America’s Inland Waterways

TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Everything You Always Wanted to Know About America's Inland Waterways…

but Never Asked

Washington DC
January 25, 2012

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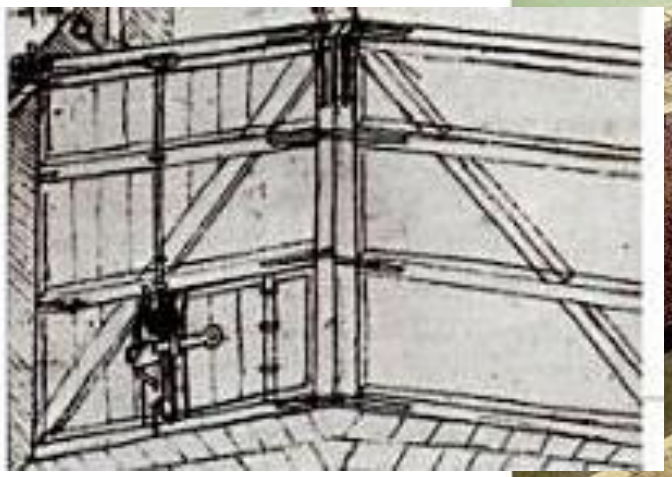
Caution

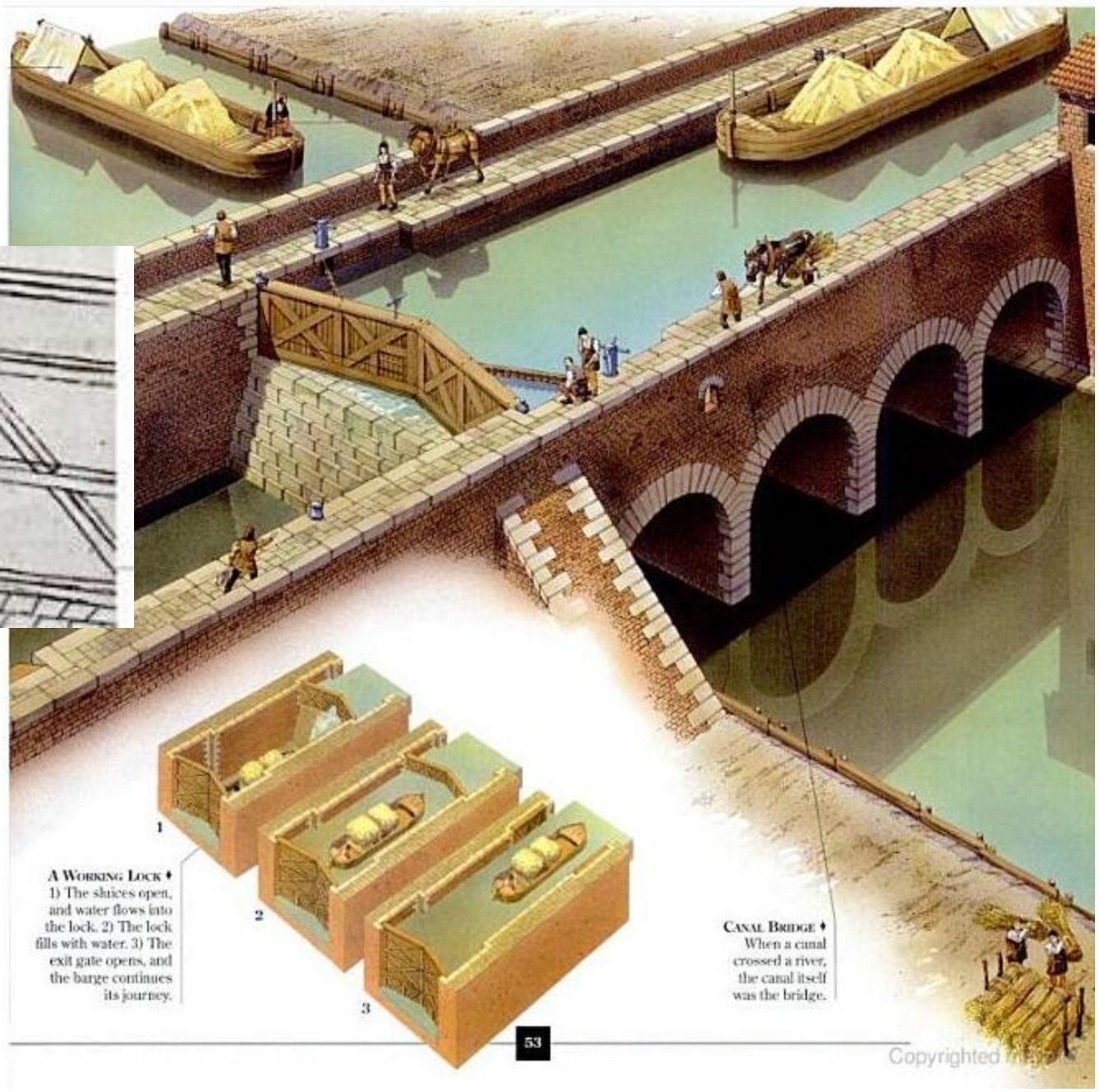
THE SPEAKER DOES NOT REPRESENT ANYONE OR ANY AGENCY.

THE OPINIONS EXPRESSED ARE HIS OWN AND DO NOT REFLECT, NECESSARILY, THE POSITIONS OF THE UNIVERSITY OF MARYLAND, THE ARMY CORPS OF ENGINEERS OR ANYONE ELSE.

