

Panama Canal: “Enough to be Dangerous”

March 8th, 2024



Early History



- “Panama” – indigenous word meaning, “abundance of fish”
- First discussion of building a canal across the isthmus in 1534
- Territory of Colombia until 1903; Darien Gap
- Current population: 4.5 million; 2 million in Panama City

Interest in Building a Canal Increases

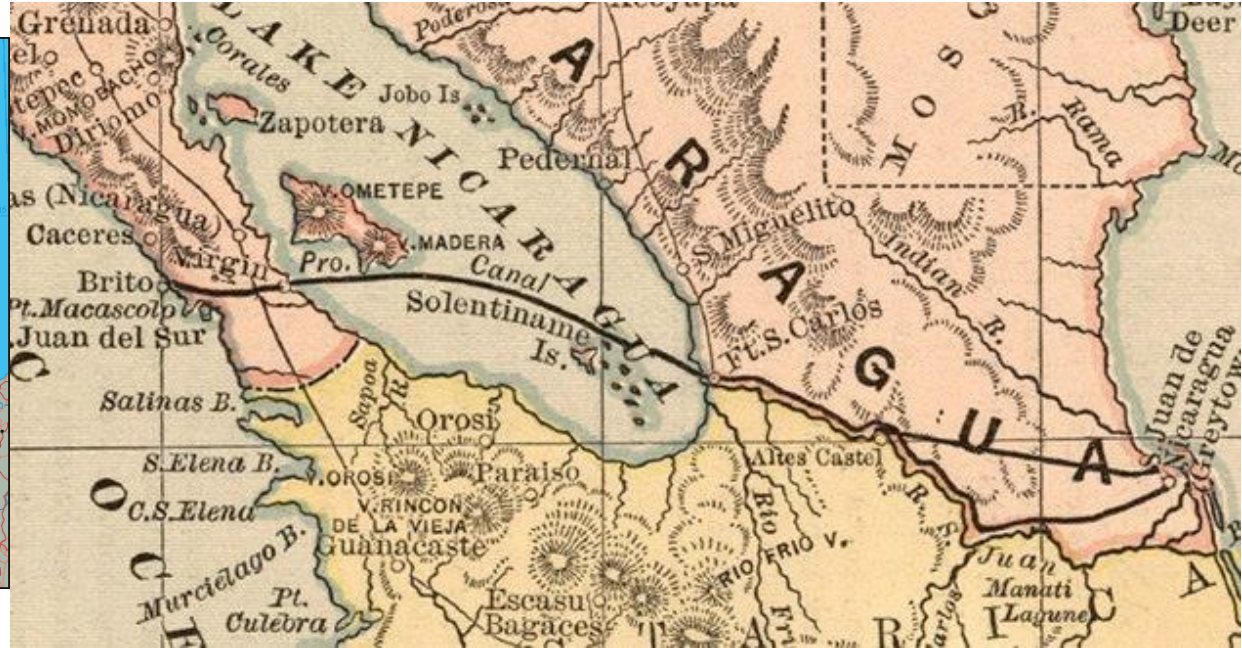
- January 14, 1848: James Marshall finds gold flakes at Sutter's Mill on the American River east of Sacramento (launches the California Gold Rush)
- Three ways to travel to San Francisco:
 - Wagon across the country: 2,000 miles from Missouri to San Francisco; 6 months
 - Boat around Cape Horn: 18,000 nautical miles; 6 months
 - Boat to Panama → Cross overland → Boat to San Francisco: 10,000 nautical miles; 3 months
- Panama Canal Railway: Built in 1855 (1st transcontinental railroad) by United States
- President U.S. Grant commissioned expeditions & surveys to determine optimal location for a Central American canal

Ferdinand de Lesseps (1805-1894): One of the world's first celebrity entrepreneurs



