The Panama Canal
1914
The Panama Canal Today
The Panama Canal
2014
Panama Canal Traffic and World Events

Source: Panama Canal Authority
Transits vs. PC/UMS Tonnage
FY 1914 – FY 2009

PC/UMS Tonnage for Commercial Transits

- FY 1955: 4,832
- FY 1975: 9,931
- FY 1995: 18,940
- FY 2009: 23,227
Average Canal Waters Time by Fiscal Year

Global

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>30.0</td>
</tr>
<tr>
<td>2007</td>
<td>28.5</td>
</tr>
<tr>
<td>2008</td>
<td>31.6</td>
</tr>
<tr>
<td>2009</td>
<td>23.1</td>
</tr>
</tbody>
</table>
Expansion Program Update
Expansion Program Components

Atlantic Post Panamax Locks

Deepening & widening of the Atlantic entrance

Atlantic Post Panamax Locks

Deepening & widening of the Gatun lake & Culebra Cut navigational channels

Increase the Maximum Operating Level of Gatún Lake

26.7 m → 27.1 m

Atlantic Ocean

Pacific Post Panamax Locks

Deepening & widening of the Pacific entrance

9.1 m

New Locks ► Access Channel ► Existing Locks

Existing Locks ▼

Atlantic Ocean

Pacific Ocean

Post Panamax Pacific Locks Access Channel

48 Mm³
Dimension of Locks and New-Panamax vessels

**Existing Locks Max Vessel:** 4,400 TEU’s

**Current Locks**
- Length: 366 m (1,200’)
- Beam: 49 m (160’)

**New Locks**
- Length: 427 m (1,400’)

**New Locks Max Vessel:** 12,600 TEU’s

**Dimensions**
- **Panamax**
  - Length: 294.1 m (965’)
  - Beam: 49 m (160’)
  - Height: 12.4 m (39.5’)

- **Existing Locks**
  - Length: 304.8 m (1,000’)
  - Beam: 18.3 m (60’)
  - Height: 12.8 m (42’)

- **New Locks**
  - Length: 427 m (1,400’)
  - Beam: 55 m (180’)
  - Height: 18.3 m (60’)

**Existing Locks Max Vessel:** 4,400 TEU’s

**New Locks Max Vessel:** 12,600 TEU’s
# Pacific Access Channel

<table>
<thead>
<tr>
<th>PAC 1</th>
<th>Excavation of 7.3 Mm³</th>
<th>Cleaning of 146 hectares of MEC</th>
<th>Relocation of 3.5 km of Borinquen Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAC 2</td>
<td>Excavation of 7.4 Mm³</td>
<td>Cleaning of 190 hectares of the remaining T6 area</td>
<td>Relocation of 1.3 km of Borinquen Road</td>
</tr>
<tr>
<td>PAC 3</td>
<td>Excavation of 8.0 Mm³</td>
<td>Cleaning of 80 hectares of MEC</td>
<td>Construction of Borinquen Dam</td>
</tr>
<tr>
<td>PAC 4</td>
<td>Excavation of 26.2 Mm³</td>
<td>Cleaning of 80 hectares of MEC</td>
<td>Length 2.3 km</td>
</tr>
<tr>
<td>TOTAL</td>
<td>48.9 Mm³</td>
<td>416 hectares</td>
<td>Ridge 30 m</td>
</tr>
</tbody>
</table>

### Pacific Access Channel Dimensions

- **Longitude**: 6.1 km (3.79 mi)
- **Width**: 218 m (715.2 ft)
- **Depth**: 16.7 m (55 ft)
Projects Underway
Pacific Access Channel - PAC 1

Project Scope:
7.3 Mm³ of earth removal,
Cleanup of 146 ha of UXO disposal area
Relocation of 3.5 km of Borinquen Road

Awarded: July 17, 2007
Amount: $40,431,196.00
Projects Underway

Pacific Access Channel - PAC 2

7.4 Mm³ excavated

Project Scope: Excavation of 7.4 Mm³
Relocation of 1.3 km of Borinquen Road
Deviation of 3.5 km of Cocolí River.
Awarded: November 27, 2007
Projects Underway

Pacific Access Channel - PAC 2
Borinquen Road - Phase II, 100% completed

Borinquen Road - Phase III, 80% completed by ACP
End of Cocoli River Deviation

December 29, 2009
Projects Underway

Pacific Access Channel - PAC 3

Awarded: December 16, 2008
Company: Constructora MECO, S.A.
Scope: 8.0 Mm³
Clearing 190 ha of UXO area
3.35 Mm³ excavated
190 hectares cleaned-up

