

# TYPICAL DREDGING PRACTICES IN THE UNITED STATES

R. E. Randall

Director, Center for Dredging Studies,  
Texas A&M University

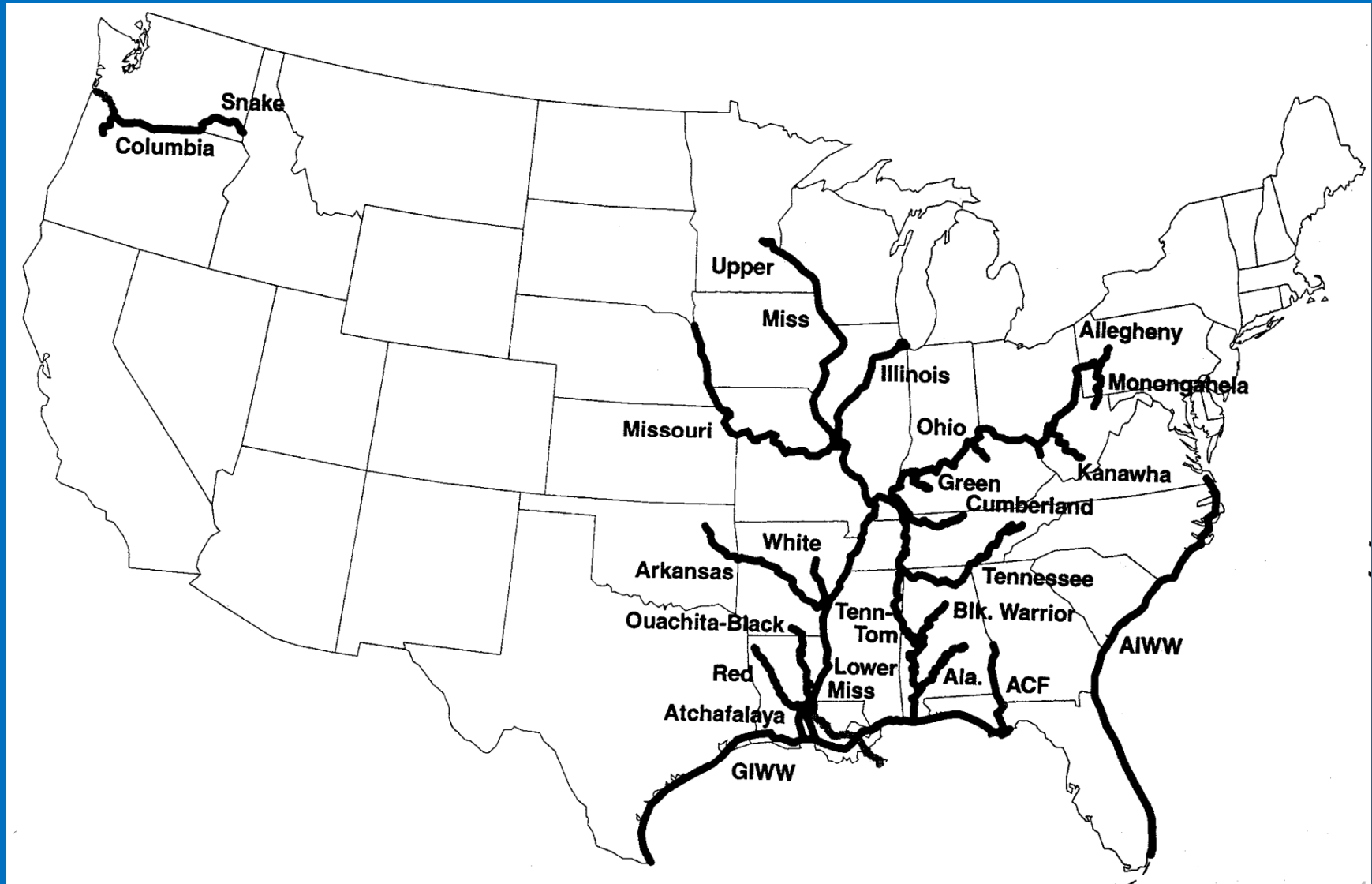
# Overview

- ▣ Brief History
- ▣ US Waterways and Ports
- ▣ Types of US Dredges
- ▣ Dredging Quantities and Costs
- ▣ Dredged Material Placement Methods
- ▣ Major US Environment Laws
- ▣ Summary

