PETROLEUM TRANSPORTATION SYSTEMS ASSESSMENT & MODELING
PPA MA-508

BASE YEAR TRAFFIC PATTERNS

PREPARED BY

U.S. DEPARTMENT OF TRANSPORTATION

RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION

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FOR

COORDINATOR FOR RESEARCH AND DEVELOPMENT

MARITIME ADMINISTRATION

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1.0 INTRODUCTION

1.1 Background

The Oil Pollution Act of 1990 (OPA 90) established the Interagency Coordinating Committee on Oil Pollution Research, and mandated the development of a comprehensive, coordinated Federal oil pollution R&D Plan [1] [2]. The Coordinator For Research and Development, Maritime Administration (MARAD) (a member of the Interagency Coordinating Committee) initiated the process of synthesizing a national perspective of the waterborne oil transportation system. A draft Research Project Plan was submitted by The Volpe Center in December 1994, outlining the tasks and resources required to document a description of petroleum traffic patterns, estimate risk of spills, and assess effectiveness of measures to minimize damage to the natural marine resources. The goal of the project plan is to develop a comprehensive understanding of the entire marine oil transport system, the means of minimizing the risk of future oil spills and damage to natural marine resources when oil spills do occur, and to identify any additional legal and/or regulatory actions that may be required, given full industry compliance with existing laws and regulations.

This project memorandum is the first of a series of products defined by the December '94 project plan. It documents a definitive description of the waterborne oil transportation system, the quantity and spacial distribution of petroleum (from crude oil origin through transfers of petroleum products to land based distribution systems. This project memorandum completes the initial MARAD/Volpe Center effort (i.e., Phase I of the multi-year project) and reflects progress to date on Task 1 Develop Base Year Traffic Patterns (i.e., completion of Subtasks 1.1 Quantitative Definition and Subtask 1.2 National GIS Displays). The remainder of Task 1 (i.e., Tasks 1.3, 1.4, & 1.5) is included in Phase II of the December '94 project plan.

1.2 Scope - A National Perspective

The scope of this project memorandum is limited to a national level perspective of the following:

1.2.1 Crude oil and petroleum products transported to and from marine ports (or river ports via salt water bays and sounds) of the United States. Domestic oil shipments differentiated from foreign imports and exports, persistent oils differentiated from non-persistent oils (commodities defined in **APPENDIX A**).

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[1] Biennial Report On The Oil Pollution Research and Technology Plan, Interagency Coordinating Committee On Oil Pollution Research, June 1994.

[2] Review of The Interagency Oil Pollution Research & Technology Plan, Final Report of The Committee on Oil Spill Research and Development, Marine Board, National Research Council, September 1994.

1.2.2 Waterborne petroleum shipping differentiated also between self-propelled tankers and tank barges. Bunker fuel estimates (Task 1.4), and underwater pipelines (Task 4.2) are excluded from this project memorandum; these two tasks are part of Phase II of the December '94 project plan.

1.2.3 All U.S. ports along the Atlantic, Gulf of Mexico and the Pacific Coasts that have oil shipments reported by the source data are included. Forty eight ports are identified as shipping or receiving domestic or foreign shipments of persistent or non-persistent oils by tanker or by barge. Total petroleum shipments between Alaska & Hawaii and the contiguous 48 states are also included in the overall perspective, but definition and charting of routes within each of these two states is deferred for Task 1.3.

1.2.4 Waterborne petroleum shipments between Puerto Rico, and The U.S. Virgin Islands, and the ports of the Atlantic, Gulf of Mexico and Pacific state ports are included in the domestic traffic patterns. However, traffic between ports of Puerto Rico and The Virgin Islands are also deferred for Task 1.3.

1.2.5 Crude oil imports by tanker to the Louisiana Offshore Oil Port (LOOP) are included in the U.S. foreign imports traffic patterns, but the underwater pipeline from the LOOP facility to shore is excluded. The data quantifying this traffic was provide by the Bureau of the Census.

2.0 SUMMARY

The format of this project memorandum is designed to facilitate use as a reference for subsequent tasks, while reflecting the task structure of the December '94 project plan. The following subsections report on the progress to date.

2.1 Quantitative Definition (Task 1.1)

This project memorandum presents 1993 shipment tons, and vessel transits, and it charts flows in/out of U.S. ports. The A.C.O.E., Waterborne Commerce Statistics Center data base for 1993 serves as the primary data source (PIERS and Bureau of Census Imports & Exports Statistics validate the foreign movements) for definition of base year petroleum traffic patterns. Only coastal and deep water traffic transiting the EEZ has been included in this task. Intracoastal waterway traffic, sound and bay internal traffic and local harbor transfers are excluded. [3] Detailed origin to destination (O-D) tons shipped tables, and graphic summaries have been prepared of 1993 tons shipped, and port calls, for persistent and non-persistent oils (defined in APPENDIX A) that are transported by tankers or by tank barges. Domestic shipping is differentiated by origin-destination pairs, and from foreign imports and exports. The foreign origins or destinations of imports and exports are defined by country where the vessel was loaded/unloaded. Bunker fuels carried by cargo and passenger vessels are not included here; Task 1.4 addresses this issue in Phase II of the project.