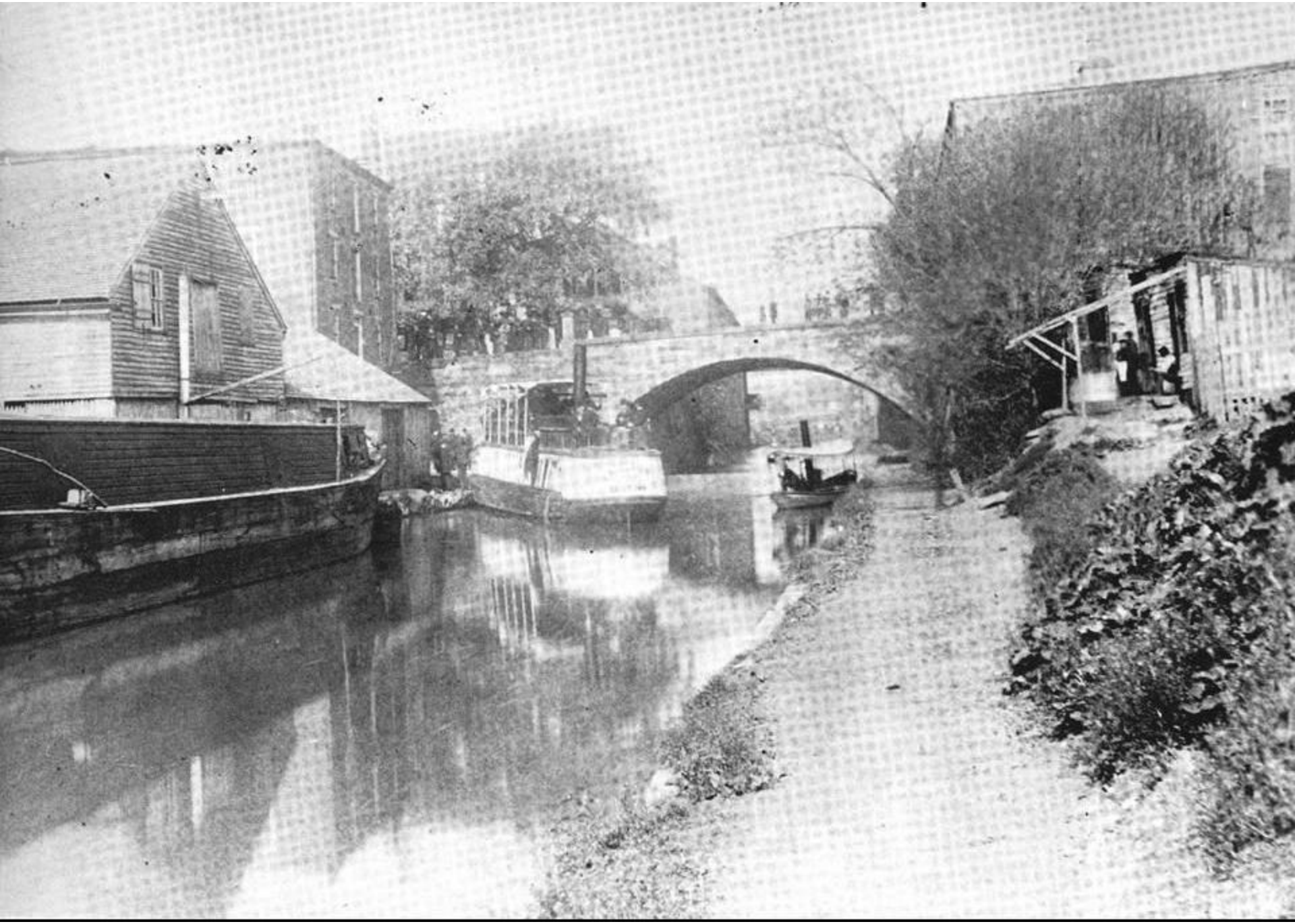
Fear the Turtle

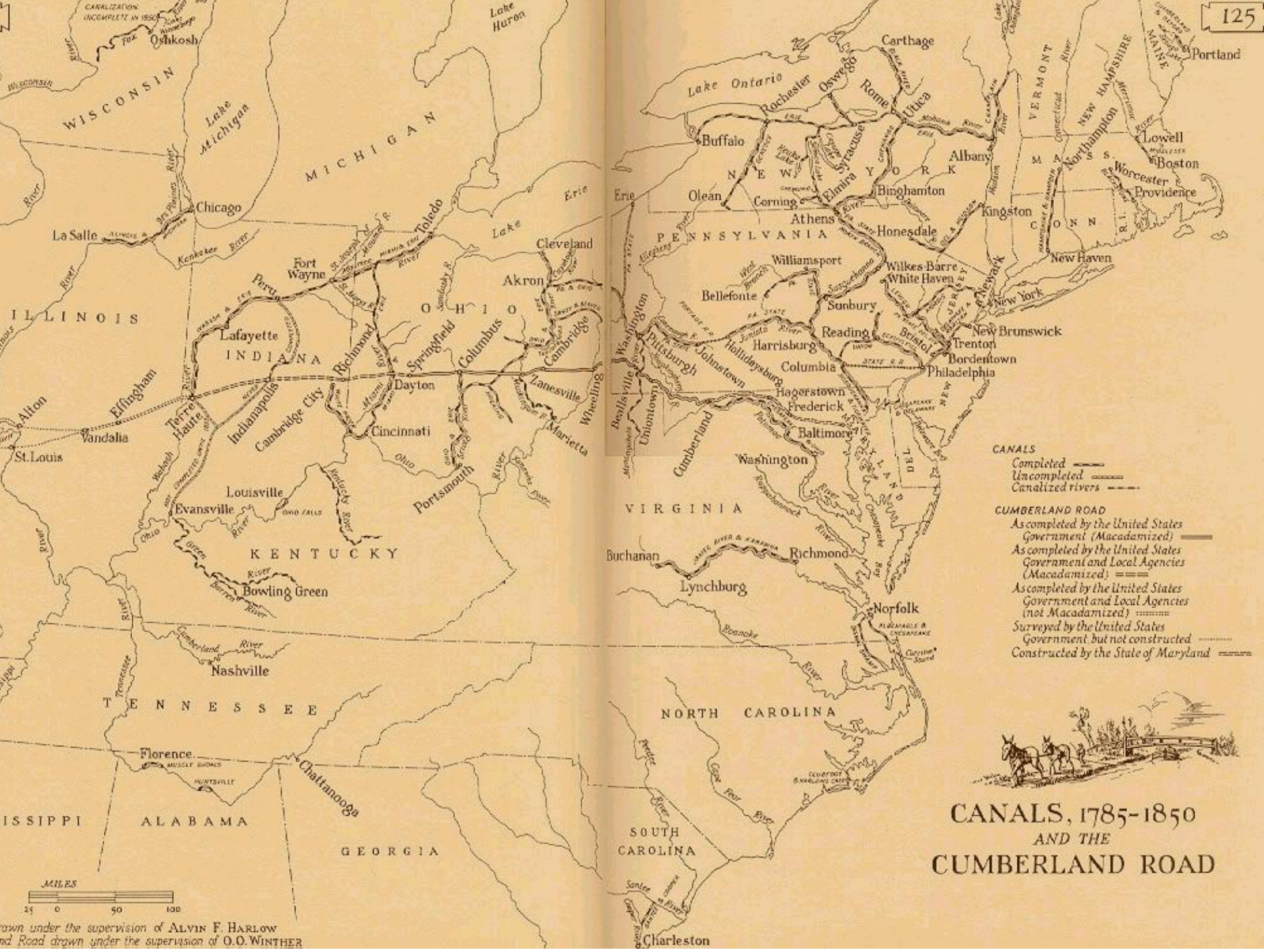
Da Vinci





c/o Francesca Romei



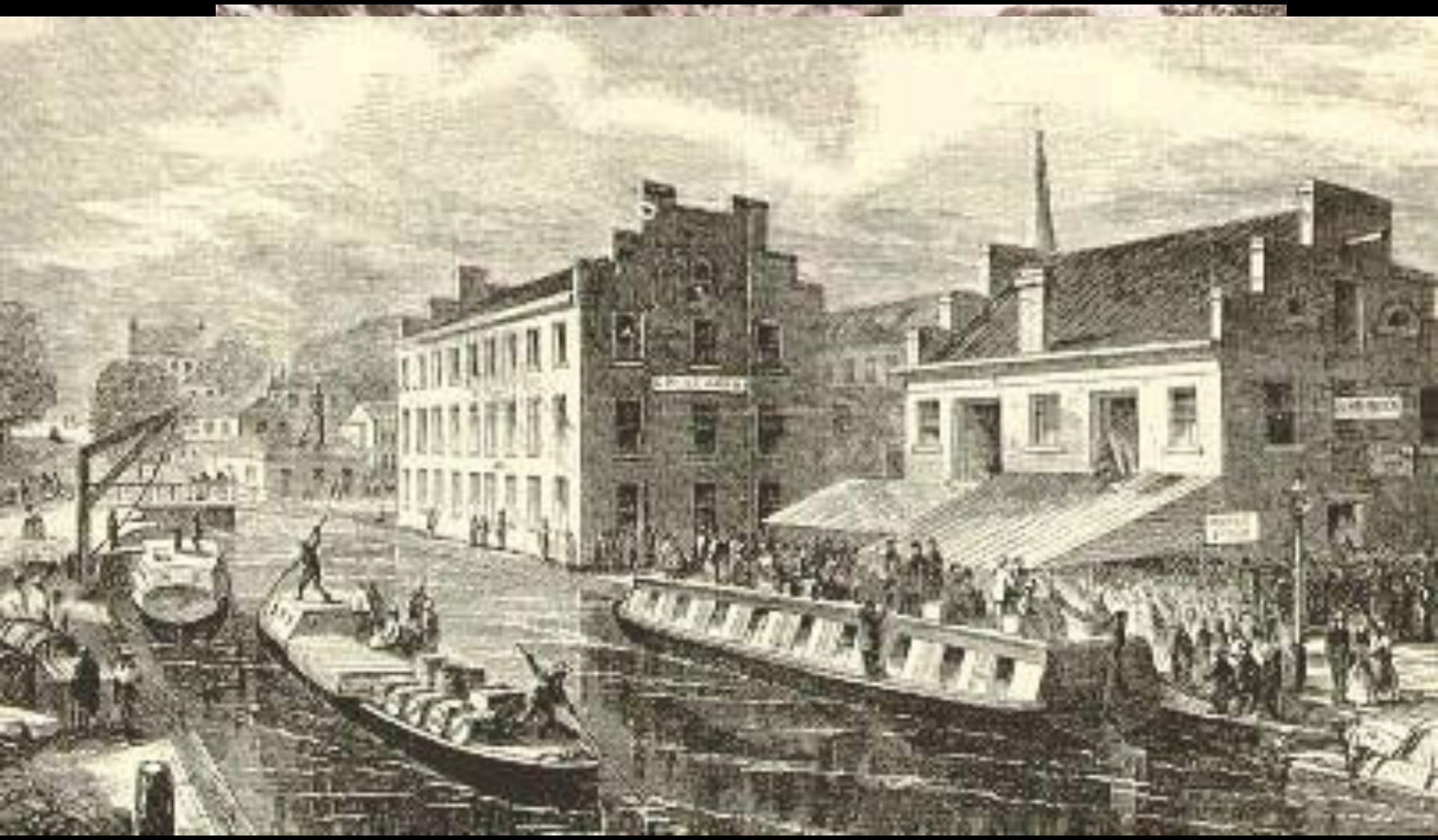


CANALS
Completed
Uncompleted
Canalized rivers

CUMBERLAND ROAD
As completed by the United States Government (Macadamized)
As completed by the United States Government and Local Agencies (Macadamized)
As completed by the United States Government and Local Agencies (not Macadamized)
Surveyed by the United States Government but not constructed
Constructed by the State of Maryland

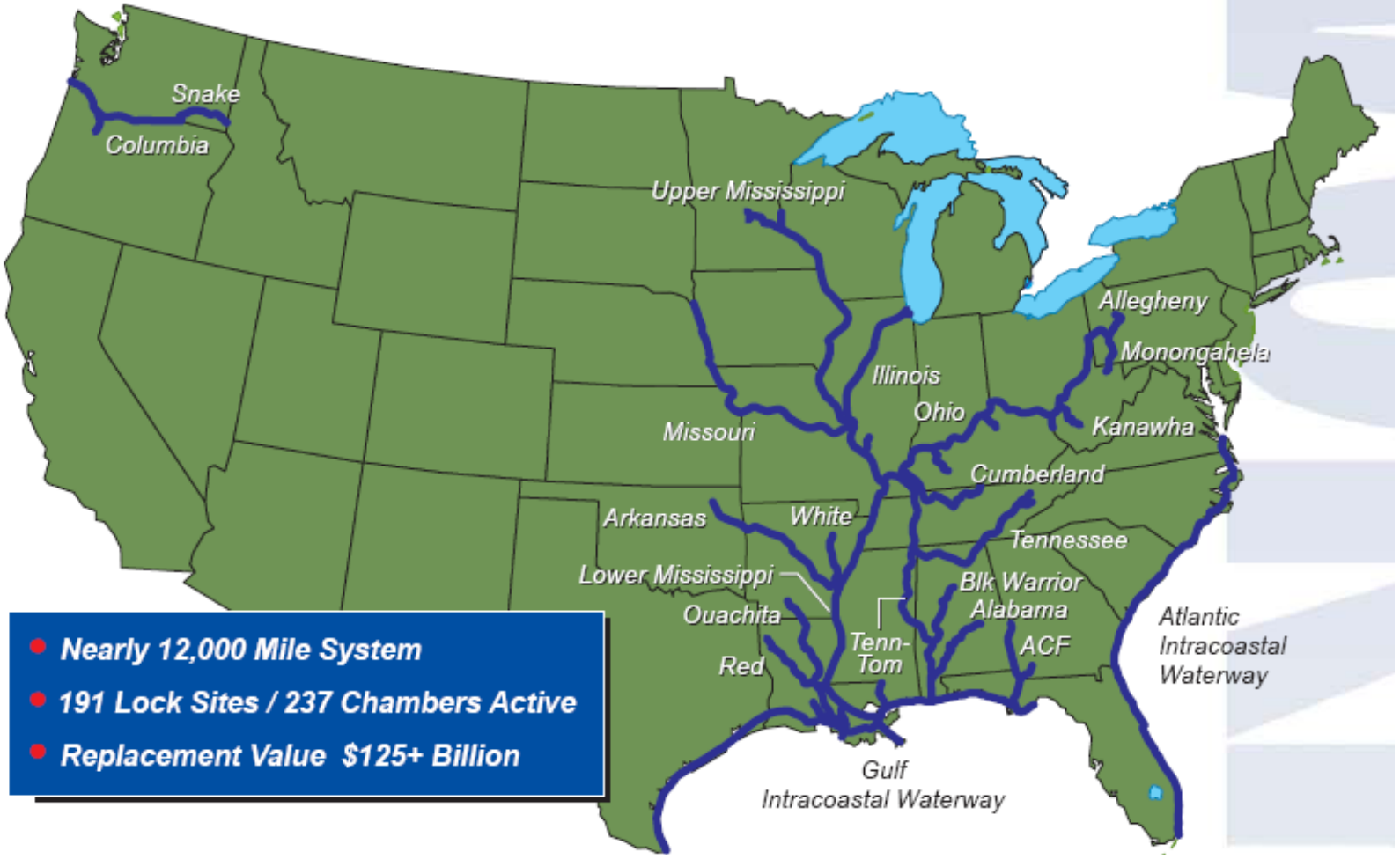
CANALS, 1785-1850
AND THE
CUMBERLAND ROAD