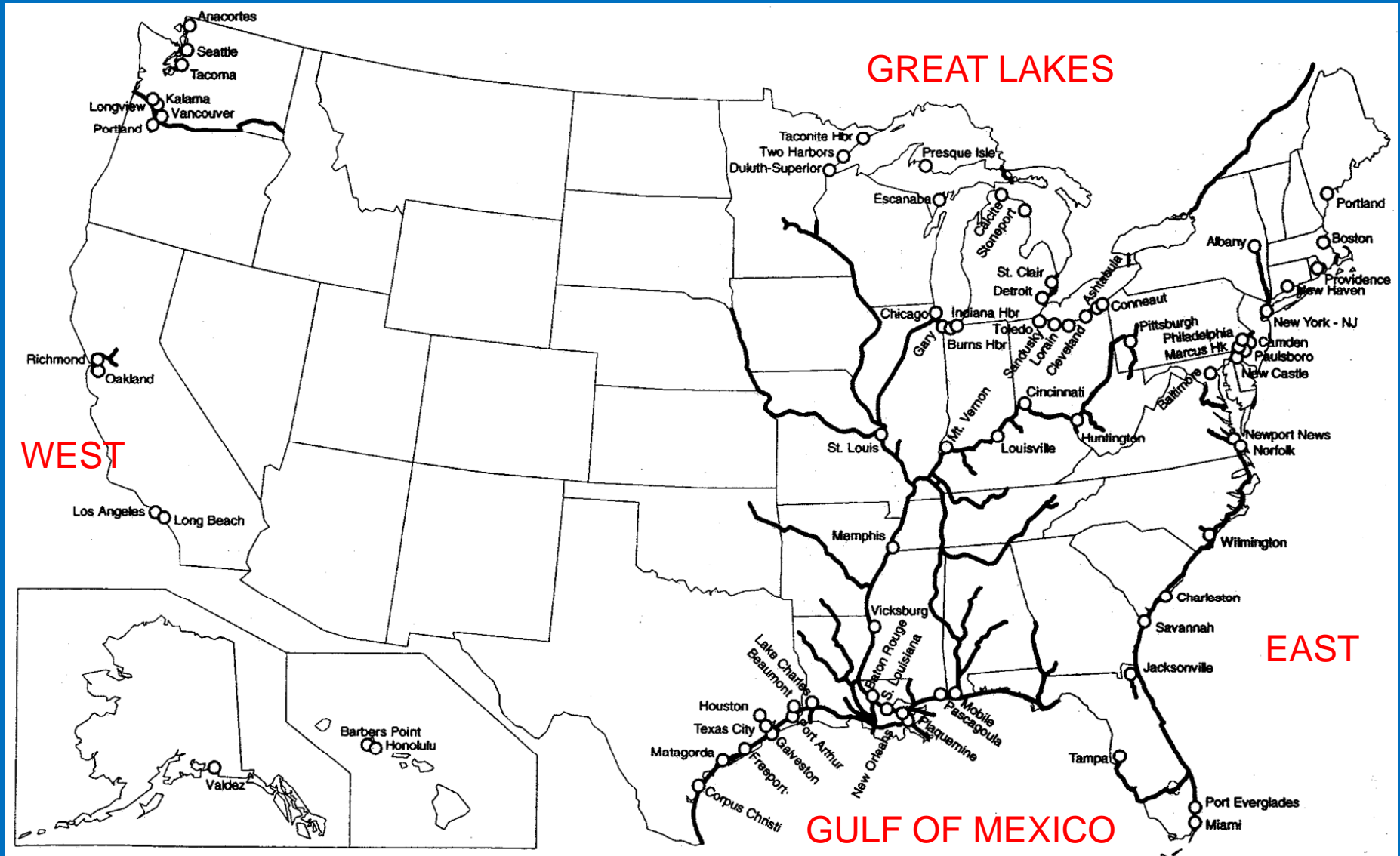
# Brief US Dredging History

- ▣ 1779 Army Corps of Engineers (USACE) established
- ▣ 1899 Rivers & Harbors Act - requires USACE permit for work in navigable waters
- ▣ 1972 - Clean Water Act
  - EPA develops guidelines
  - USACE authorizes discharge of dredged material according to EPA guidelines
- ▣ 1972 MPRSA - USACE authorizes ocean placement of DM using criteria developed by EPA
- ▣ 1986 WRDA - local sponsors pay 1/2 and US federal government pays 1/2 costs.
- ▣ 1988 Endangered Species Act - protects endangered species.