The products of Task 1.1 are: a) data base residing on a Volpe Center PC network server, and b) hard copy tabulations of relevant statistics, and graphical summaries presented in this Volpe Center project memorandum.

The marine petroleum transportation system of the United States has been defined here as serving 48 ports and port groups. The ten largest volume ports are responsible for 80 percent of the total tons of all petroleum shipped by tanker and by barge. When the total petroleum traffic is disaggregated by shipment category and vessel type, the concentrations of traffic varies somewhat as shown in Table 2-1.

Table 2.1 indicates that:

a) oil tankers serve 41 of the 48 ports, and the largest ten ports are responsible for 84 percent of the total tons shipped in tankers,

b) foreign shipments load or unload at only 34 of the 48 ports, and the largest ten ports are responsible for 91 percent of the total petroleum tonnage of U.S. imports and exports, and

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[3] Task 1.3 of the December '94 project plan address oil transport on the internal waterways.

c) persistent oils load or unload at 44 of the 48 ports, and the largest ten ports are responsible for 88 percent of the total persistent oil tonnage shipped.

TABLE 2-1 GEOGRAPHICAL DISTRIBUTION OF PETROLEUM TRAFFIC

SHIPMENT CATEGORY	CATEGORY SHIPMENTS (Million Tons)	NUMBER OF PORTS	CUMULATIVE PERCENT OF CATEGORY TONS BY TEN LARGEST PORTS
Total U.S. Shipments	817	48	80
Persistent Oil Shipments Only	608	44	88
Non-Persistent Oil Shipments Only	209	45	73
Tanker Shipments Only	712	41	84
Barge Shipments Only	105	45	78
Domestic Shipments Only	380	48	77
Foreign Shipments Only	437	34	91

A national level perspective of the total petroleum movements disaggregated by domestic, foreign, tanker, barge, persistent and non-persistent is provided by a series of graphic displays in Sections 3, 4, and 5. Extensive tabulations in Sections 4 and 5 provide port O-D pair tonnage disaggregated among all these categories.

2.2 GIS Chartlets - National Perspective (Task 1.2)

In order to develop an early perspective of the marine oil spill risk issue [4], an abstract representation has been prepared of the oil shipment corridors serving the 48 ports of the Atlantic, Gulf of Mexico and Pacific coasts (Alaska and Hawaii are each currently

[4] Assuming that risk of oil spill is related to petroleum traffic volume and routing.

represented by single port groups). Base year (1993) shipment tons on the major petroleum corridors is presented on small scale GIS chartlets. These charlets provide a national level perspective with O-D points representing the major coastal port entrance, or group of closely located ports, or the entrance to a bay or a sound. An abstract network representing the approximate routing of domestic and foreign tanker traffic within the EEZ, and to and from each port along the Atlantic coast, Gulf of Mexico coast, and the Pacific coast is represented.[5] The O/D shipment tons developed in Task 1.1 were assigned to the abstract network in Task 1.2 producing small scale chartlets displaying the major oil ports and the volume of domestic or foreign oil shipping to and from each port via tankers or barges. A subsequent task (Task 1.3) is planned to develop enlarged views of many of these waterways (i.e., bays, sounds and large port areas and their approaches). The basic data source used for Tasks 1.1 and 1.2 will support charting the traffic patterns within these waterways.

Sections 3, 4 and 5 of this project memorandum each follow a similar pattern of presenting a sequence of perspectives using pie chart and bar chart summaries and GIS chartlets. Sections 3, 4, and 5, respectively, present the national totals, domestic shipments only, and foreign shipments only. Sections 4 and 5 each contain, in addition, detailed O-D tables of oil shipment tons for each cell of the multi-dimensional matrix of the constituent components (i.e., tanker, barge, persistent and non-persistent oils).

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[5] The abstract route network is an extension of that created by the Volpe Center for the U.S. Coast Guard report to Congress Evaluation of Oil Tanker Routing per Section 4111(b)(7), Oil Pollution Act of 1990.