drawn under the supervision of ALVIN F. HARLOW
nd Road drawn under the supervision of O.O. WINTHER



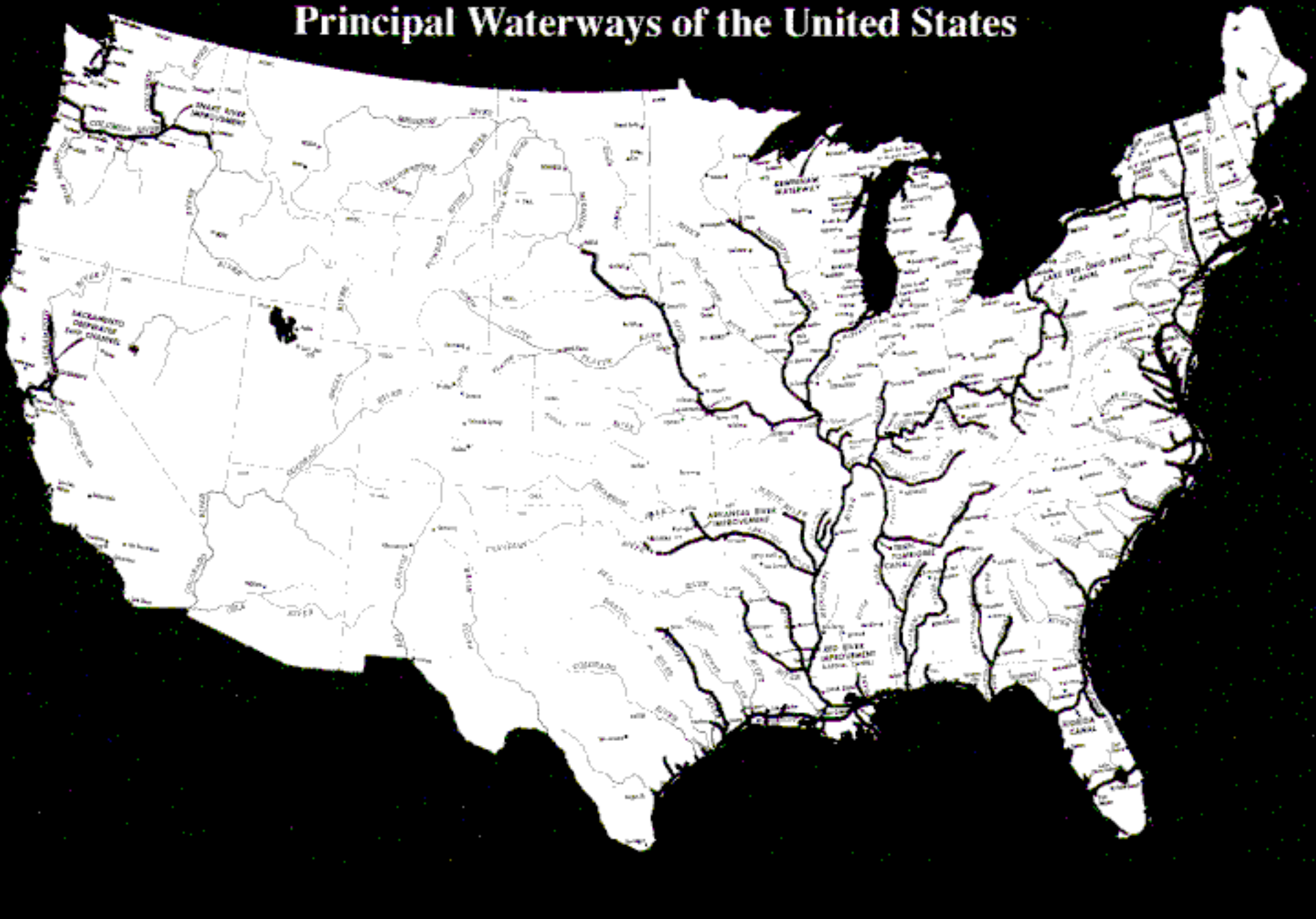
THE GREAT MISSISSIPPI STEAMBOAT RACE

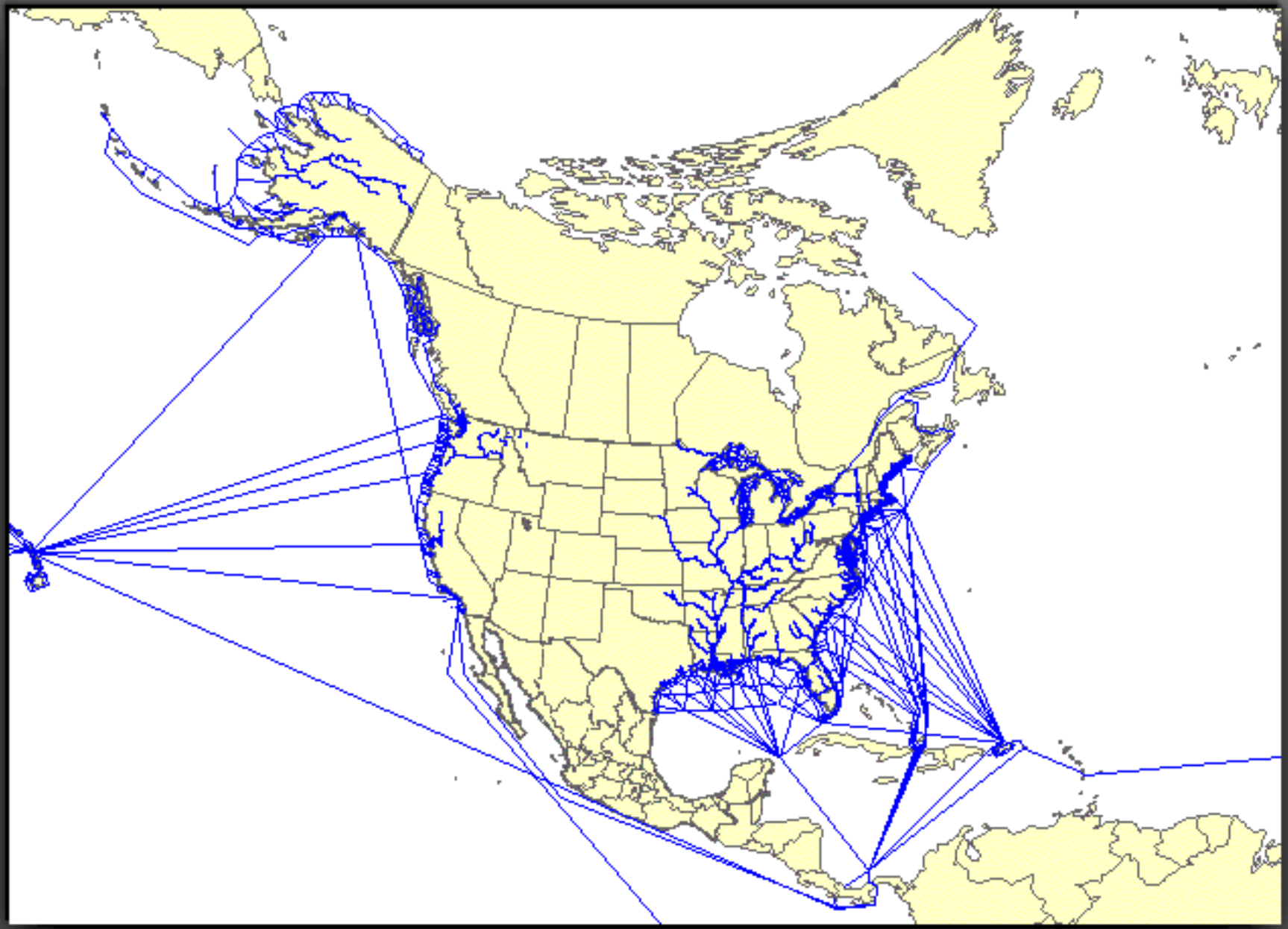
U.S. Inland & Intracoastal Waterways

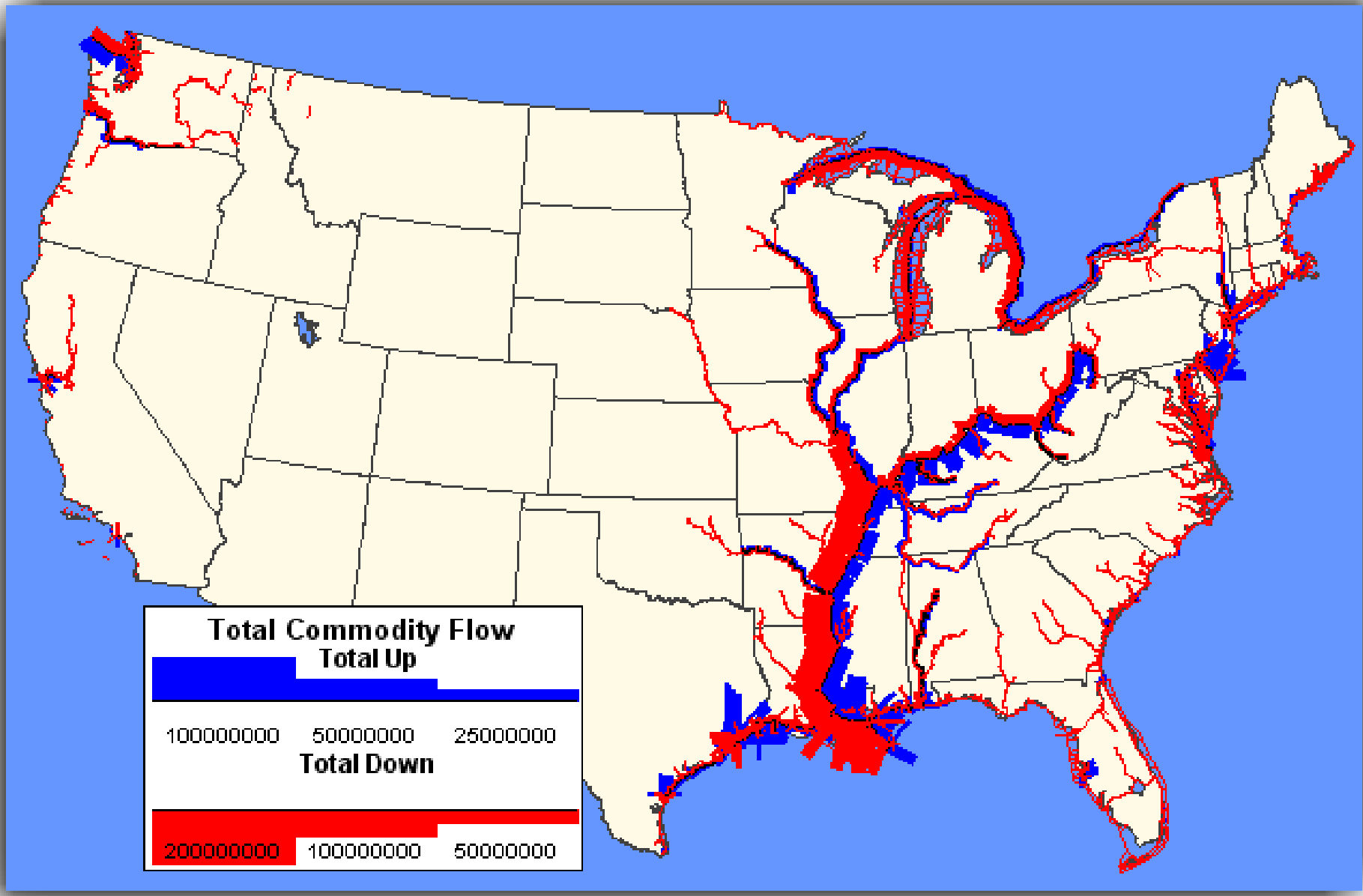


- Nearly 12,000 Mile System
- 191 Lock Sites / 237 Chambers Active
- Replacement Value $125+ Billion

Principal Waterways of the United States