- French diplomat: Developed friendship with Said Pasha (later Viceroy of Egypt)
- Built the Suez Canal (1859-1869)
 - Sea level canal (no locks)
- Most famous person in France; Head of Franco-American Union that presented the Statue of Liberty to the U.S. (October 1886)
- Became interested in building a canal in Panama
- Wyse Concession received from Colombia in 1878
- 1879 Paris Congress on central American canal
 - U.S. delegation proposed a canal through Nicaragua
 - Adolphe Godin de Lepinay proposal for Panamanian canal with locks
- Dominated by de Lesseps, Congress approved constructing a sea level canal in Panama

U.S. delegation supported Nicaraguan Canal



- Closer to the United States
- Politically less volatile
- Geography less imposing than Panama
- San Juan River + Lake Nicaragua = Approximately the same amount of construction as Panama
- Plan would include a series of locks

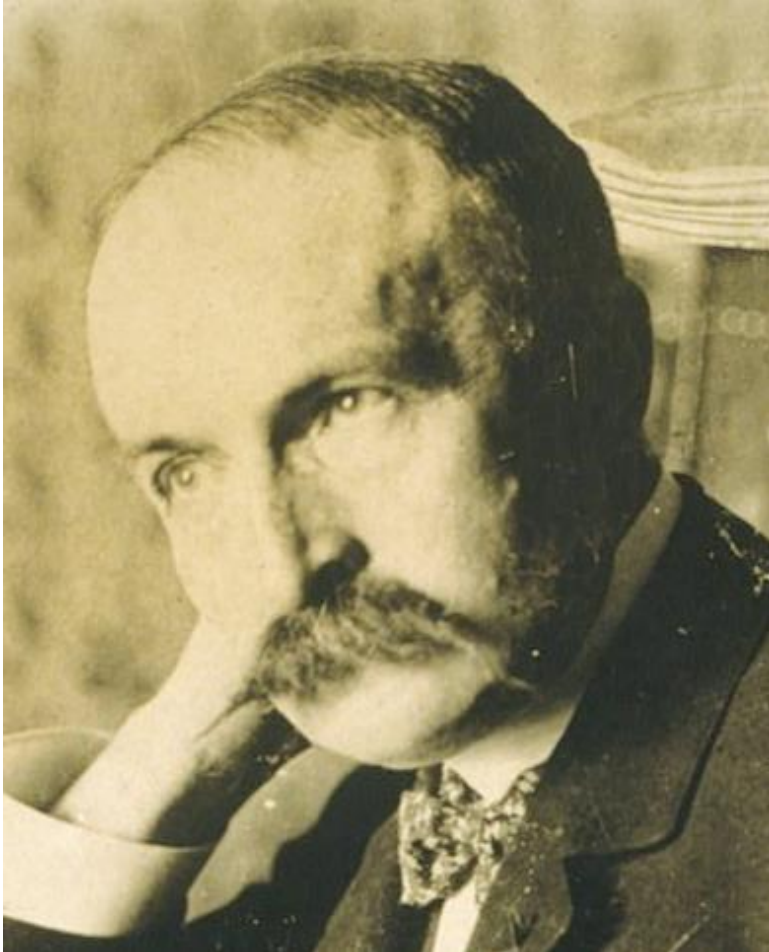
French Effort

- French effort: 1881-1888 (bankruptcy) 1889 (liquidation)
 - Ferdinand de Lesseps only visited Panama during dry season (mid-December through April)
 - Difficult conditions (rain/flooding, humidity, snakes, etc.)
 - Failed for two main reasons:
 - ❑ Stubborn insistence on a sea level canal (mudslides, esp. at Culebra Cut)
 - ❑ Massive fatality from diseases (especially Malaria & Yellow Fever); 20,000 estimate*
 - Massive scandal in France: Ferdinand & Charles de Lesseps convicted; Politicians & journalists received bribes
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American Effort

- Increasing sentiment that national military & commercial greatness → a function of a dominant navy; Theodore Roosevelt a strong proponent
- Resurgence of interest in central American canal after Spanish-American War (1898); Philippines, Guam became U.S. territories; Journey of U.S.S. Oregon
 - Nicaragua Canal remained preferred option
- Philippe Bunau-Varilla (“Pot stirrer of the Panama Canal”)

Philippe Bunau-Varilla (“Pot stirrer of the Panama Canal”)