3.0 U.S. TOTAL PETROLEUM SHIPMENTS

Section 3 graphically presents a top level perspective of the aggregate of the total of all domestic and foreign shipments of persistent oils, non-persistent oils to and from U.S. ports. Figures 3-1 through 3-10 are pie and bar charts displaying percent distributions of the tons shipped of persistent oils, non-persistent oils, by tanker and by barge. Figures 3-11.1, 3-11.2, & 3-11.3 are GIS chartlets displaying the major corridors, or sea lanes, used for these oil shipments along the Atlantic, Gulf of Mexico, and Pacific coasts respectively.

All pie charts in Section 3 represent the total tons shipped between pairs of U.S. ports (including Puerto Rico and The U.S. Virgin Islands) as well as the tons imported and exported at all domestic ports. All bar charts in Section 3 represent total tons moving in vessels on the waterways of each port. The pie chart counts each O-D shipment ***once*** (including internal port traffic and transshipments). The bar chart represents the sum of inbound and outbound traffic on the waters of the port (also including the internal port traffic and the outbound as well as inbound transshipments). The bar chart totals are ***not*** double the pie chart totals, because the internal and transshipment portion of the pie chart totals must be counted only once.

FIGURE 3-1 U.S. TOTAL TONS SHIPPED - DISTRIBUTED BY TANKER, BARGE, PERSISTENT & NON-PERSISTENT

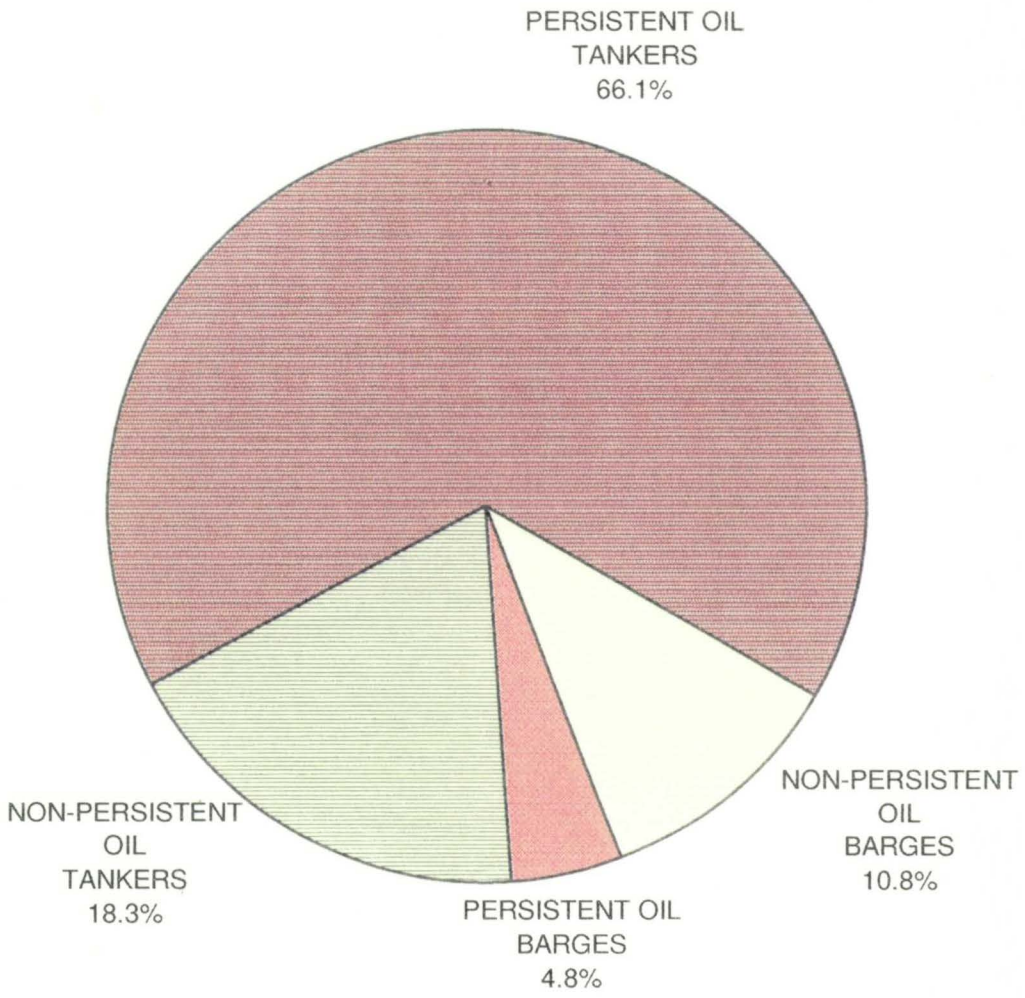