Programmed: 39%
Current: 48%
Projects Underway

Pacific Access Channel - PAC 4
26.2 M m³ of dry excavation

- Scope: 26.2 Mm³
- Receipt of proposals: 22-DEC-09
- Awarded: 7-JAN-10
- Ending date: 1,288 days as of the order to Proceed (estimated 1-AUG-13)

<table>
<thead>
<tr>
<th>Programmed</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

![Map showing Pacific Access Channel and Borinquen Dam]
Borinquen Dam

Pacific Access Channel

Miraflores Lake
Canal Expansion Dredging Components

Dredging

• Pacific entrance deepening and widening (9.1 Mm³)
• Gatun Lake & Culebra Cut dredging (30 Mm³)
• Atlantic entrance deepening & widening (15.8 Mm³)

Total Volume: 54.9 Mm³
Projects Underway

Pacific entrance deepening and widening (8.7 M m³)

Awarded: April 1, 2008
Company: Dredging International
Amount: $177.5 M
Dredging Amount: 8.7 Mm³

5.03 Mm³ dredged
Projects Underway
Gatun Lake and Culebra Cut dredging

Scope: 30 Mm³
6.62 Mm³ dredged
De Lesseps Island

300,000 lb = 136 Metric tons
Projects Underway

Atlantic entrance deepening & widening

- Volume: 15.6 M m³
- Awarded to: Jan de Nul NV
- Date of award: September 25, 2009
- Awarded amount: $89,617,317
- Option: Additional 60 cm in depth $16,411,600
- End of project: May 2013

- Widening: of 198 m to 225 m (navigational Channel)
- Canal width to 218 m (Approach channel - North)
- Turnaround area for PostPanamax

- Width: 225m (740')
Design and Construction of the Locks

**Lock Chamber**
- Length: 427 m
- Width: 55 m
- Depth: 18.3 m

**Vessel size**
- LOA: 366 m
- Beam: 49 m
- Draft: 15.2 m

**Atlantic**
- Excavation: 15.6 Mm³
- Dredging: 9.2 Mm³
- Concrete: 2.5 Mm³
- Total length: 2.2 km
- Reinforcing steel: 123,000 T
- Gates and valves steel: 30,000 T

**Pacific**
- Excavation: 22 Mm³
- Dredging: 861 Km³
- Concrete: 2.3 Mm³
- Total length: 2.7 km
- Reinforcing steel: 170,000 T
- Gates and valves steel: 37,000 T
With the water saving basins, the new locks will use 7% less water than the existing locks.
Clearing Atlantic Locks Area
Clearing Atlantic Locks Area
Clearing Pacific Locks Area
Impact of the Panama Canal Expansion
A major advantage for developing relay traffic, as it provides the possibility of linkages between multiple services on both east-west and north-south routes.
Panama is the main logistical, transportation and transshipment hub of the Americas.
### U.S. Ports Main Channel Depths

#### Depths at Mean Low Water (MLW)

<table>
<thead>
<tr>
<th>U.S. East Coast</th>
<th>MLW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>40’</td>
</tr>
<tr>
<td>New York / New Jersey</td>
<td>45’</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>40’</td>
</tr>
<tr>
<td>Baltimore</td>
<td>50’</td>
</tr>
<tr>
<td>Norfolk</td>
<td>50’</td>
</tr>
<tr>
<td>Wilmington</td>
<td>38’</td>
</tr>
<tr>
<td>Charleston</td>
<td>45’</td>
</tr>
<tr>
<td>Savannah</td>
<td>42’</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>40’</td>
</tr>
<tr>
<td>Tampa</td>
<td>43’</td>
</tr>
<tr>
<td>Miami</td>
<td>42’</td>
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<table>
<thead>
<tr>
<th>U.S. East Coast</th>
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<tbody>
<tr>
<td>Everglades</td>
<td>44’</td>
</tr>
<tr>
<td>Manatee</td>
<td>40’</td>
</tr>
<tr>
<td>U.S. Gulf</td>
<td></td>
</tr>
<tr>
<td>Houston</td>
<td>45’</td>
</tr>
<tr>
<td>New Orleans</td>
<td>45’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. West Coast</th>
<th>MLW</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA / Long Beach</td>
<td>50’</td>
</tr>
<tr>
<td>Oakland</td>
<td>50’</td>
</tr>
<tr>
<td>Portland</td>
<td>40’</td>
</tr>
<tr>
<td>Seattle / Tacoma</td>
<td>50’</td>
</tr>
</tbody>
</table>