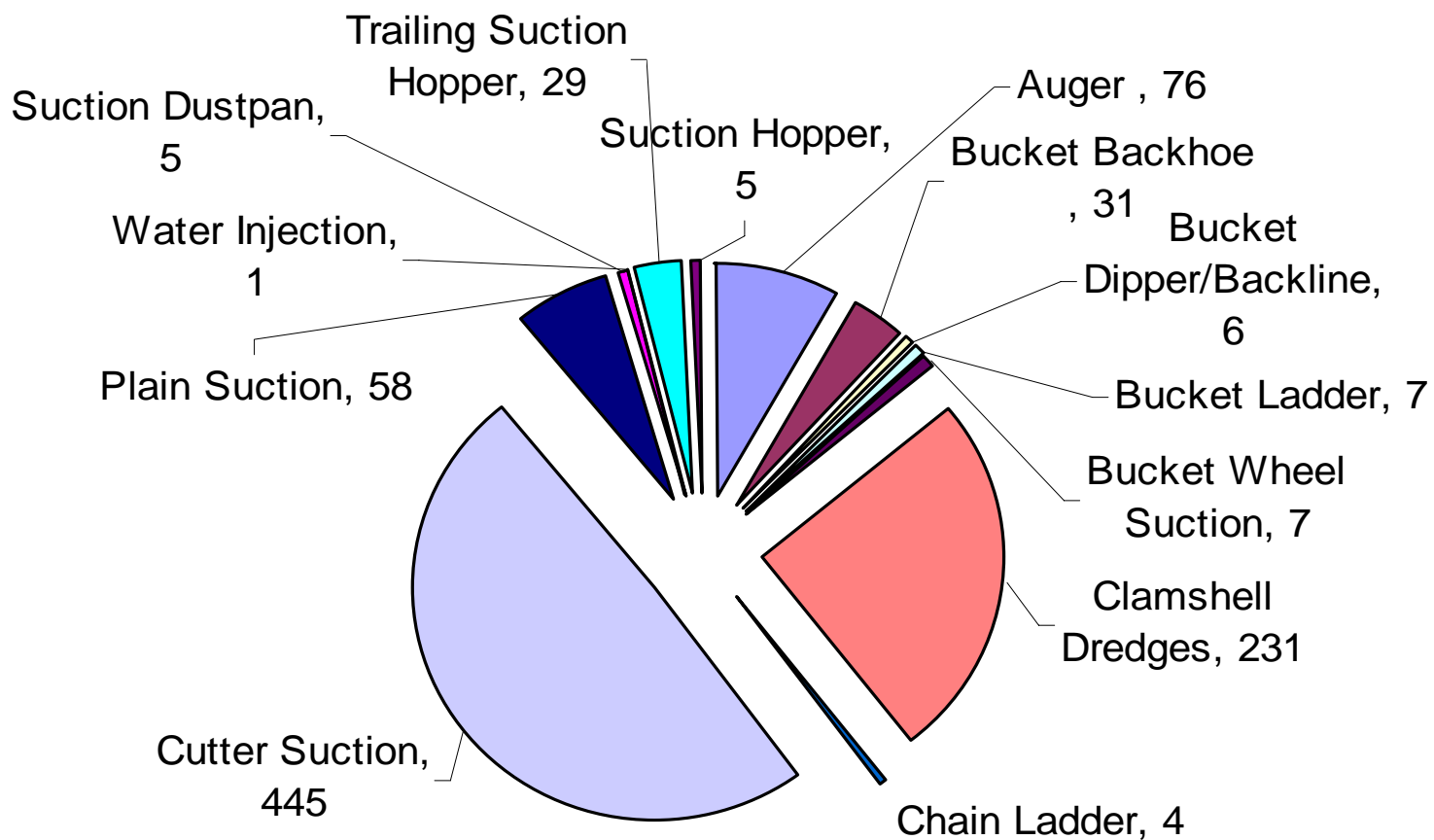
# MAJOR US WATERWAYS



# MAJOR US PORTS



# US Dredge Distribution by Class



# Cutter Suction Dredge (courtesy GLDD)

TEXAS



L – 93 m  
B – 20 m  
Draft – 3 m  
Dig Depth – 5 – 20 m  
Suct Dia – 864 mm  
Disch Dia – 762 mm  
Total Power – 15,000 KW

# Hopper Dredge

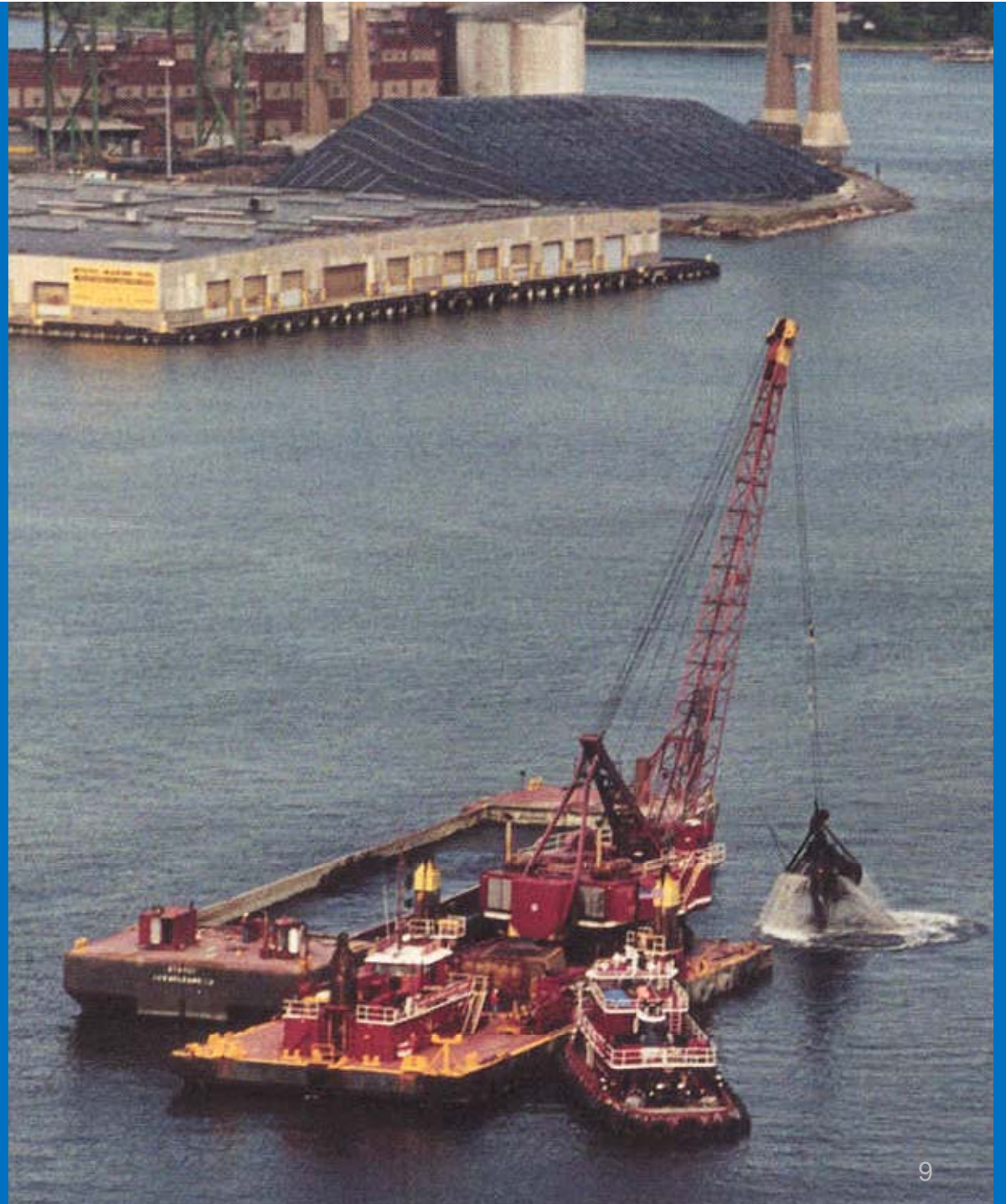
(courtesy Manson Construction)

Bayport Hopper Dredge  
3800 cm  
6000 KW





# Mechanical Clamshell Dredge



# LEVEL CUT ENVIRONMENTAL BUCKET

(courtesy of Cable Arm)



# CUTTER SUCTION AUGER DREDGE

(courtesy Ellicott)