- French Engineer who briefly managed the French effort
- Assumed control of French assets & concession after liquidation
- Partnered with New York attorney William Nelson Cromwell on successful public relations/lobbying campaign to discredit Nicaraguan option



Hay-Herran Treaty

- Proposed treaty would sell ownership of French assets & concession to U.S.
- Approved by Colombian administration, but rejected by Colombian Senate; Outraged Roosevelt
- Bunau-Varilla told Roosevelt & Sec. of State Hay of Panamanian separatists
 - Separatists declared independence from Colombia on November 3rd, 1903
 - U.S. instantly recognized; Naval presence; Panama railroad would not transport Colombian troops to suppress rebellion

Hay Bunau-Varilla Treaty

- U.S. purchased French assets, concession, & railroad for \$40 million; Paid Panama \$10 million + \$250,000 annual payment
 - Established Panama Canal Zone (10 miles wide X 40 miles long); U.S. sovereignty
 - Immediately criticized by many Panamanians
 - Roosevelt: “I took the canal & let Congress debate it, & while the debate continues, so does the canal.”
-

John Findley Wallace: Appointed by Roosevelt as 1st Chief Engineer



- Public & political pressure to “let dirt fly”
- Frustrated by conditions, demoralized workforce, dilapidated equipment, bureaucracy
- Resigned after a year (May 1904 – June 1905)
- Not an enthusiastic supporter of Dr. Gorgas’ efforts
- Advocated for a sea level canal

John Frank Stevens: 2nd Chief Engineer



- Successful railroad builder; Responsible for Great Northern Railway
- Four major contributions:
 - Worker conditions
 - Significantly upgraded the Panama Railroad (“The canal is a railroad project.”)
 - Persuaded Roosevelt to approve a canal with locks
 - Supported Dr. William Gorgas
- Resigned after 20 months (June 1905 – February 1907)

George Washington Goethals: 3rd Chief Engineer

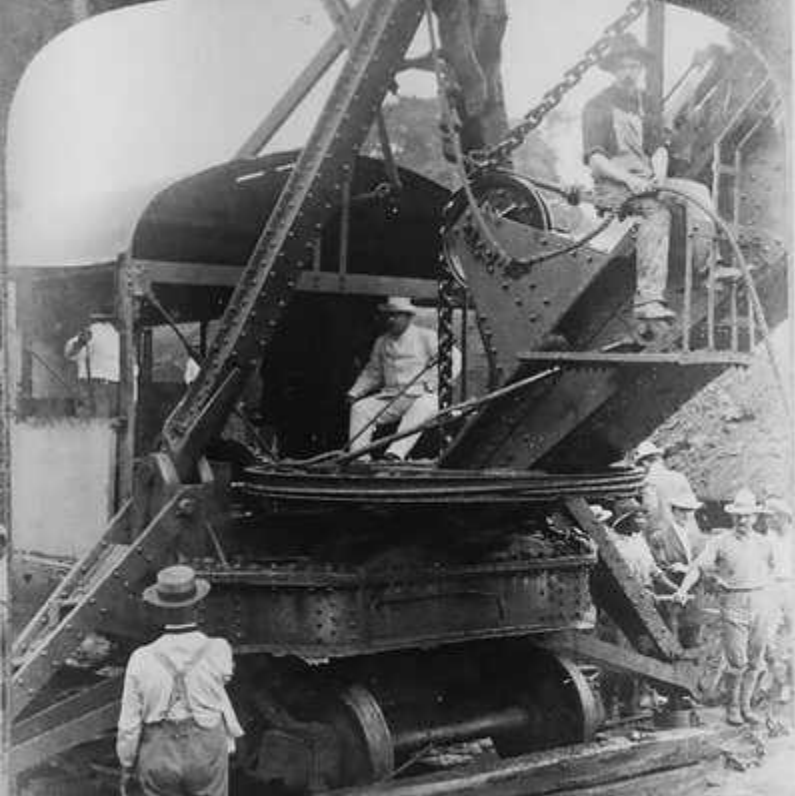


- Military engineer; Roosevelt wanted someone under orders who could not quit
- Continued Stevens' successful strategy
- Oversaw operations until completion (1907-1914); Two years ahead of schedule & \$23 million under budget
- 268 million cubic yards of material excavated (238 million by U.S. + 30 million by France); 4 times the original estimate
- Final cost: \$500 million (\$14.6 billion in current dollars)