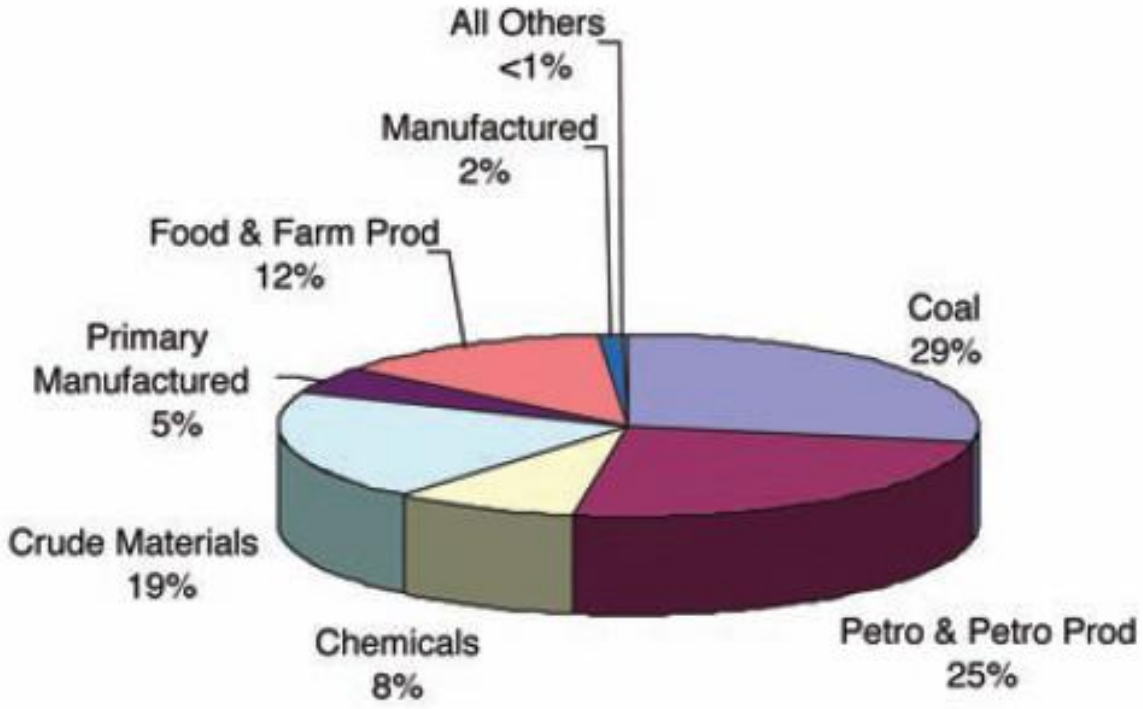





Total Commodity Flow
Total Up
100000000
50000000
25000000
Total Down
200000000
100000000
50000000

Inland Waterway Commodities

SHARE BY TONS, 2006



Total 2006 Volume: 627 Million Tons

DOMESTIC WATERBORNE COMMERCE, 1990-2009
TON-MILES BY TYPE OF TRAFFIC
(billion short ton-miles)

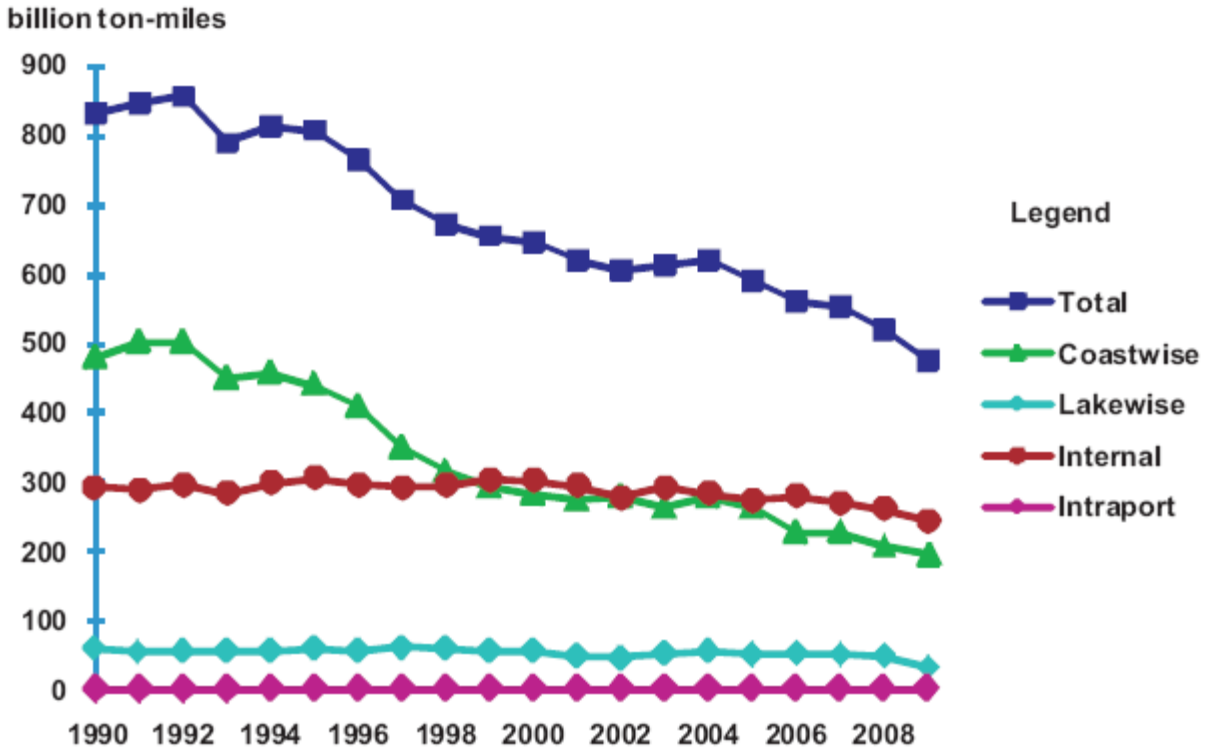
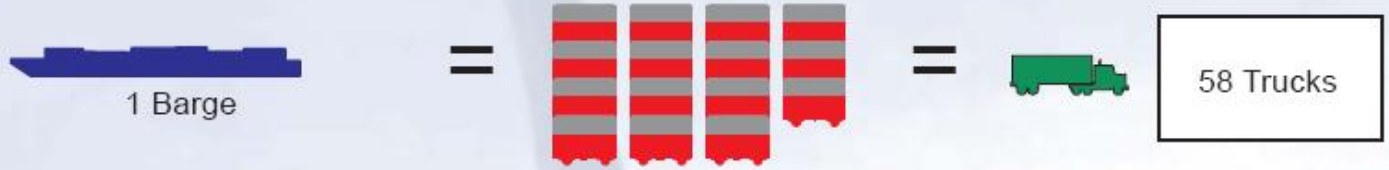