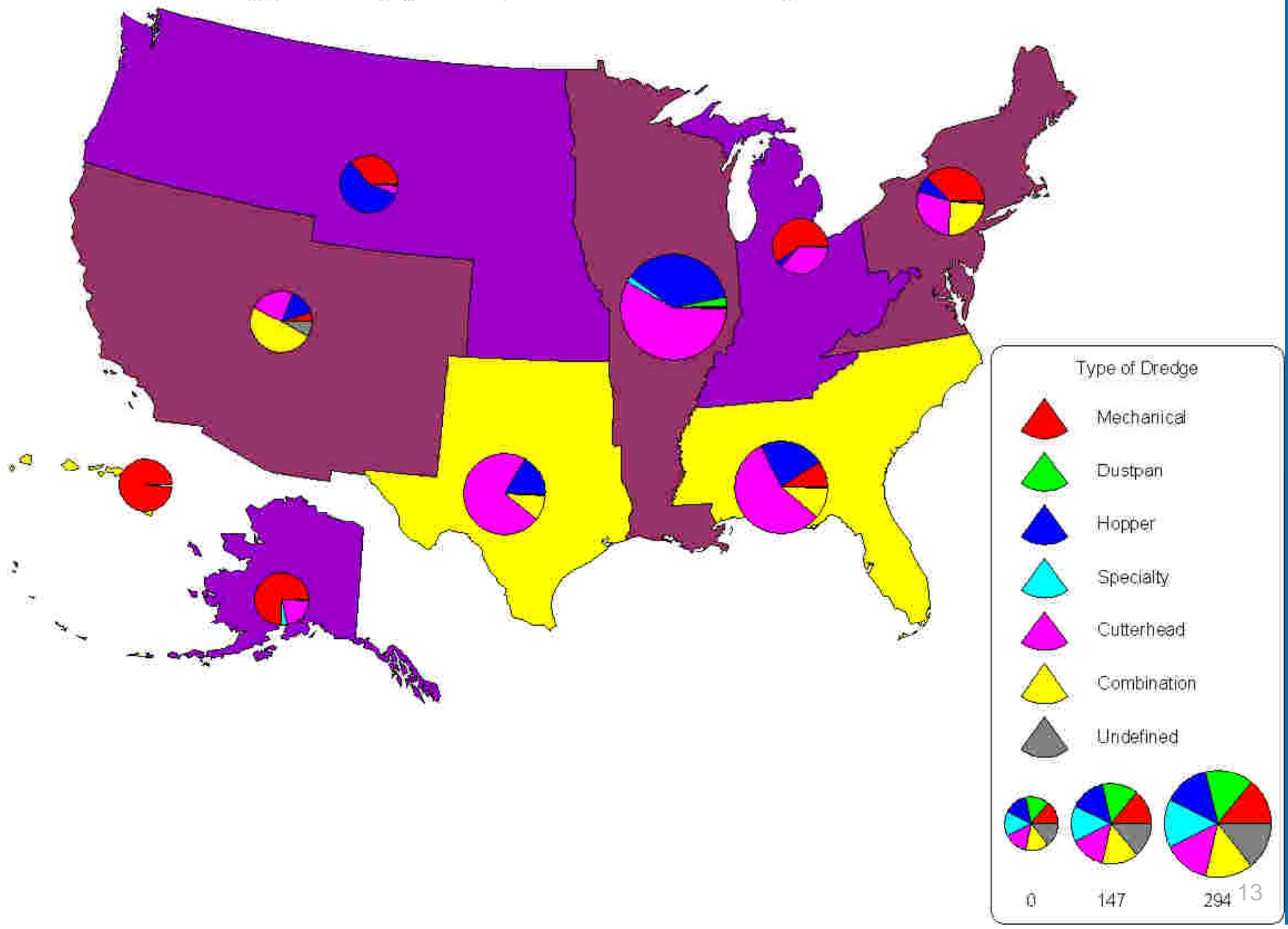


# Swinging Ladder Dredge

(courtesy DSC)

