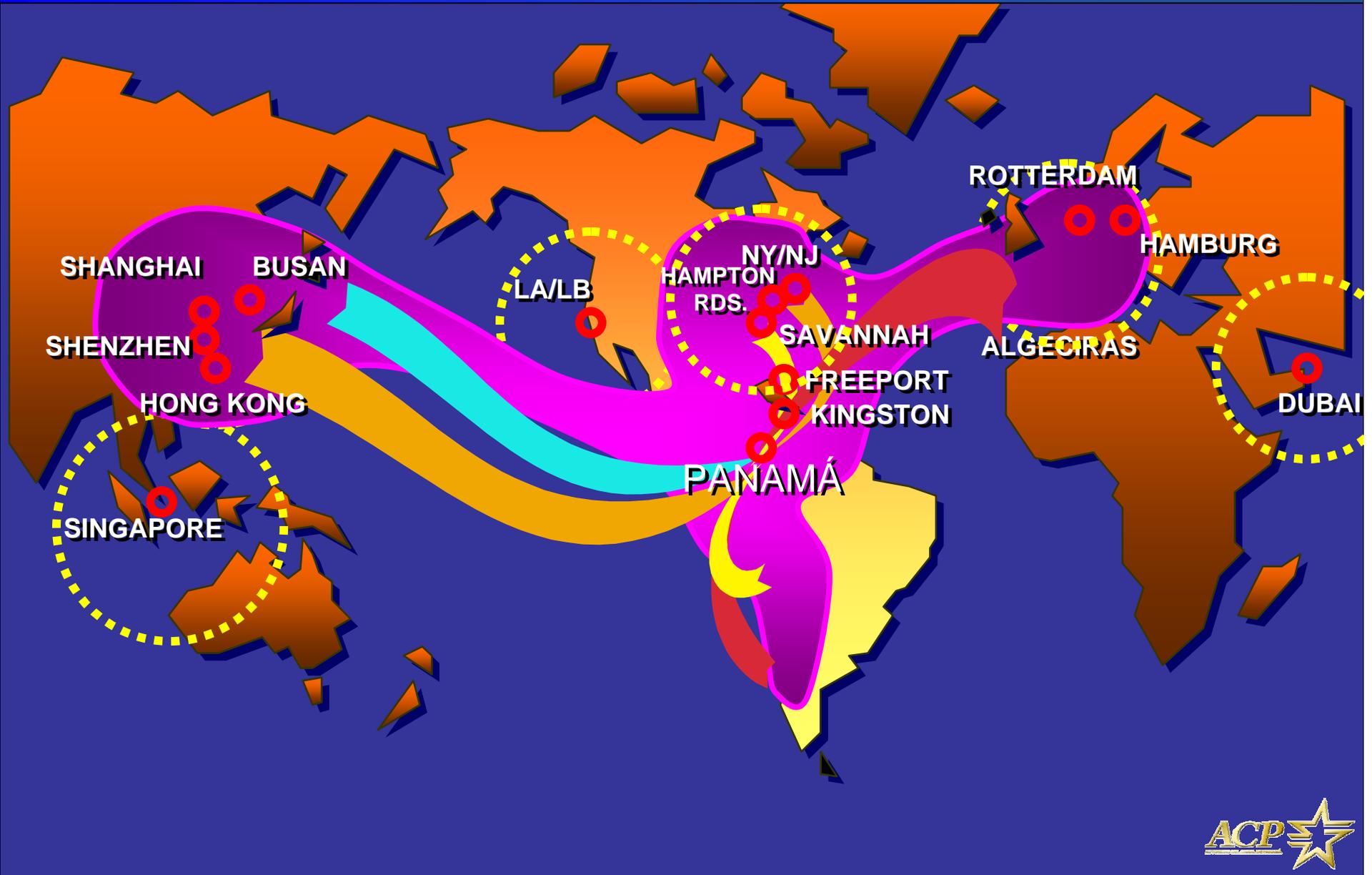
— Maximum sustainable capacity

■ Demand

# Principle Logistics Centers



# Principle Logistics Centers

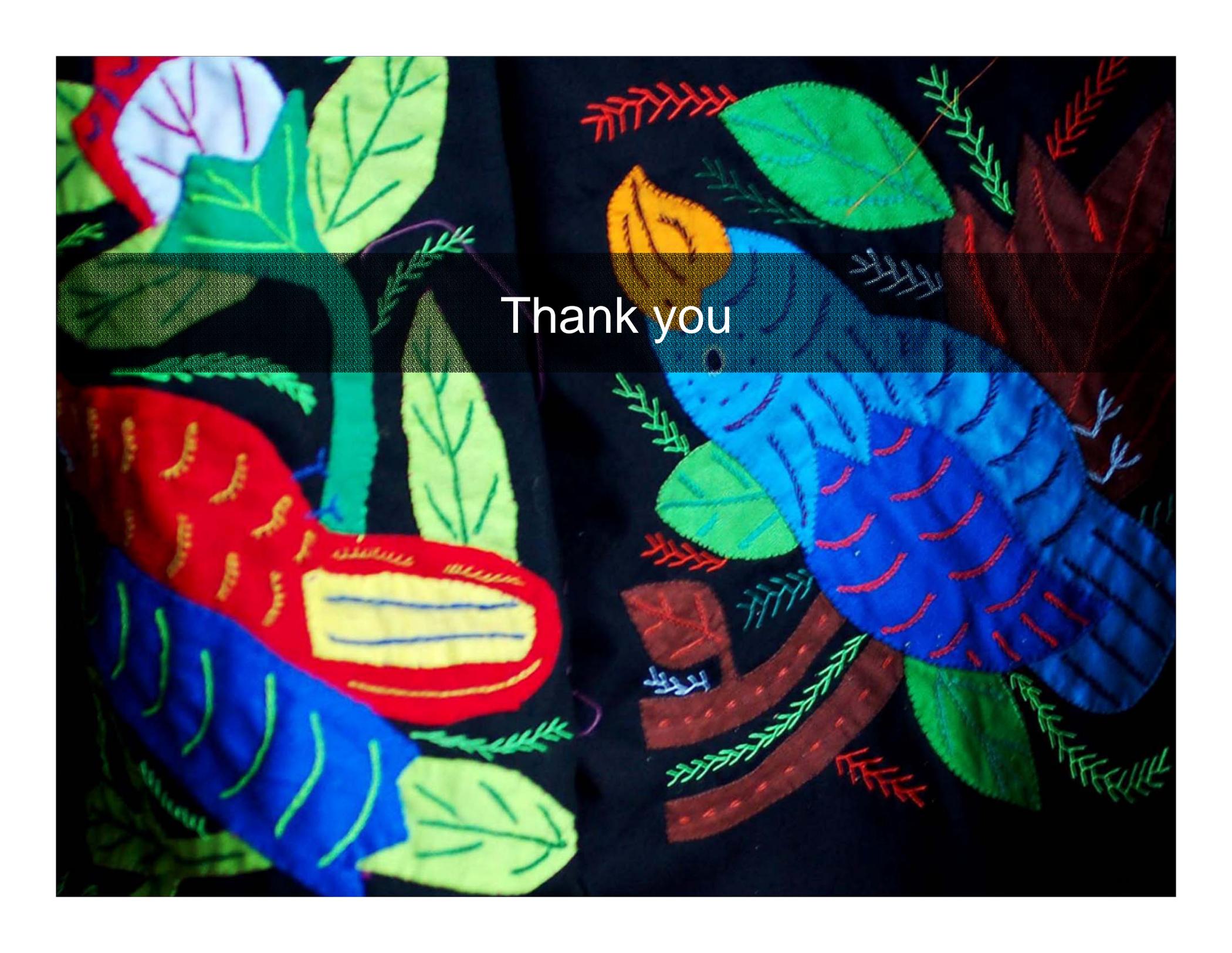




## World ports connected by liner services that transit the Canal or use Panamanian ports

Algeciras	Felixstowe	Miami FL	Salerno
Altamira, MEX	Freeport, Bahamas	Mobile AL	San Antonio
Antofagasta	Genoa	Mumbai (Nhava Sheva)	Santo Tomas de
Antwerp	Guayaquil	Mundra	San Juan PR
Arica	Haifa	Nagoya	San Vicente
Auckland	Halifax, Nova Scotia	Napier	Savannah GA
Balboa	Hamburg	Naples	Shanghai
Baltimore MD	Havana	New York NY/NJ	Shekou
Barcelona	Hong Kong	Ningbo	Shimizu
Barranquilla	Houston TX	Norfolk VA	Southampton
Bilbao	Iquique	Noumea	Sydney
Boston MA	Jacksonville FL	Oakland CA	Tampa FL