Table 1-9: DOMESTIC WATERBORNE COMMERCE, 1990-2009
TON-MILES BY TYPE OF TRAFFIC
(billion short ton-miles)

Alternate Transportation Mode Comparison

Barge	15-Barge Tow	Jumbo Hopper Car	100 Car Unit Train	Large Semi
1500 Ton	22,500 Ton	100 Ton	10,000 Ton	26 Ton
52,500 Bushels	767,500 Bushels	3,500 Bushels	350,000 Bushels	910 Bushels
453,000 Gallons	6,804,000 Gallons	30,240 Gallons	3,024,000 Gallons	7,865 Gallons

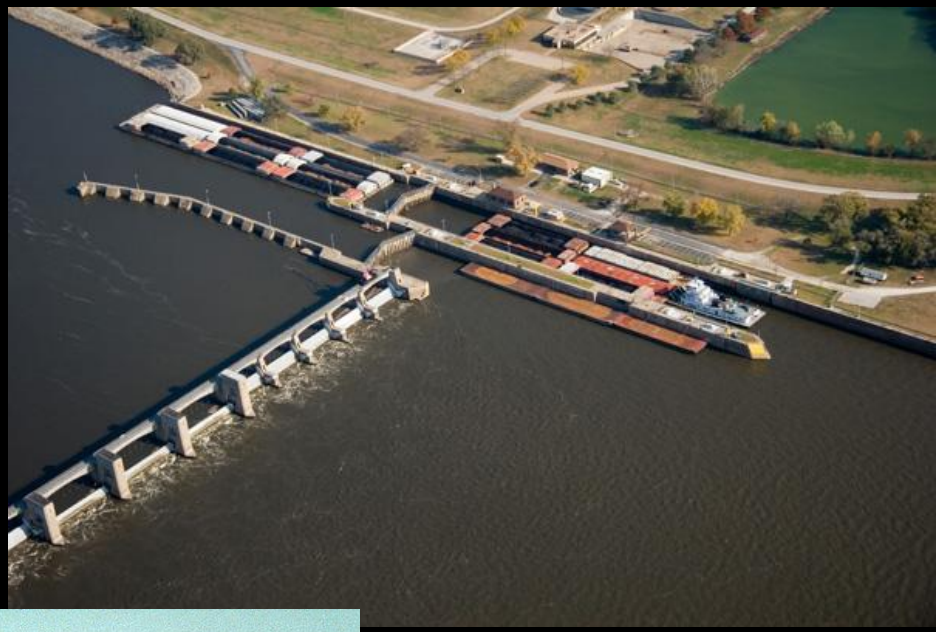


Equivalent Lengths

1/4 Mile	2 3/4 Miles	34 1/2 Miles
15 Barge Tow	2 1/4 Unit Trains	Assuming 150 Ft. Between Trucks

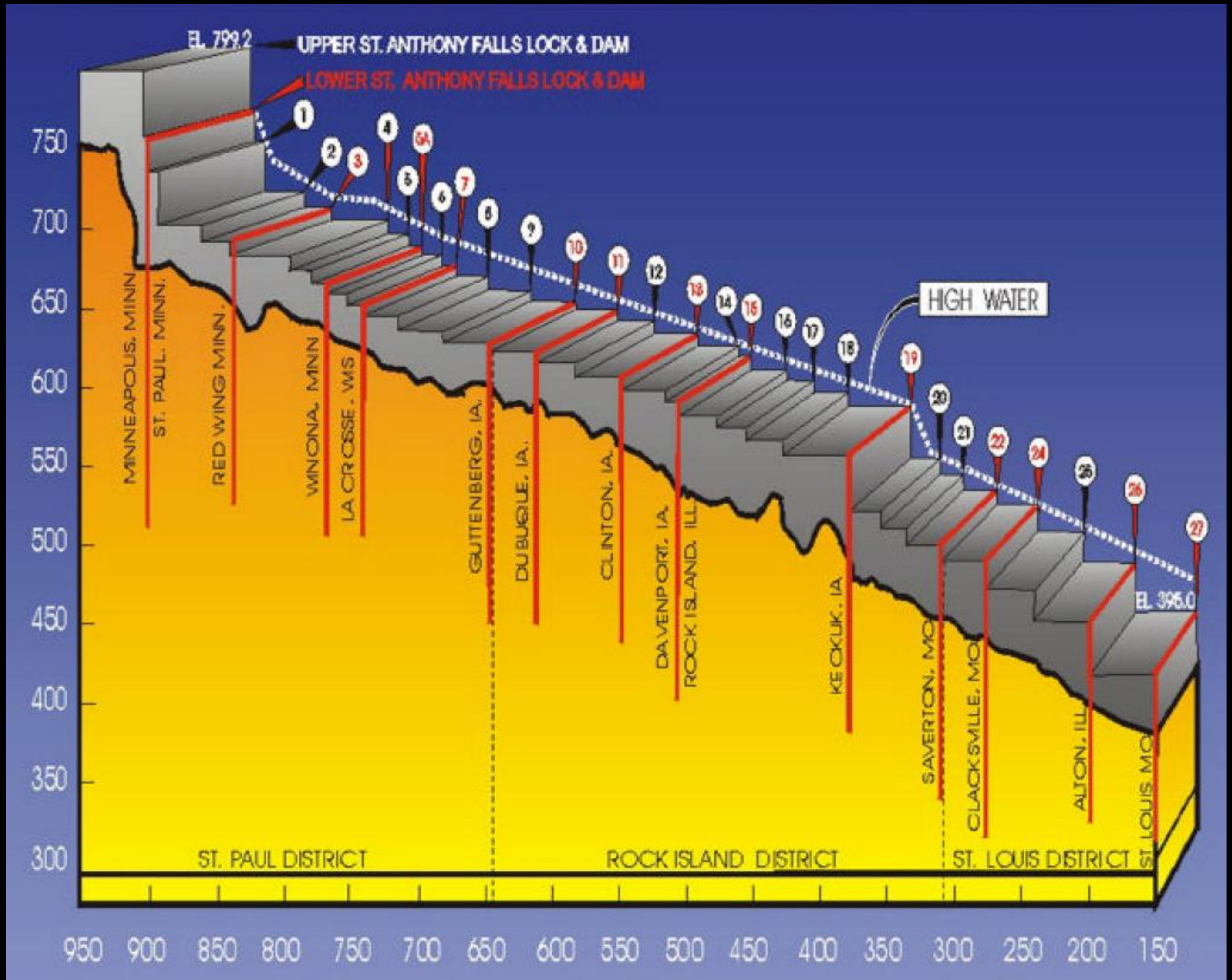
Waterways Today

Rivers

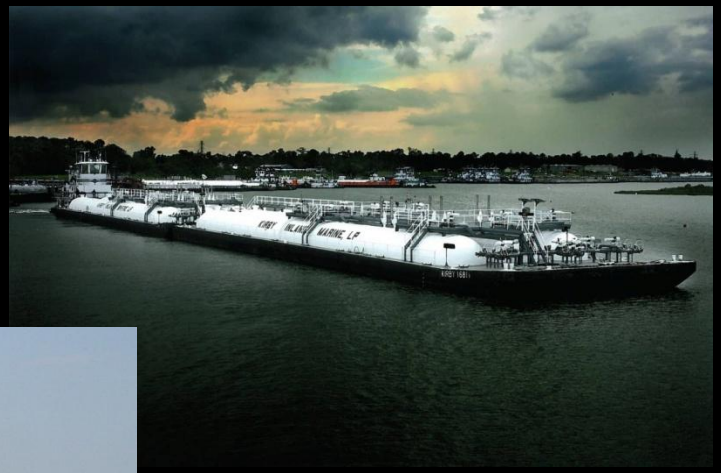


Locks and Dams

Intracoastal Waterways


EL. 799.2
UPPER ST. ANTHONY FALLS LOCK & DAM
LOWER ST. ANTHONY FALLS LOCK & DAM
HIGH WATER
EL. 396.0
MINNEAPOLIS, MINN.
ST. PAUL, MINN.
RED WING, MINN.
WINONA, MINN.
LA CROSSE, WIS.
GUTTENBERG, IA.
DUBUQUE, IA.
CLINTON, IA.
DAVENPORT, IA.
ROCK ISLAND, ILL.
KEOKUK, IA.
SAVERTON, MO.
CLARKSVILLE, MO.
ALTON, ILL.
ST. LOUIS, MO.
ST. PAUL DISTRICT
ROCK ISLAND DISTRICT
ST. LOUIS DISTRICT
750
700
650
600
550
500
450
400
350
300
950 900 850 800 750 700 650 600 550 500 450 400 350 300 250 200 150