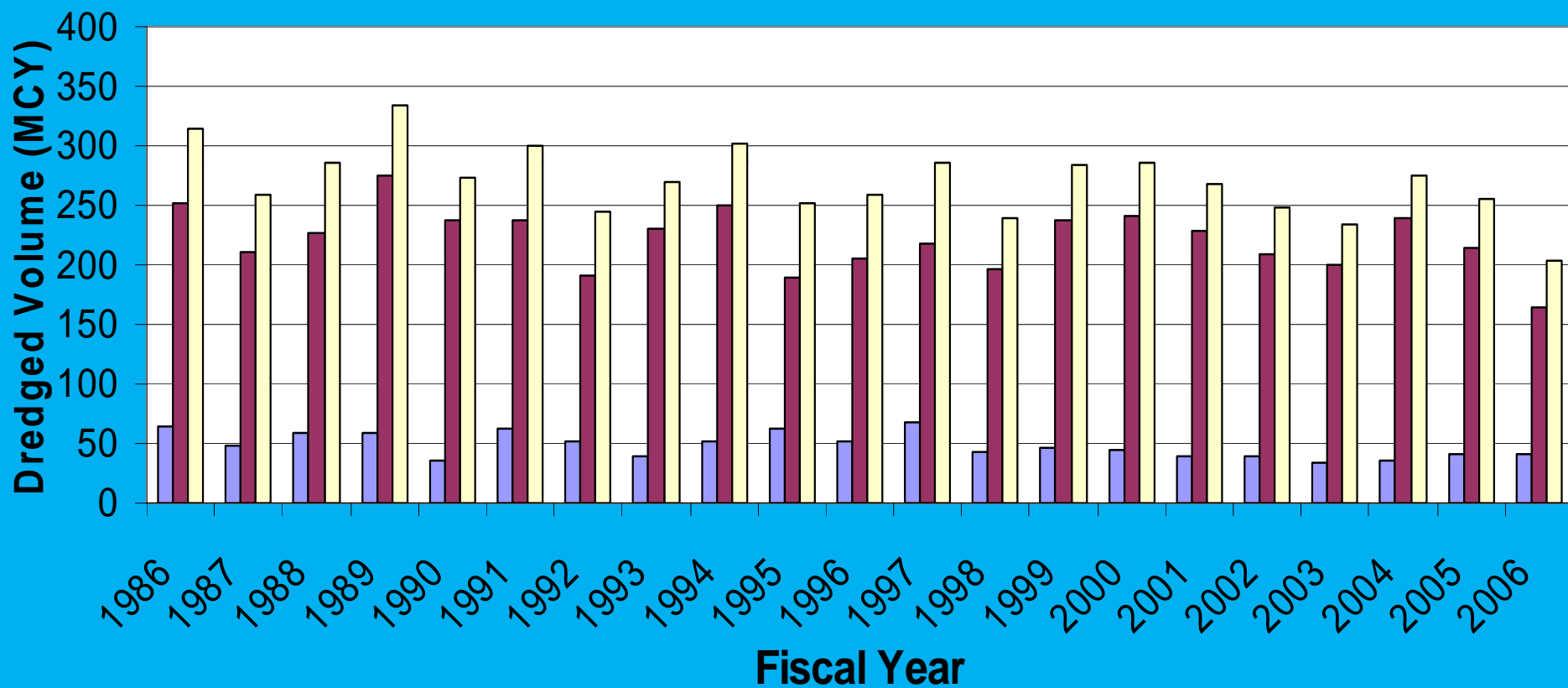


# Five-Year Volume of Dredged Material by Dredge Type (1997-2001) MCM

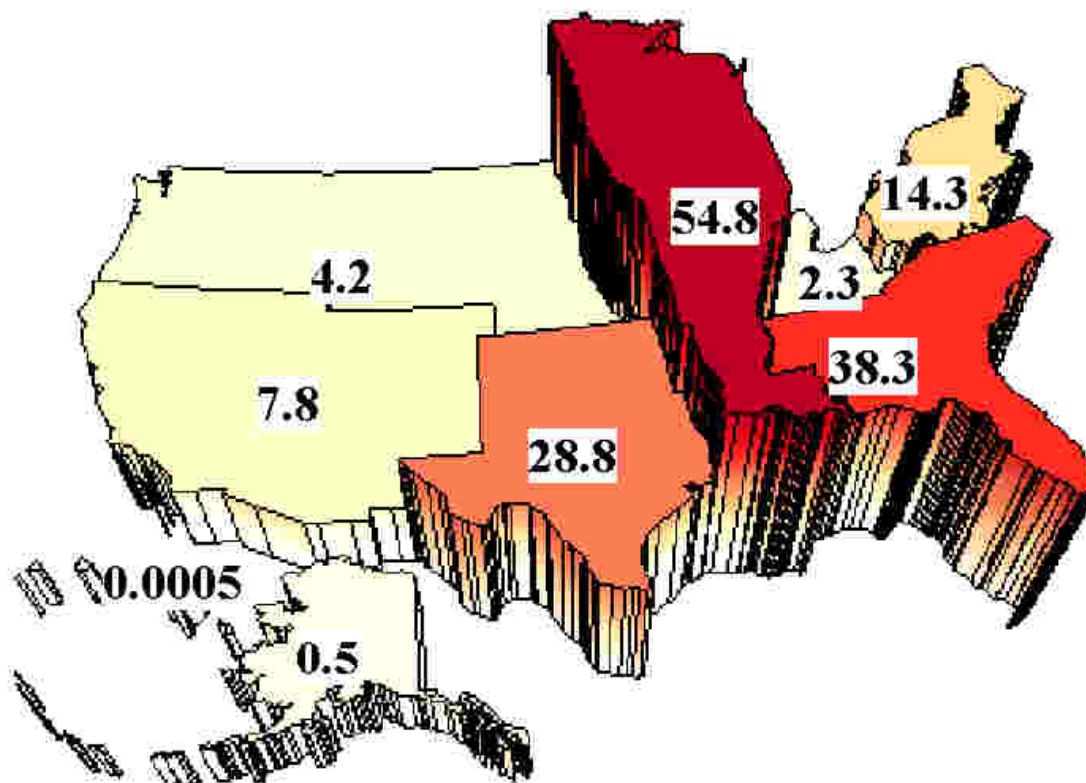


## Total CY Dredged (1986-2006)

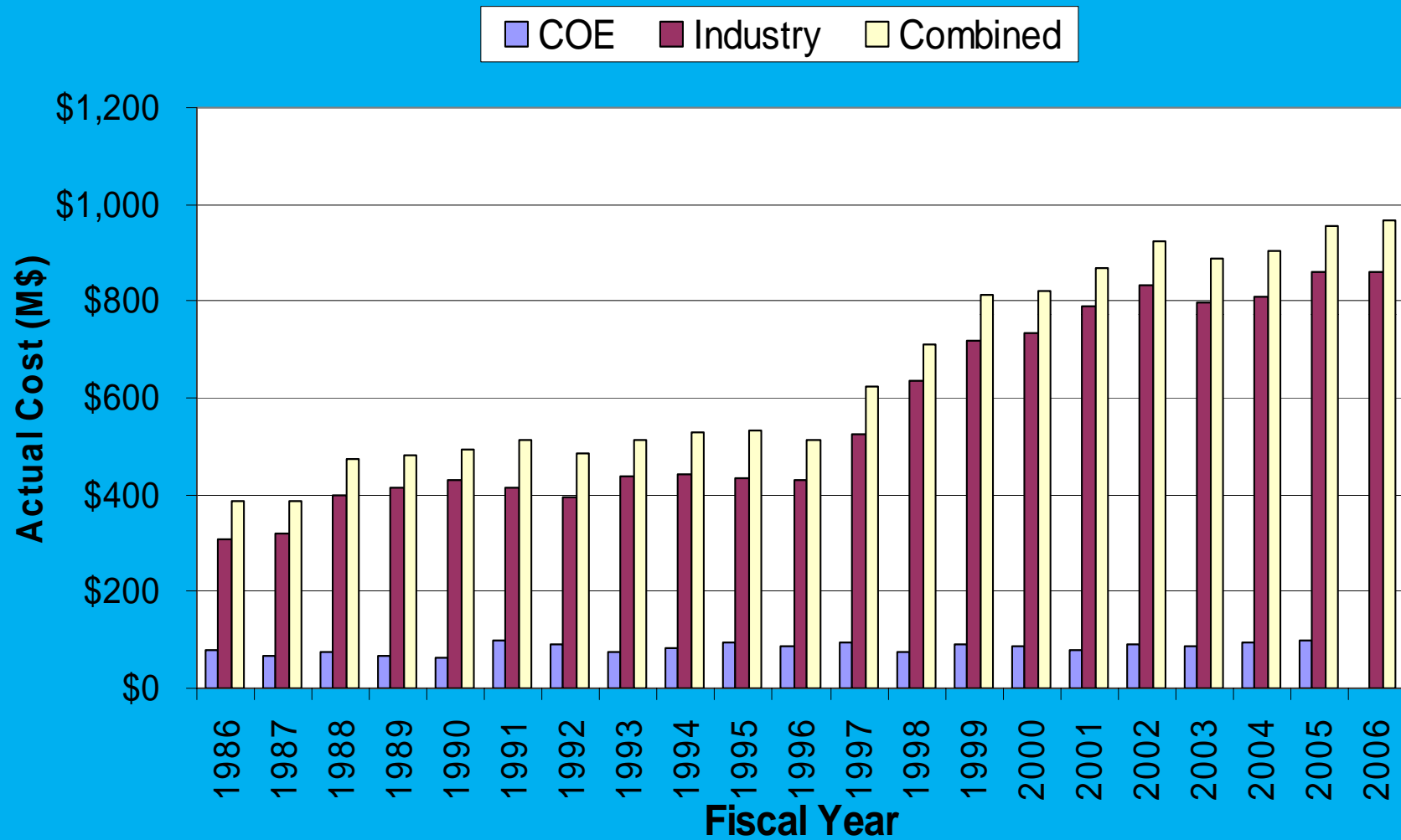
COE Industry Combined



# Average Yearly Volume of Material Dredged in the United States from 1997-2002 (MCM)

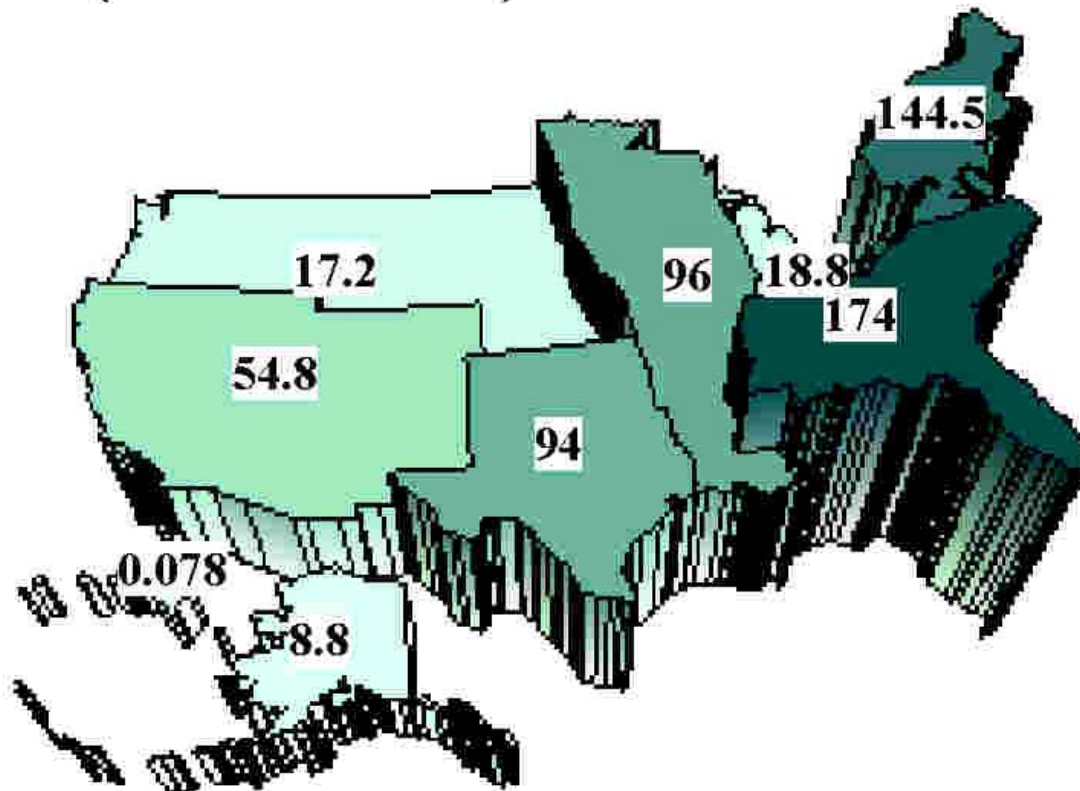