Bremerhaven	Kaohsiung	Oakland CA	Tauranga
Brisbane	Keelung	Osaka	Thamesport
Buenaventura	Kingston	Paita	Tilbury
Busan	Kobe	Papeete, Tahiti	Timaru
Callao	Kwangyang	Philadelphia PA	Tokyo
Cartagena,	La Guaira	Port Chalmers	Tuticorin, India
Caucedo, Dom Rep	Lazaro Cardenas	Port Everglades FL	Valencia
Charleston SC	Le Havre	Port Kelang	Valparaiso
Chiwan	Leghorn	Port of Spain,	Vancouver, B.C.
Colombo	Long Beach CA	Port Said, Egypt	Veracruz, MEX
Cristobal, Panama	Los Angeles CA	Port-au-Prince	Vigo
Curacao	Manzanillo, Dom Rep	Portland OR	Wilmington NC
Damietta, Egypt	Manzanillo, MEX	Puerto Cabello	Xiamen
Dubai, Jebel Ali	Manzanillo, Panama	Puerto Limon	Xingang/Tianjin
Dunkirk	Maracaibo	Puerto Quetzal	Yantian
Ensenada, MEX	Matarani	Qingdao	Yokohama
	Mejillones	Rio Haina	Zeebrugge
	Melbourne	Rotterdam	





Thank you