Vessels



Inland Ports

Rosedale, MS

St Louis

Stockton

Hannibal, MO

Waterways Users

Commercial

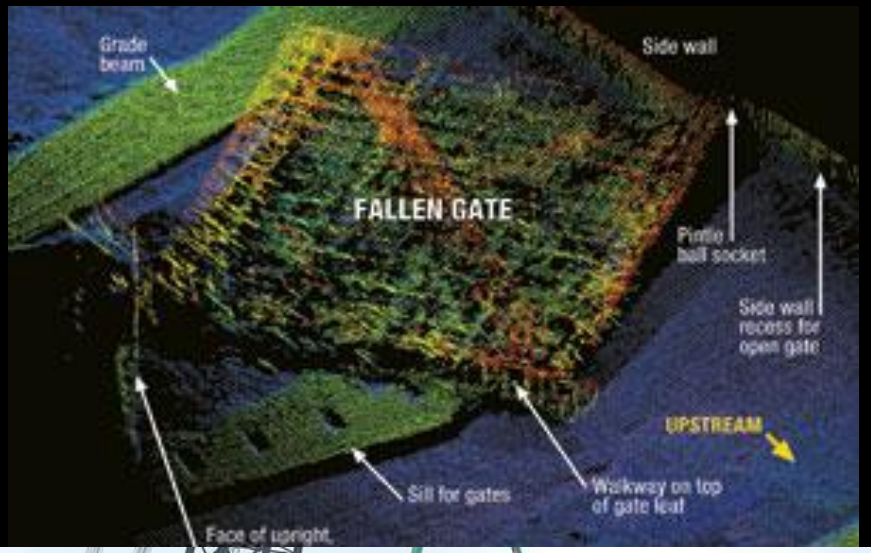
Waterways Users

Recreation

Tourism

Environment

Taking Care of Waterways – Locks and Dams



US Army Corps of Engineers®

Taking Care of Waterways Channels

US Army Corps of Engineers®

United States Coast Guard

U.S. Department of Homeland Security

Aids to Navigation, Safety, Security

21st Century Challenges

Challenge Infrastructure -

ASCE American Society of Civil Engineers

REPORT CARD for AMERICA'S INFRASTRUCTURE

SEARCH

★ HOME ★ REPORT CARDS ★ STATES ★ CATEGORIES ★ SOLUTIONS ★ TAKE ACTION ★ NEWSROOM ★

Inland Waterways

The average tow barge can carry the equivalent of 870 tractor trailer loads. Of the 257 locks still in use on the nation's inland waterways, 30 were built in the 1800s and another 92 are more than 60 years old. The average age of all federally owned or operated locks is nearly 60 years, well past their planned design life of 50 years. The cost to replace the present system of locks is estimated at more than $125 billion. [2]

TRANSPORTATION
INLAND WATERWAYS
2009 GRADE
D-

★ SOLUTIONS ★ CONDITIONS ★ RESILIENCE ★ CONCLUSION ★ SOURCES

Solutions

- Establish a program to improve and maintain ports, harbors, and waterways;
- Create a predictable and reliable source of maintenance funding with a dedicated source of revenue, such as a portion of U.S. Customs receipts;
- Deepen and widen ship channels to accommodate the world fleet's new, larger ships;
- Continue maintenance dredging of ship channels for the efficient handling of maritime commerce;

ESTIMATED 5-YEAR FUNDING REQUIREMENTS FOR
INLAND WATERWAYS

Total investment needs
$50 BILLION

Estimated spending
$29.475 BILLION

Projected shortfall
$20.5 BILLION

Melvin Price Lock and Dam (MO-IL) (1200’ x 110’)

Challenge

Operations

Great Lakes Ports
(Dry-and Liquid-Bulk and General Cargo)

GENERAL CARGO PORTS

Shipping/Receiving Ports	
Duluth	Detroit
Superior	Toledo
Green Bay	Cleveland
Milwaukee	Erie
Chicago	Oswego
Burns Harbor	Ogdensburg

LIMESTONE

Shipping Ports	Receiving Ports
Port Inland	Duluth
Cedarville	Superior
Bruce Mines	Presque Isle
Thessalon	Marquette
Drummond Island	Escanaba
Calcite	Green Bay
Stoneport	Milwaukee
Meldrum Bay	Calumet
Marblehead	Indiana Harbor
Port Colborne	Buffington
	Gary
	Burns Harbor
	St. Joseph
	Holland
	Grand Haven
	Muskegon
	Ludington
	Manistee
	Saginaw
	Port Huron
	Marysville
	Marine City
	Detroit
	Trenton
	Kingsville
	Huron
	Lorain
	Cleveland
	Fairport
	Parry Sound
	Ashtabula
	Conneaut
	Erie
	Clarkson
	Buffalo

GYPSUM

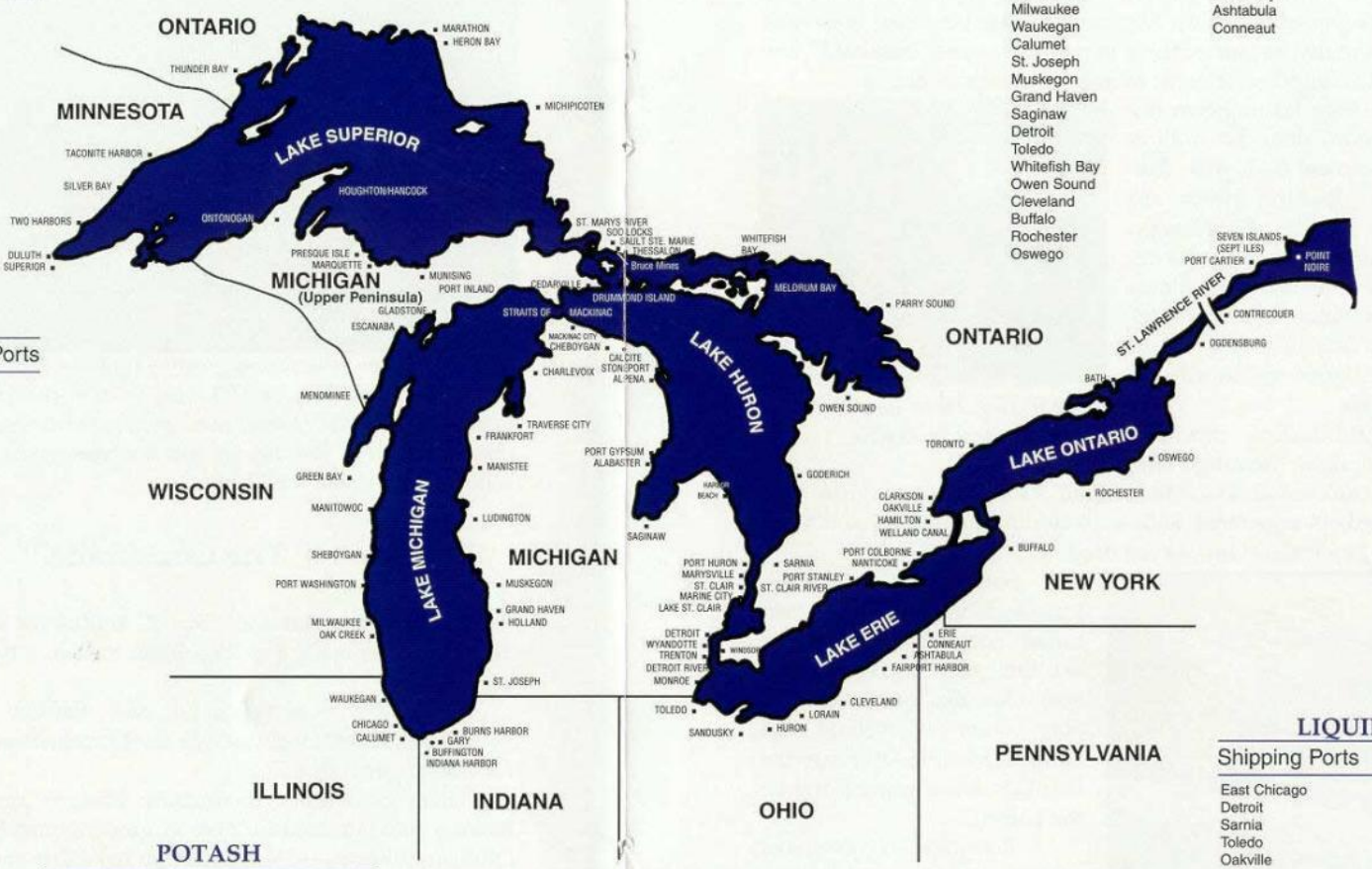
Shipping Ports	Receiving Ports
Port Gypsum	Waukegan
Alabaster	Indiana Harbor
	Detroit
	Toledo
	Sandusky
	Lorain
	Fairport Harbor

CEMENT

Shipping Ports	Receiving Ports
Charlevoix	Duluth
Alpena	Superior
Bath	Heron Bay
	Green Bay
	Manitowoc
	Milwaukee
	Waukegan
	Calumet
	St. Joseph
	Muskegon
	Grand Haven
	Saginaw
	Detroit
	Toledo
	Whitefish Bay
	Owen Sound
	Cleveland
	Buffalo
	Rochester
	Oswego

COAL

Shipping Ports	Receiving Ports
Superior	Duluth
Thunder Bay	Superior
South Chicago	Ashland
Toledo	Ontonogan
Sandusky	Houghton/Hancock
Ashtabula	Presque Isle
Conneaut	Marquette
	Munising
	Escanaba
	Menominee
	Green Bay
	Manitowoc
	Sheboygan
	Port Washington
	Milwaukee
	Oak Creek
	Calumet
	Holland
	Grand Haven
	Muskegon
	Manistee
	Charlevoix
	Alpena
	Saginaw
	Harbor Beach
	Marysville
	St. Clair
	Detroit
	Wyandotte
	Trenton
	Monroe
	Port Stanley
	Nanticoke
	Buffalo



POTASH

Shipping Ports	Receiving Ports
Thunder Bay	Burns Harbor
	Toledo
	Huron
	Ashtabula

GRAIN

Shipping Ports	Receiving Ports
Thunder Bay	Cleveland
Duluth	Buffalo
Superior	
Milwaukee	
Chicago	
Saginaw	
Sarnia	
Toledo	