Dr. William Crawford Gorgas



- Chief Sanitation Officer
- Trained under Dr. Walter Reed in Havana; Advanced the theory that malaria & yellow fever are transmitted by mosquitos
- Instituted extensive, military-style operation to combat mosquitos (spraying insect breeding areas, draining stagnant water, nets/screens)
- Panama Canal was just as much an epidemiological triumph as an engineering triumph



Source: Getty Images



**SS Ancon in the Panama Canal,
15 August 1914**

Inaugural transit: August 15, 1914



- Gatun Lake: Largest manmade lake in the world at the time
- Three locks take a ship up 85 ft. (approximately 28 ft. per step)
- Original “Panamax” canal (south to north):
 - Miraflores Locks: 2 steps
 - Pedro Miguel Locks: 1 step
 - Gatun Locks: 3 steps

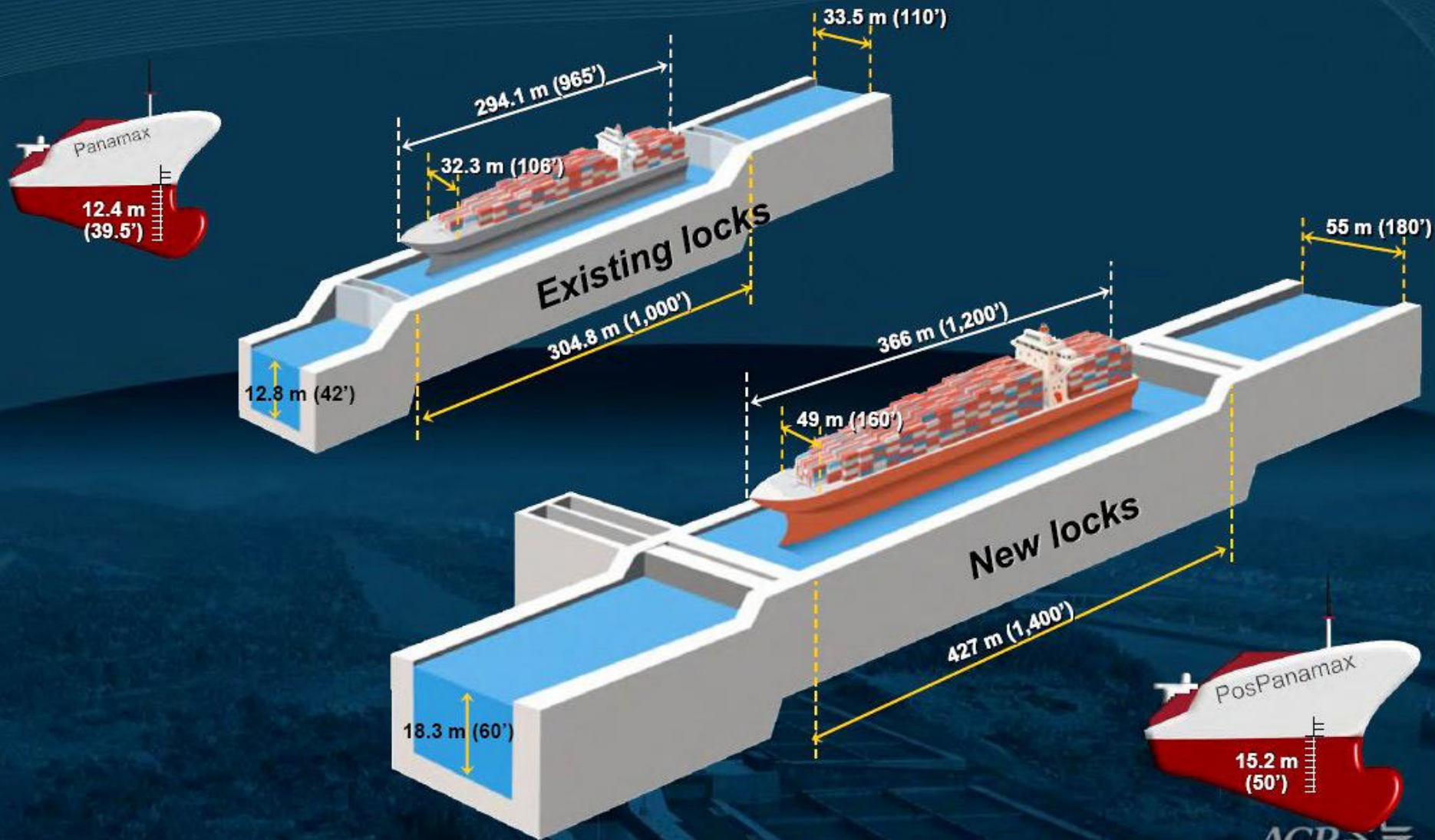
Carter-Torrijos Treaty (September 7, 1977)