Source: 2009 AAPA Directory
<table>
<thead>
<tr>
<th>Location</th>
<th>Project</th>
<th>Estimated Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia Ports Authority</td>
<td>Deepening of the Savannah River Channel from 42’ to 48’.</td>
<td>2014</td>
</tr>
<tr>
<td>Port of Miami</td>
<td>Deepening draft from 42’ to 50’ and the construction of Port of Miami Tunnel Project to expedite delivery of goods.</td>
<td>2014</td>
</tr>
<tr>
<td>Philadelphia Regional Port Authority</td>
<td>Dredging the main shipping channel of the Delaware River from 40’ to 45’.</td>
<td>Within 5 – 7 years</td>
</tr>
<tr>
<td>Port Authority of New York &amp; New Jersey</td>
<td>Harbor deepening project to 50’; $10 million approved to analyze alternatives for Bayonne Bridge (height: 151’).</td>
<td>Harbor deepening to be completed in phases from 2010 to 2014.</td>
</tr>
<tr>
<td>Port of Houston Authority</td>
<td>The Bayport Container &amp; Cruise Terminal project (Phase 1 is completed); future capacity of 2.3M TEU.</td>
<td>All phases completed in 15-20 years</td>
</tr>
<tr>
<td>Broward County’s Port Everglades Department</td>
<td>Inauguration of Cruise Terminal 18 for megaships.</td>
<td>Nov. 2009</td>
</tr>
</tbody>
</table>

Source: MERC with information provided by port Authorities, January 2010.
## Port Authorities Expansion Projects

<table>
<thead>
<tr>
<th>Location</th>
<th>Project</th>
<th>Estimated Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port of Palm Beach</td>
<td>Development of logistics center for storage and distribution of cargo to the South Florida region.</td>
<td></td>
</tr>
<tr>
<td>Jacksonville Port Authority</td>
<td>Development of container terminals by MOL (already in use) and Hanjin with total additional capacity of 1.5M TEU</td>
<td>2011 - 2012</td>
</tr>
<tr>
<td>Maryland Port Administration</td>
<td>Construction of the new 50-foot berth at Baltimore’s Seagirt Marine Terminal.</td>
<td>2012</td>
</tr>
<tr>
<td>Manatee County Port Authority</td>
<td>The 788 acre Logistics Port Manatee (LPM) multimodal logistic park (Port Manatee’s first container terminal); directly served by CSX railroad.</td>
<td>2011</td>
</tr>
</tbody>
</table>

Source: MERC with information provided by port Authorities, January 2010.
Components of the Green Route Concept

- The CO$_2$ emission reduction in the planet as a result of the Panama Canal route
- The actions taken by ACP: Environmental management in operations and Canal Watershed sustainability programs
- Become carbon neutral
**CO₂ emissions by TM (dry bulk carrier)**

**Yokohama, Japan - Louisiana, USA Route**

**Comparison of the Landbridge, Cape Horn, Cape of Good Hope, Suez Canal, and the Panama Canal Routes**

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance (nm)</th>
<th>Vessel Size (DWT)</th>
<th>CO₂ Tons per Cargo Unit (Dry Bulker)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panama Canal</td>
<td>9,241</td>
<td>62,635</td>
<td>0.10</td>
</tr>
<tr>
<td>Landbridge</td>
<td>16,734</td>
<td>101,275</td>
<td>0.11</td>
</tr>
<tr>
<td>Cape Horn</td>
<td>15,737</td>
<td>120,640</td>
<td>0.09</td>
</tr>
<tr>
<td>Cape of Good Hope</td>
<td>14,501</td>
<td>120,640</td>
<td>0.10</td>
</tr>
<tr>
<td>Suez Canal</td>
<td>4,842</td>
<td>120,640</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**Vessel Size (DWT)**

- **Panamax**: 62,635
- **Capesize**: 101,275
- **Capesize**: 120,640
Port Development in Panama

1996: 235 Thousand TEUs
2009: 4.23 Million TEUs
2015: 7.4 Million TEUs

Source: Panama Maritime Authority

Panama Ports Company – Cristobal
Manzanillo International Terminal (MIT)
Colon Container Terminal
Panama Ports Company – Balboa
International Ports Connected through the Panama Canal every Week

Source: ACP and ComPairData, 2007
Panama: the main transportation and logistics hub of the Americas
Thank you