SALT

Shipping Ports	Receiving Ports
Windsor	Duluth
Goderich	Superior
Cleveland	Green Bay
Fairport Harbor	Milwaukee
	Chicago
	Muskegon
	Saginaw
	Detroit
	Toledo
	Erie
	Buffalo
	Toronto
	Montreal

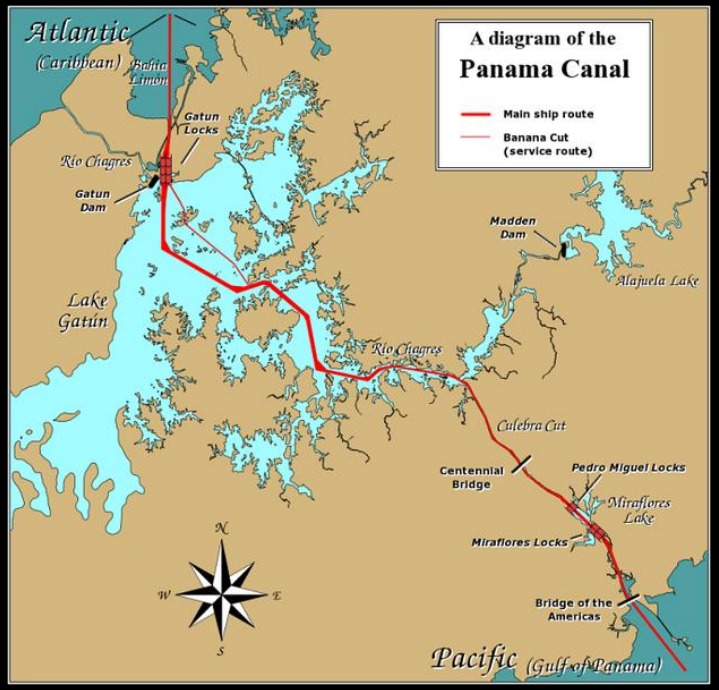
IRON ORE

Shipping Ports	Receiving Ports
Duluth	Calumet
Superior	Buffington
Two Harbors	Indiana Harbor
Silver Bay	Gary
Taconite Harbor	Burns Harbor
Marquette	Detroit
Escanaba	Trenton
Michipicoten	Toledo
Port Cartier	Huron
Point Noire	Lorain
Sept Iles	Cleveland
	Ashtabula
	Conneaut
	Contrecouer

LIQUID BULK

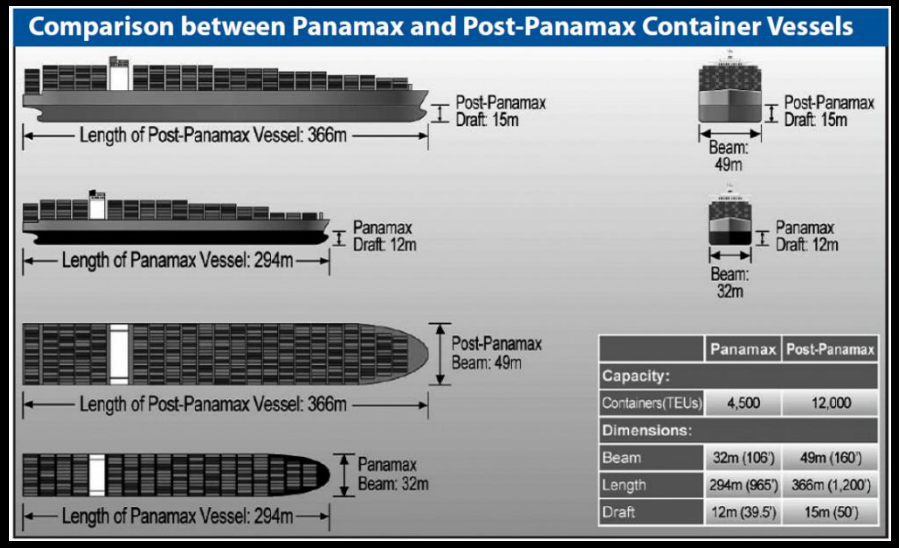
Shipping Ports	Receiving Ports
East Chicago	Escanaba
Detroit	Marathon
Sarnia	Green Bay
Toledo	Milwaukee
Oakville	Frankfort
	Grand Haven
	Traverse City
	Mackinac City
	Cheboygan
	Marysville
	Detroit
	Trenton
	Cleveland
	Nanticoke
	Parry Sound
	Oakville
	Buffalo
	Oswego

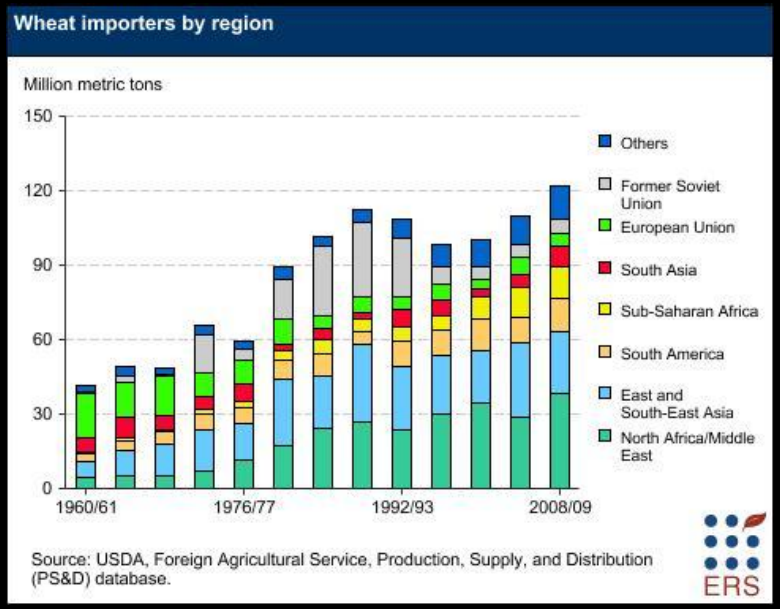
The Challenge - Change



Panama

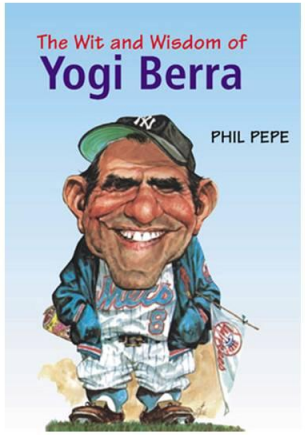
Climate





Commodity Shipments

Challenges – Vision of the Future



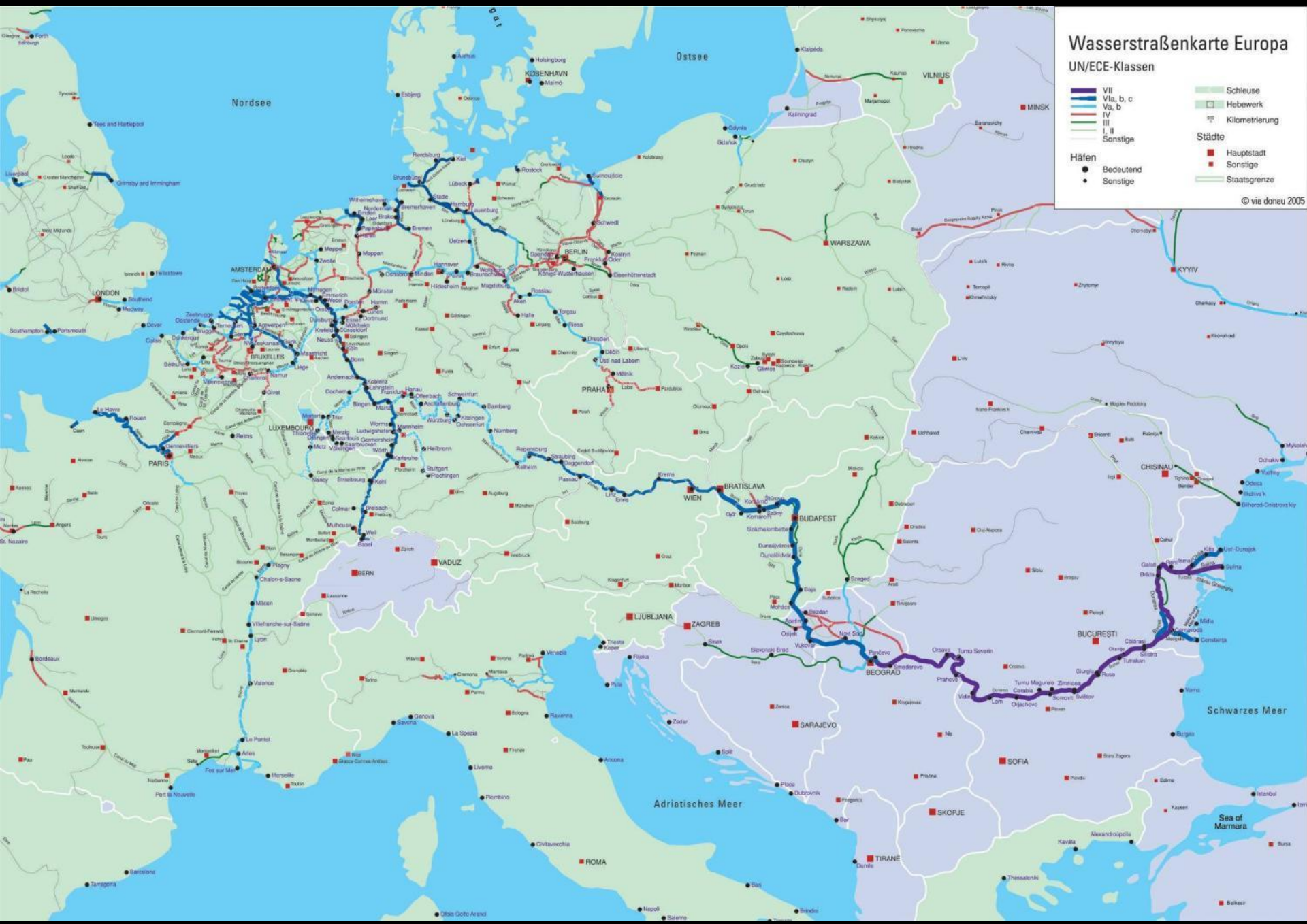
Think Ahead !