Source: Getty Images

- Original Hay-Bunau-Varilla Treaty widely criticized by many Panamanians since it was signed
- Increasing protests over the subsequent decades; Tension between U.S. & Latin America
- 20-year transition period
- Full transfer on December 31st, 1999
- Permanent neutrality of canal

Existing locks' maximum vessel 4,800 TEU



New locks' maximum vessel size: 12,600 TEU

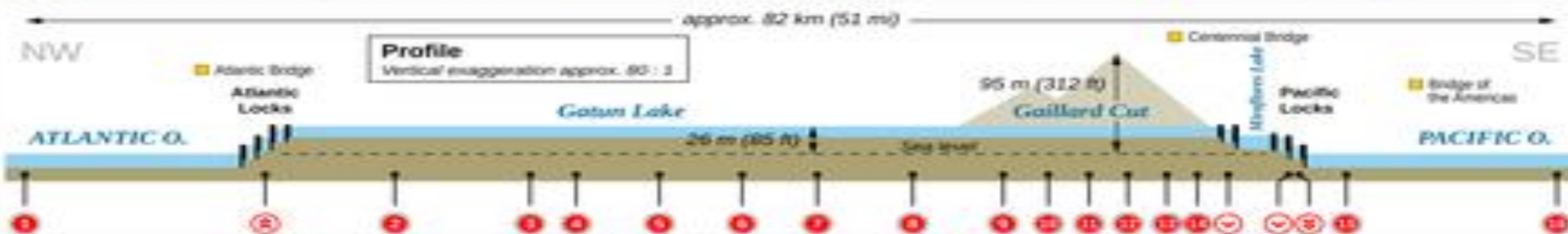
ATLANTIC OCEAN
(CARIBBEAN SEA)

PANAMA CANAL

- 1 Atlantic Entrance
- 2 Trinidad Turn
- 3 Bohio Turn
- 4 Orchid Turn
- 5 Frijoles Turn
- 6 Barbacoa Turn

- 7 Mamei Turn
- 8 Gamboa Reach
- 9 Bas Obispo Reach
- 10 Las Cascadas Reach
- 11 Empire Reach

- 12 Culebra Reach
- 13 Cucaracha Reach
- 14 Paraiso Reach
- 15 Balboa Reach
- 16 Pacific Entrance



Current drought conditions



Source: Panama Canal Authority

- Gatun Lake: 80.7 ft. vs. 83.9 ft. normal
- Panamax locks: 52 million gallons of freshwater release each transit
- Neopanamax locks (2007-2016): 48 million gallons due to retention basins (60% retention)
 - Cocoli Locks (Pacific side); 3 steps
 - Agua Clara Locks (Atlantic side); 3 steps
- Cross-filing; Inner gates; Simultaneous lockage
- Limiting number of transits (24 vs. 36-40); Approximately 11 hours per transit
- Draft reduction of 44 ft. for Neopanamax locks; Panamax locks remain at 39.5 ft.
- Terrorist attacks at Suez route