## Actual Cost (1986-2006)





# Average Yearly Dredging Costs in the United States from (1997-2002) Millions of US Dollars



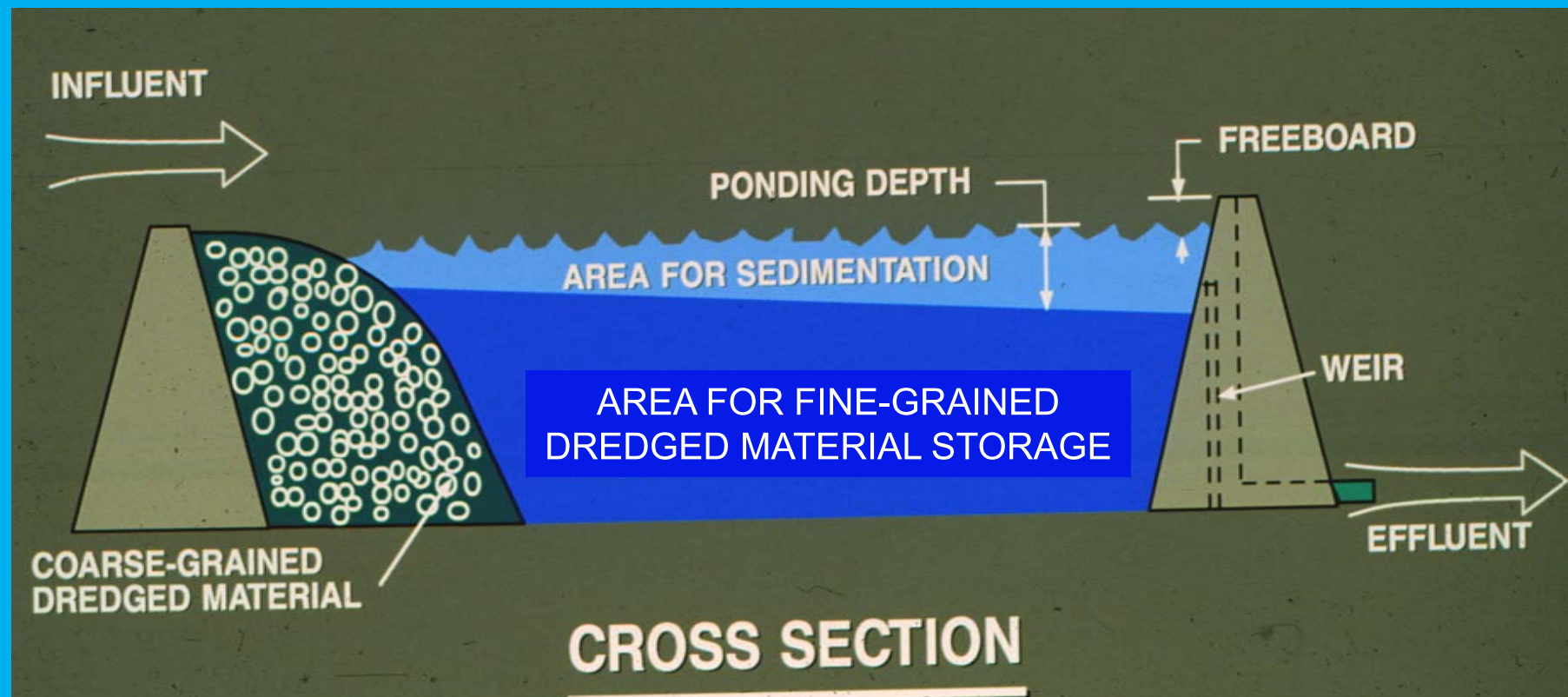
# Dredged Material Placement Methods

- ▣ Open Water Placement
  - rivers, estuaries, & oceans
- ▣ Confined Disposal Facilities
  - diked nearshore, island, or upland facilities
- ▣ Beneficial Use –
  - Habitat development (wetland, upland, & island)