FIGURE 3-2 U.S. TOTAL TONS SHIPPED - DISTRIBUTED BY PORT

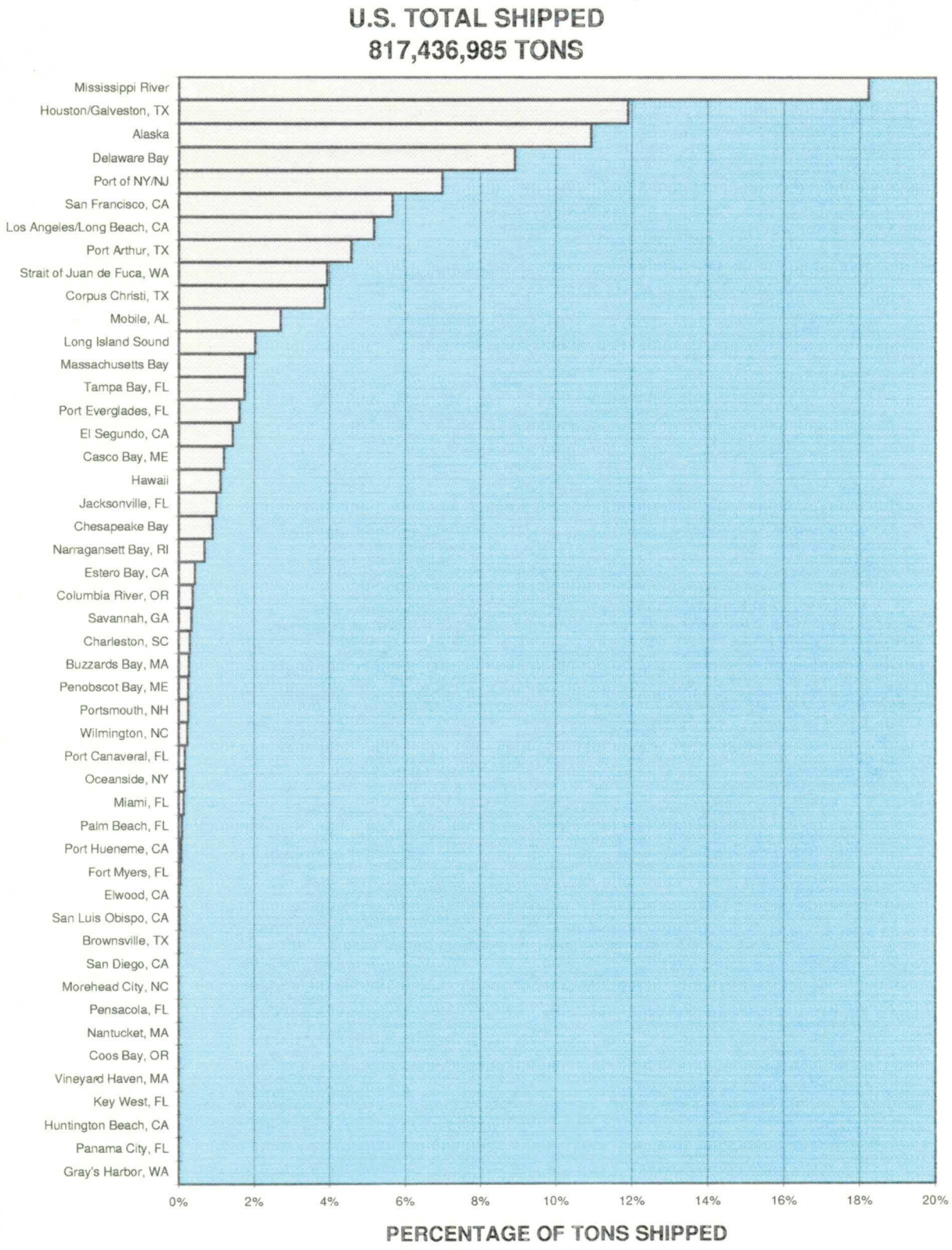


FIGURE 3-3 PERSISTENT OIL TONS SHIPPED - DISTRIBUTED BY TANKER, BARGE, DOMESTIC & FOREIGN

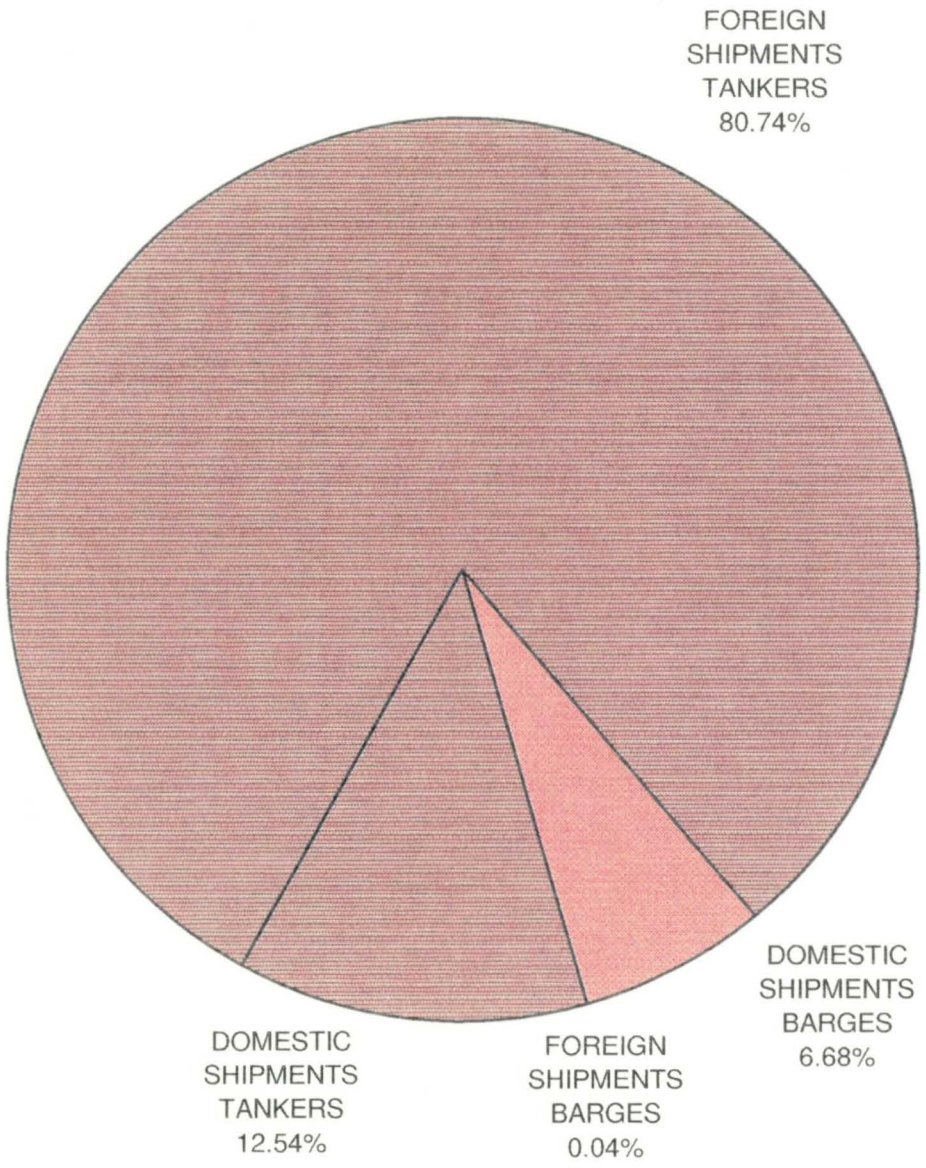


FIGURE 3-4 PERSISTENT OIL TONS SHIPPED - DISTRIBUTED BY PORT

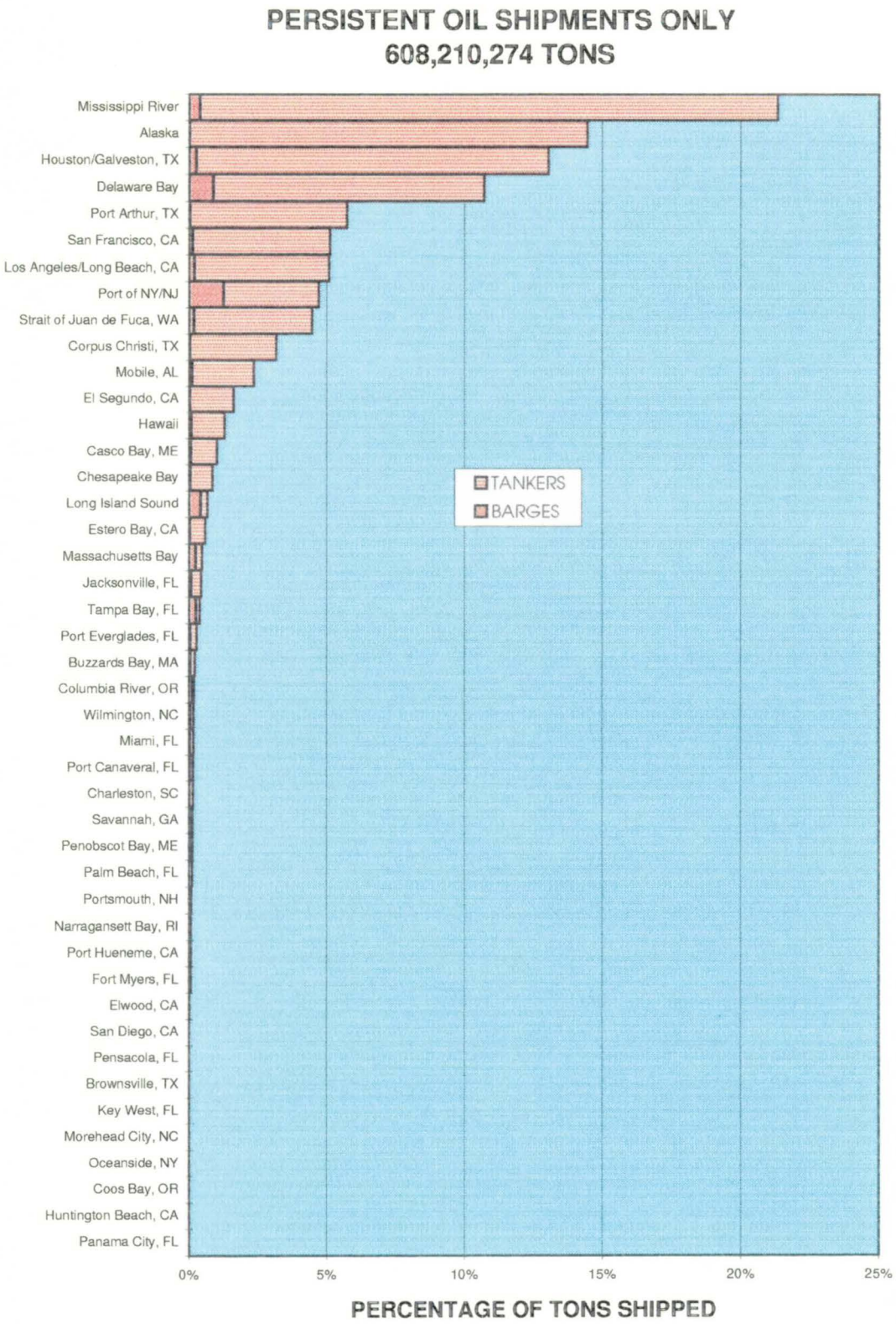


FIGURE 3-5 **NON-PERSISTENT OIL TONS SHIPPED - DISTRIBUTED BY TANKER, BARGE, DOMESTIC & FOREIGN**