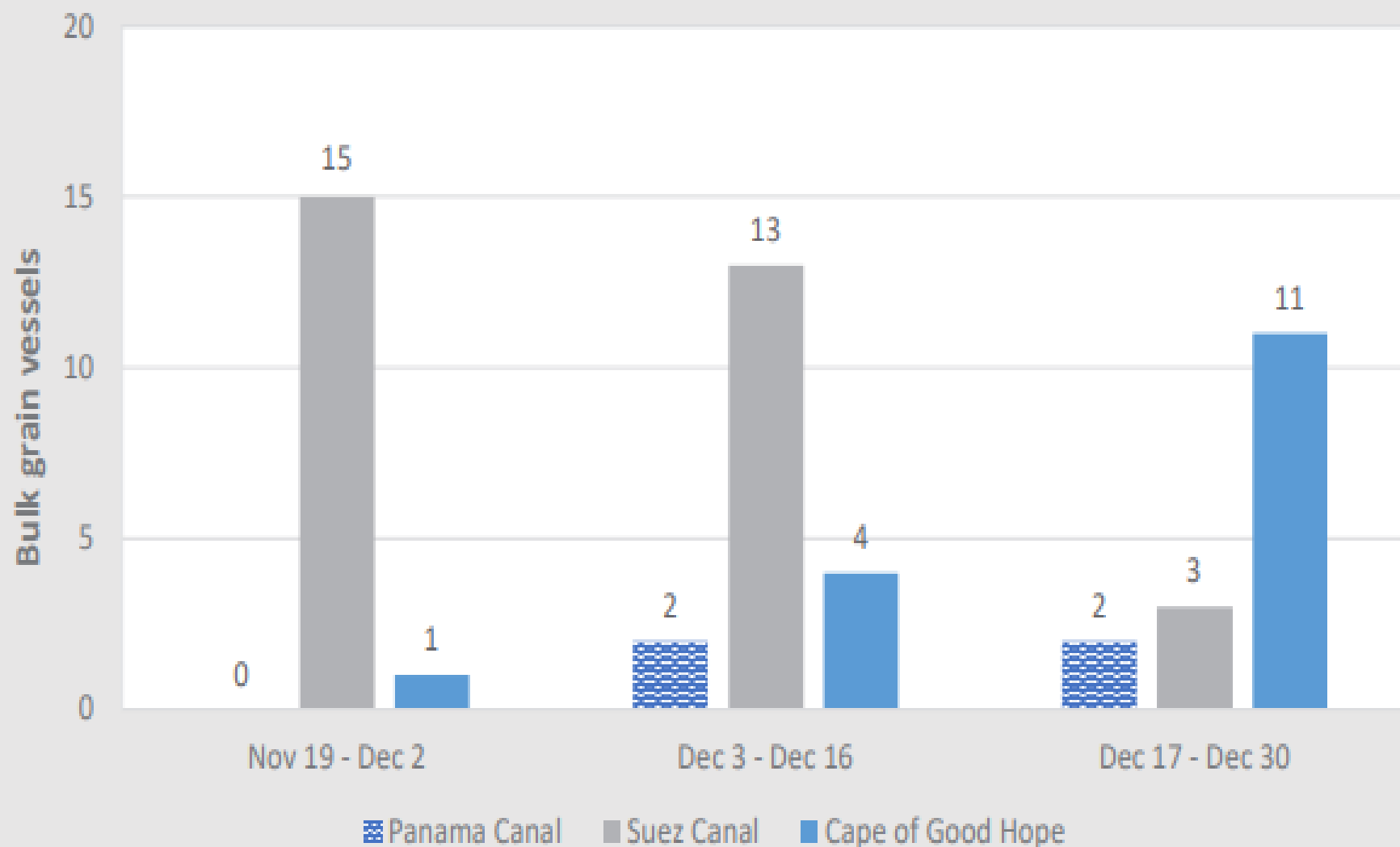
Figure 1. U.S. Gulf export routes to Japan