  - Beach nourishment
  - Aquaculture
  - Parks and Recreation
  - Solid waste management
  - Shoreline stabilization
  - Construction and industrial use
  - Fill, dikes, levees, parking lots, roads

# OPEN WATER PLACEMENT BY SPLIT HULL HOPPER BARGE



# Confined Disposal Facility (CDF)



# UPLAND



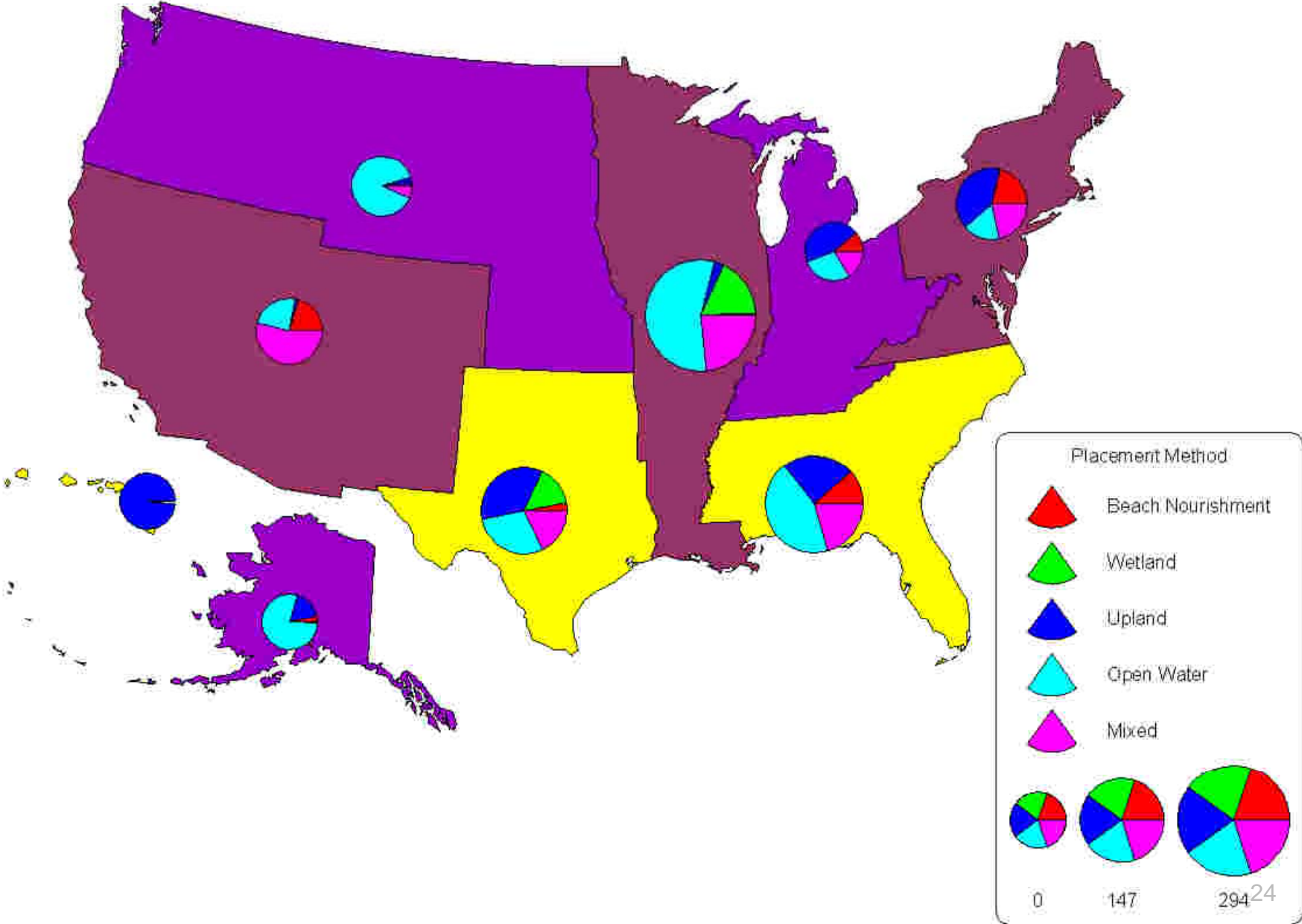
# BENEFICIAL USE CATEGORIES (USACE)