"If you don't know where you are going,

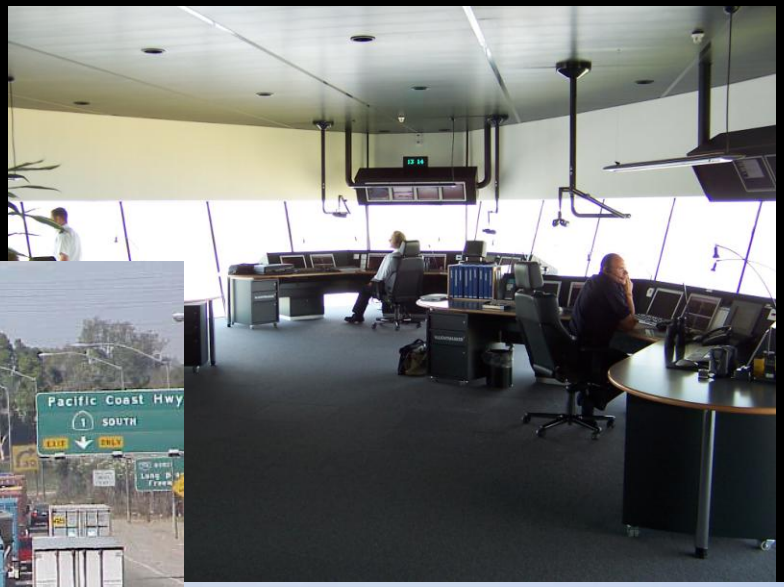
… you will wind up somewhere else"

VISION!

World Class System?


Wasserstraßenkarte Europa
UN/ECE-Klassen
VII
Vla, b, c
Va, b
IV
III
I, II
Sonstige
Schleuse
Hebewerk
Kilometrierung
Städte
Hauptstadt
Sonstige
Staatsgrenze
Häfen
Bedeutend
Sonstige
© via donau 2005
Nordsee
Ostsee
Adriatisches Meer
Schwarzes Meer
Sea of Marmara
KOBENHAVN
VILNIUS
MINSK
WARSZAWA
KYYIV
BERLIN
AMSTERDAM
LONDON
PARIS
BRUXELLES
LUXEMBOURG
BERN
VADUZ
PRAHA
WIEN
BRATISLAVA
BUDAPEST
CHISINAU
BUCUREŞTI
BEOGRAD
SARAJEVO
ZAGREB
LJUBLJANA
SOFIA
SKOPJE
TIRANË
ROMA

National Commitment



- Our Earth
- Rivers, lakes & wetlands
- Threats
- Infrastructure
  - Dams
  - Water transfers
  - River navigation
  - Floods

Infrastructure problems: River navigation schemes

The Environment

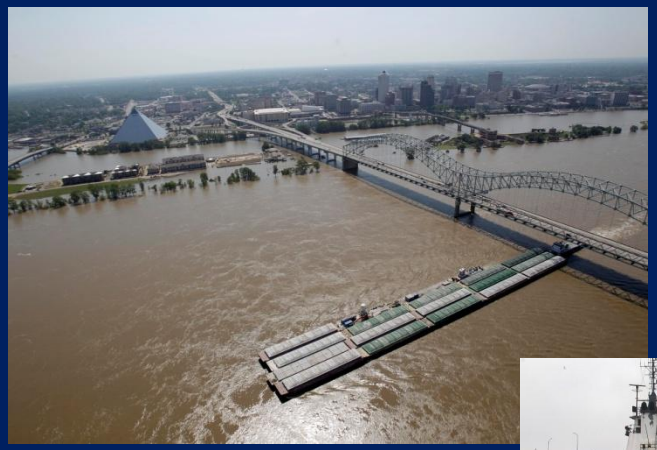
River transportation: Clean alternative or destruction for waterways?

Transport over water is a relatively clean method of moving goods from one point to another. But the development of rivers for navigation — by dredging, channelling, and

Aerial view of a canalised section of the São João River, Rio de Janeiro State, Brazil

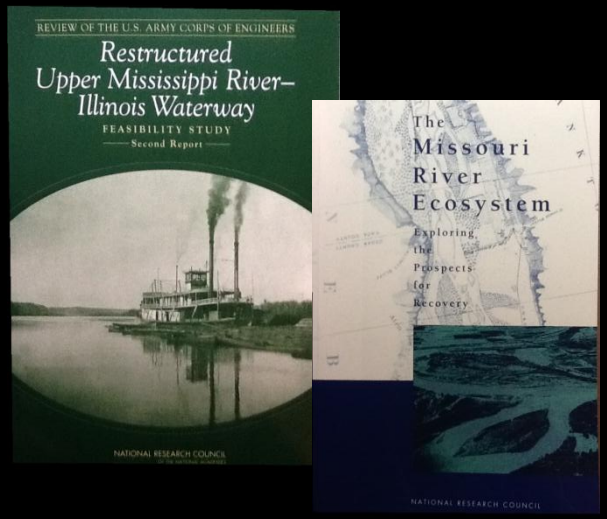
Challenges – Physical Parameters

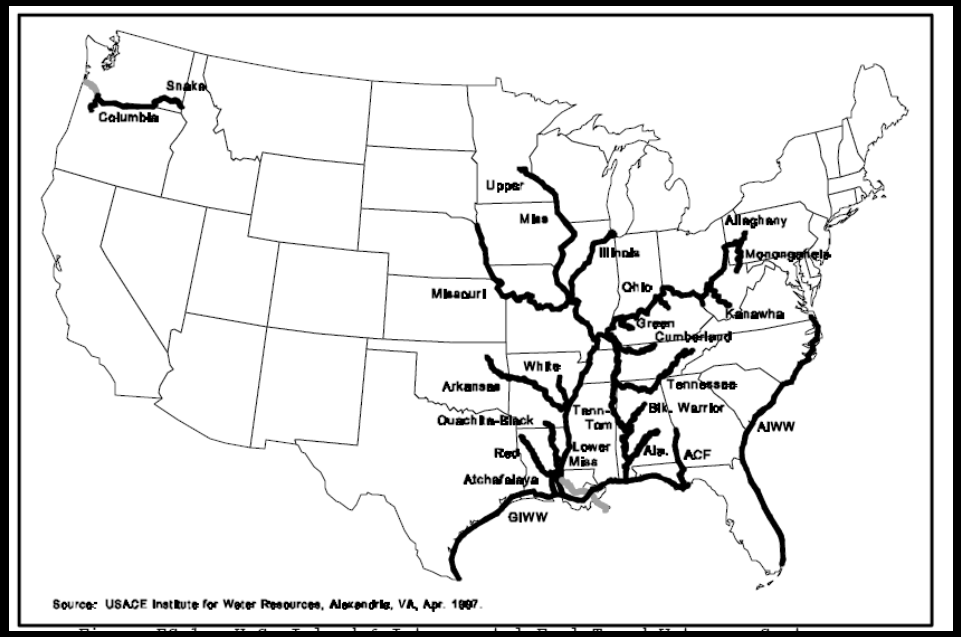
- 24/7/365
  - Low water
  - High water
  - Ice
- Vulnerability



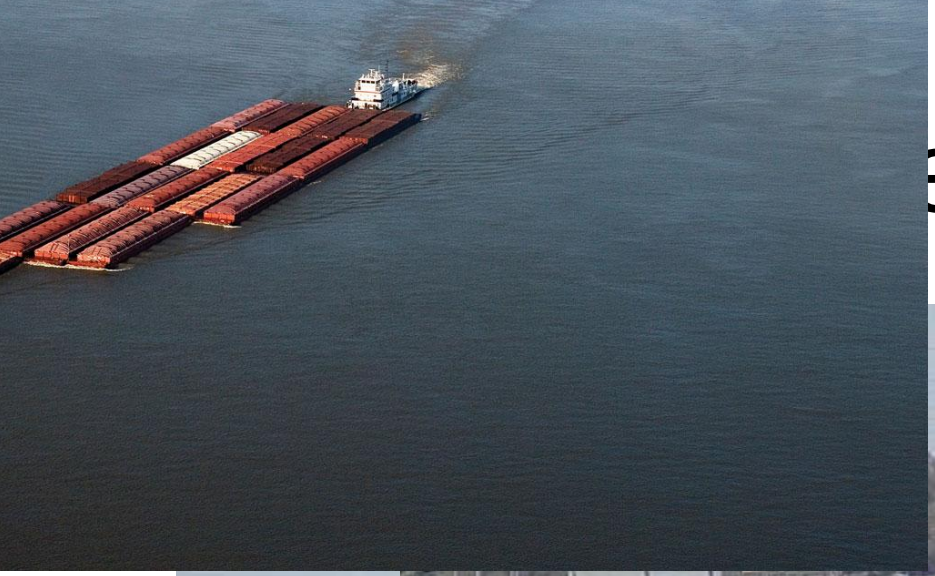
Challenge - Unthinkables

- Decommissioning of Lesser Used Waterways
- Non-Structural Measures
  - Congestion Fees
  - Priority Passage
  - Scheduling
- Environmental Controls





es - Change



Challenge – Attention and Understanding

- **INLAND WATERWAYS = THE SILENT TRANSPORTER**

- **ADVOCACY – Who?**


America's Inland Waterways
Thank You!