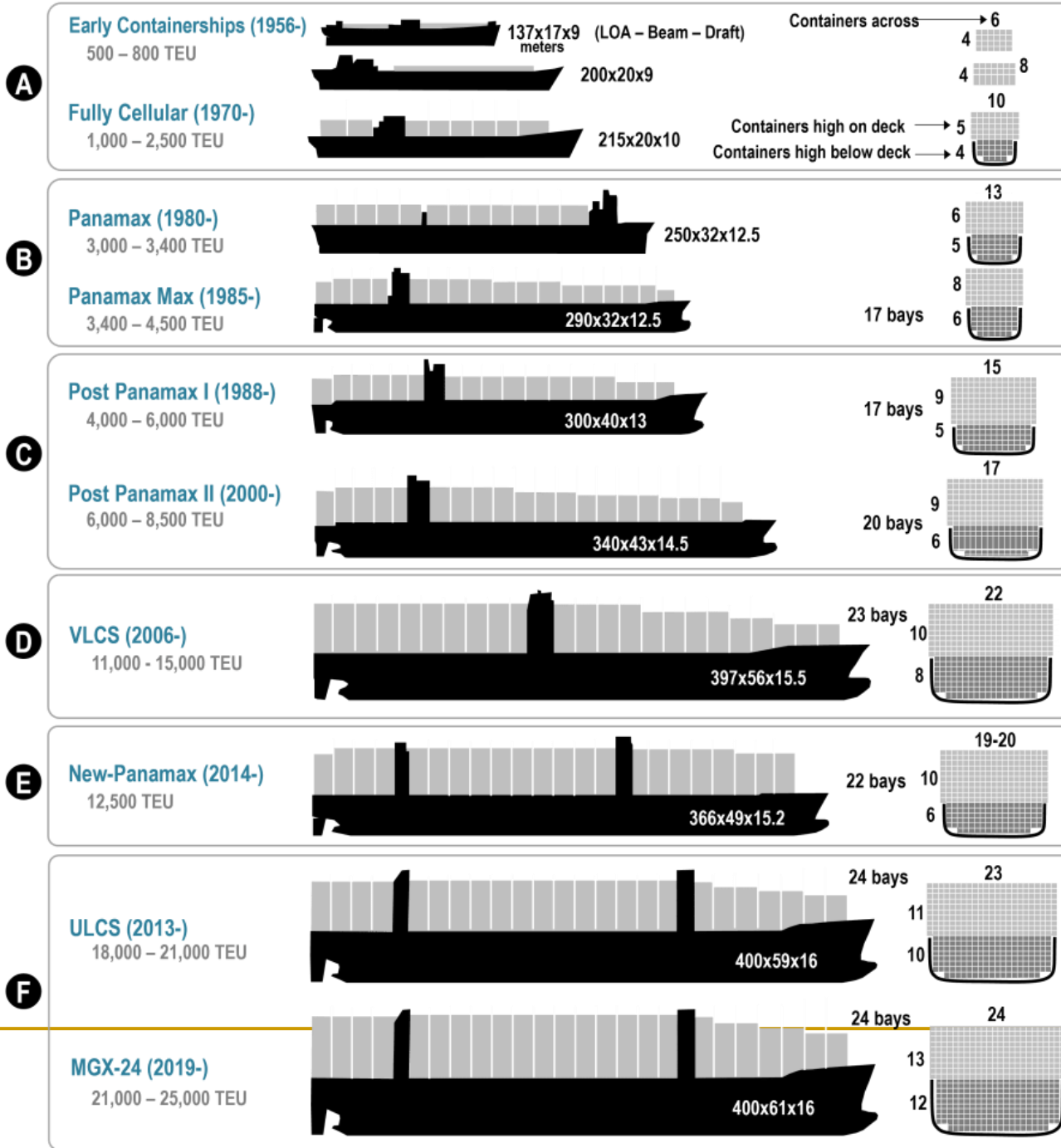
Fig. 1A0, NOAA, USGS

Source: U.S. Department of Agriculture

Figure 2. Bulk grain vessels from U.S. Gulf to East Asia, by route



Source: U.S. Department of Agriculture



Thank You

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