- ▣ Habitat development (wetland, upland, island, aquatic, others)
- ▣ Beach nourishment
- ▣ Aquaculture
- ▣ Parks and Recreation
- ▣ Strip mine reclamation & solid waste management
- ▣ Shoreline stabilization and erosion control
- ▣ Construction and industrial use (port development, airports, urban, & residential)
- ▣ Material transfer (fill, dikes, levees, parking lots, roads)
- ▣ Multiple purpose

# Beneficial Use – Bird Island



# Five-Year Volume of Dredged Material by Placement Method (1997-2001) MCM

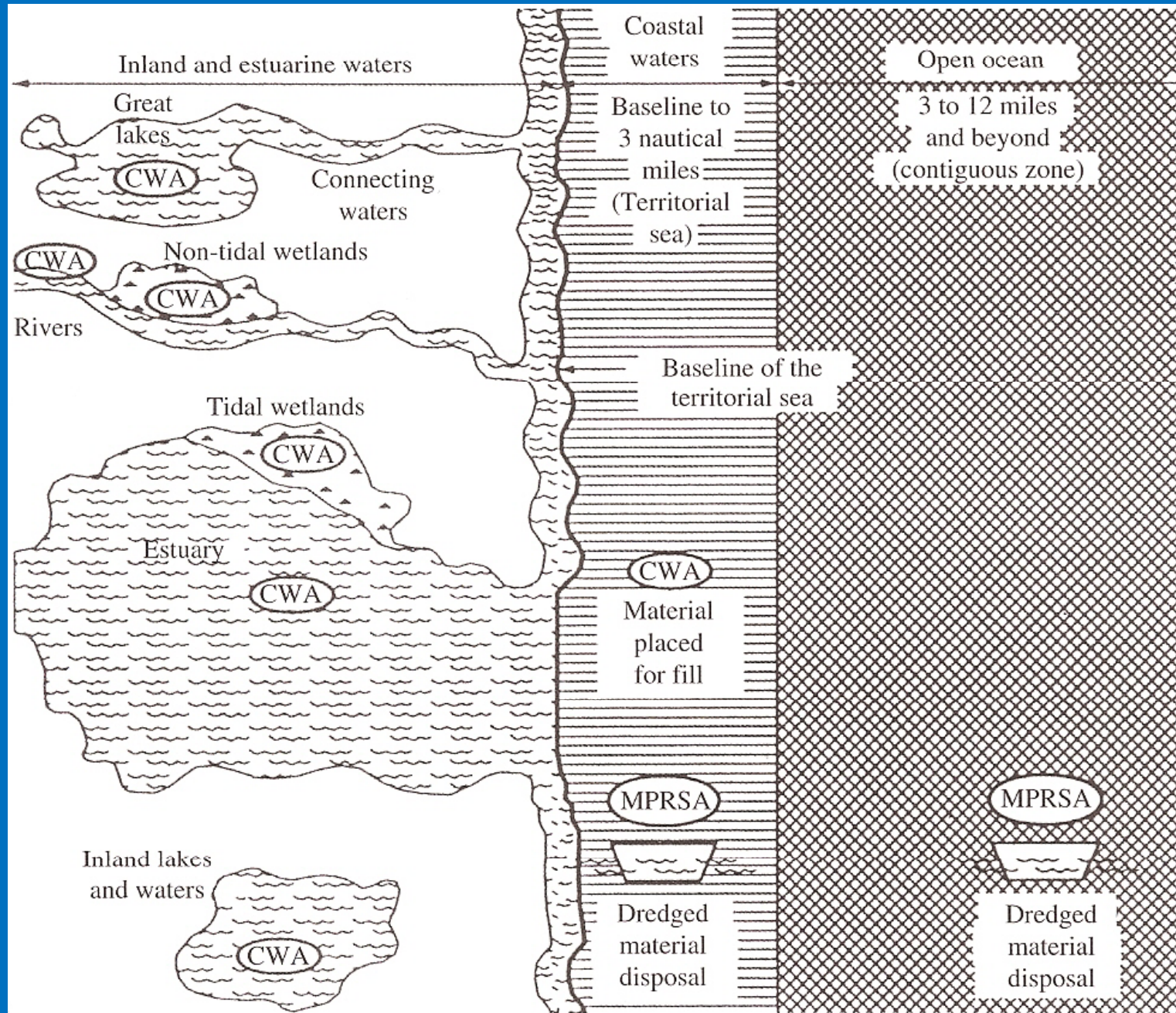




## Three Major US Environmental Laws

- ▣ Marine Protection, Research, and Sanctuaries Act (MPRSA) – Ocean Dumping Act – London Dumping Convention – requires EPA to develop criteria in consultation with USACE .
- ▣ Clean Water Act (CWA) – requires EPA with USACE to publish guidelines for dredged material placement such that no unacceptable adverse environmental impacts occur.
- ▣ National Environmental Policy Act (NEPA) – requires identification and evaluation of alternatives (EA or EIS).

# JURISDICTION OF MPRSA & CWA



# Summary

- ▣ Major Ports – East coast, Gulf of Mexico, & West coast
- ▣ Dredging equipment - cutter suction (pipeline), hopper dredge, mechanical clamshell, booster pumps, etc.
- ▣ Dredge Placement Methods – open water, confined disposal facilities, beneficial uses
- ▣ Environmental Laws – NEPA, MPRSA, CWA,
- ▣ Dredging volumes and costs – 200 MCY, 900 M\$, Average cost of \$4.5/CY

# THANK YOU