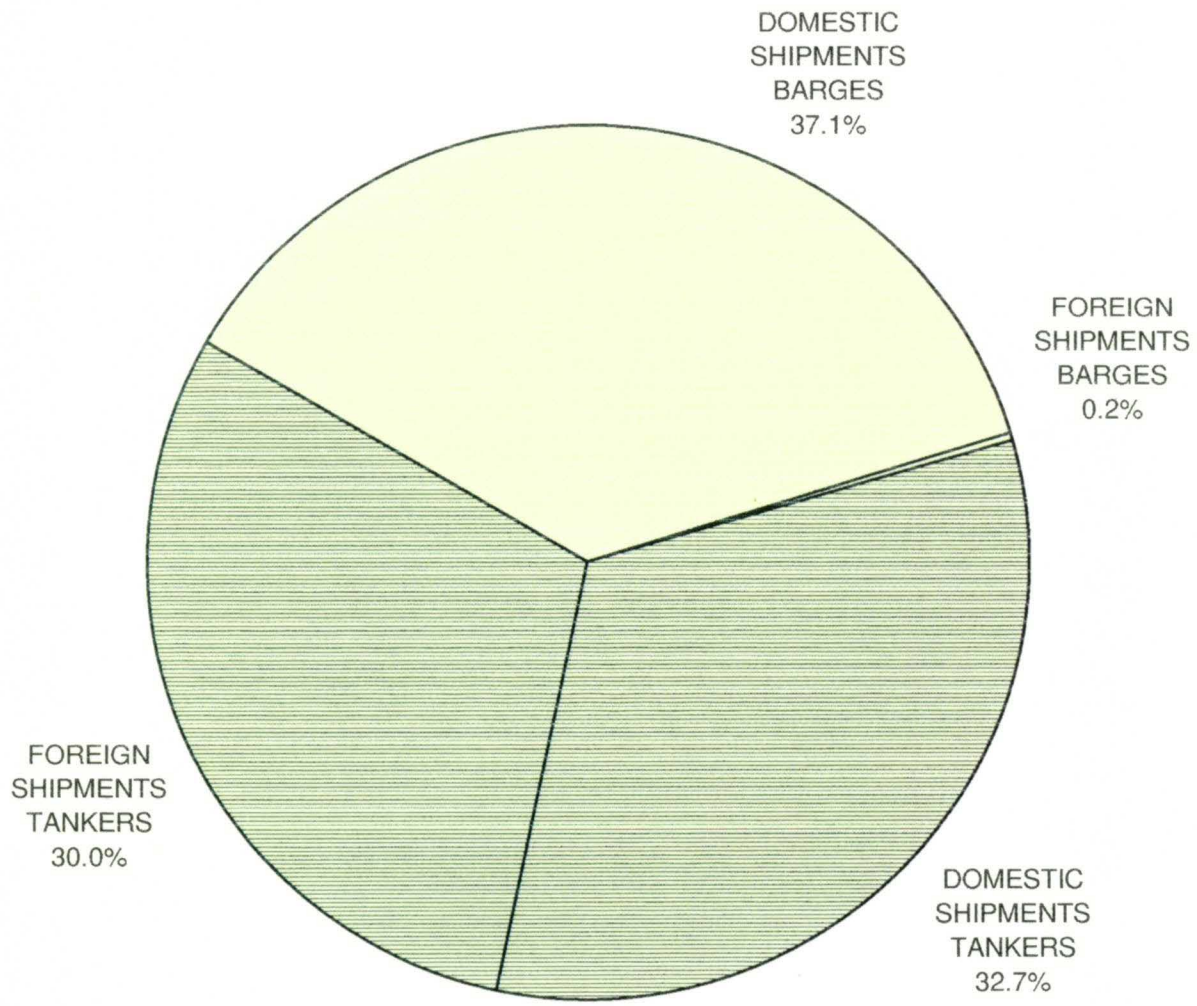


FIGURE 3-6 NON-PERSISTENT OIL TONS SHIPPED - DISTRIBUTED BY PORT

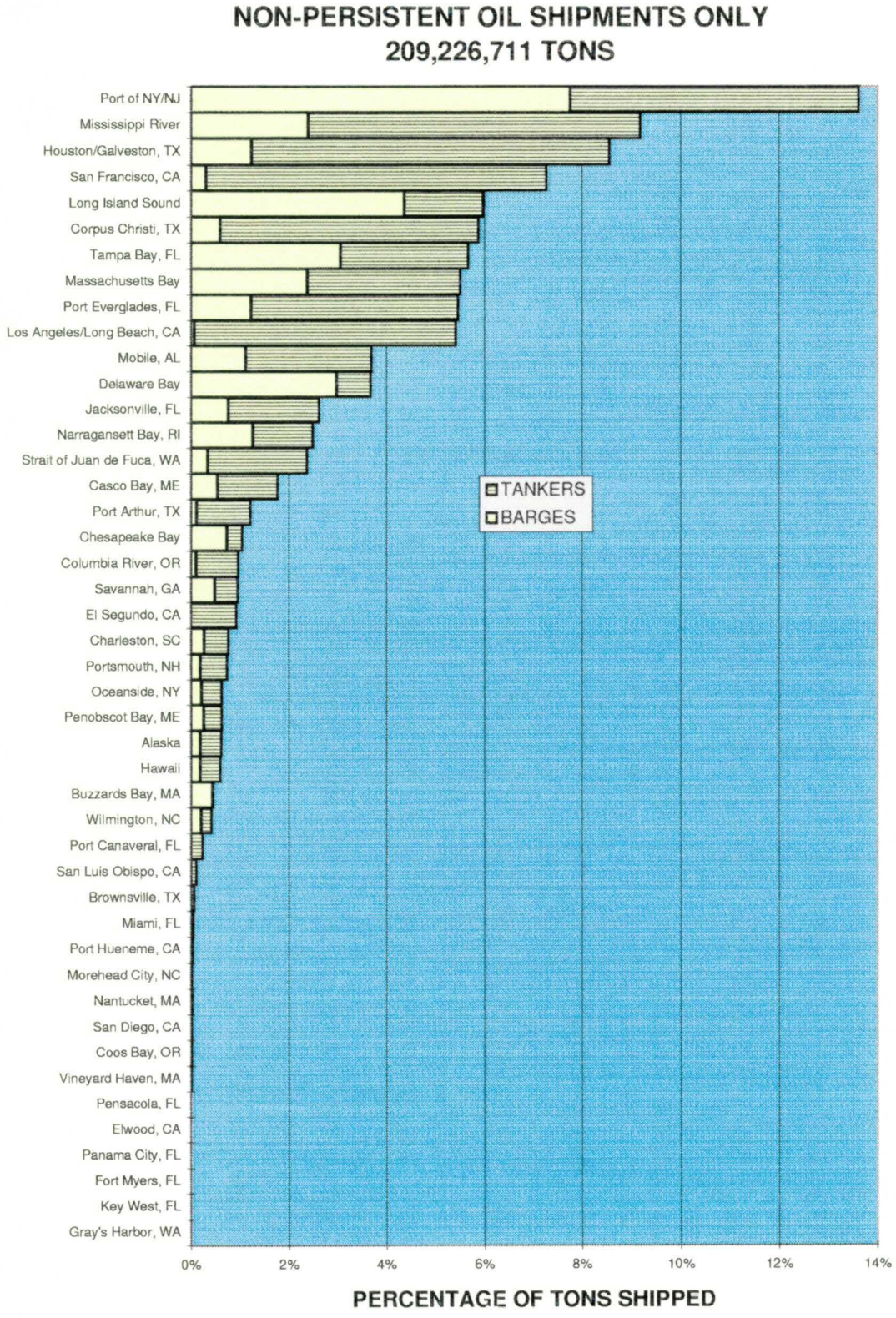


FIGURE 3-7 TANKER SHIPMENT TONS - DISTRIBUTED BY TANKER, BARGE, PERSISTENT, & NON-PERSISTENT

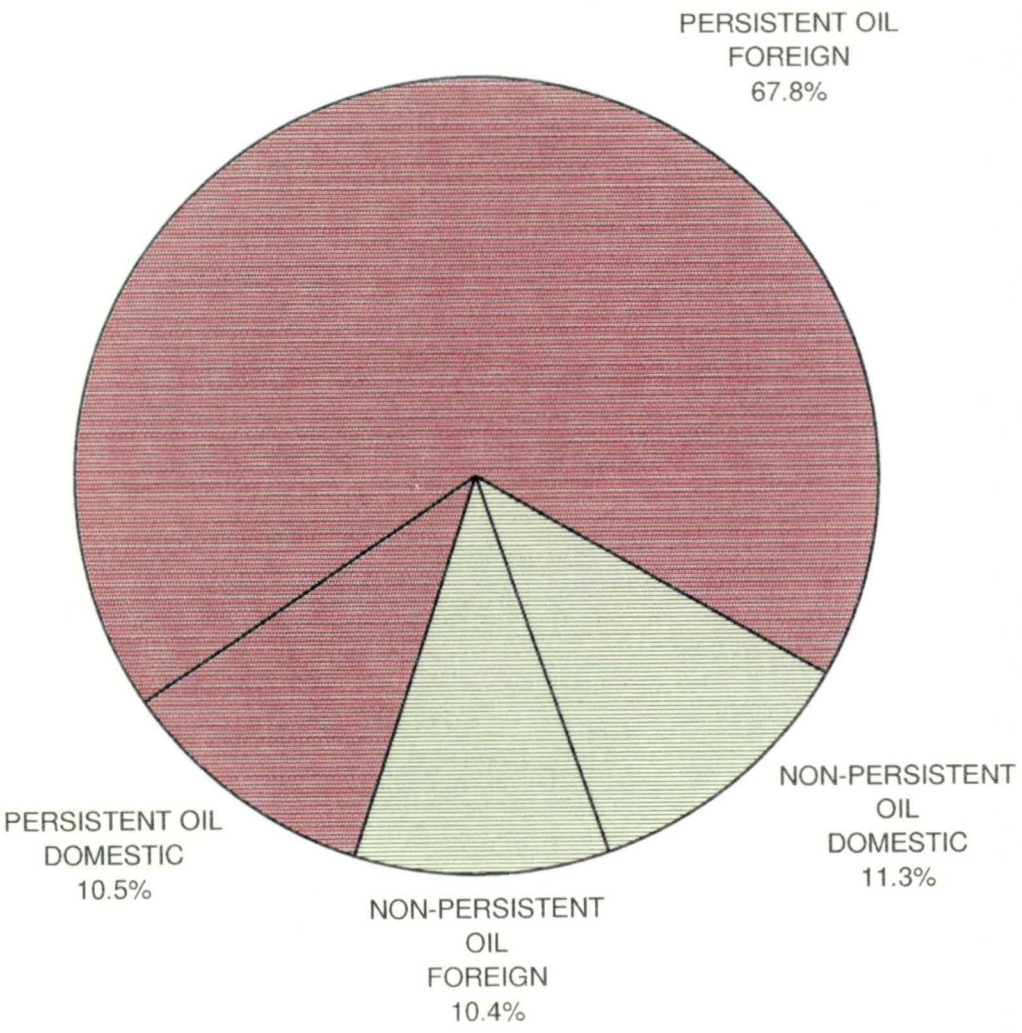


FIGURE 3-8 TANKER SHIPMENT TONS - DISTRIBUTED BY PORT

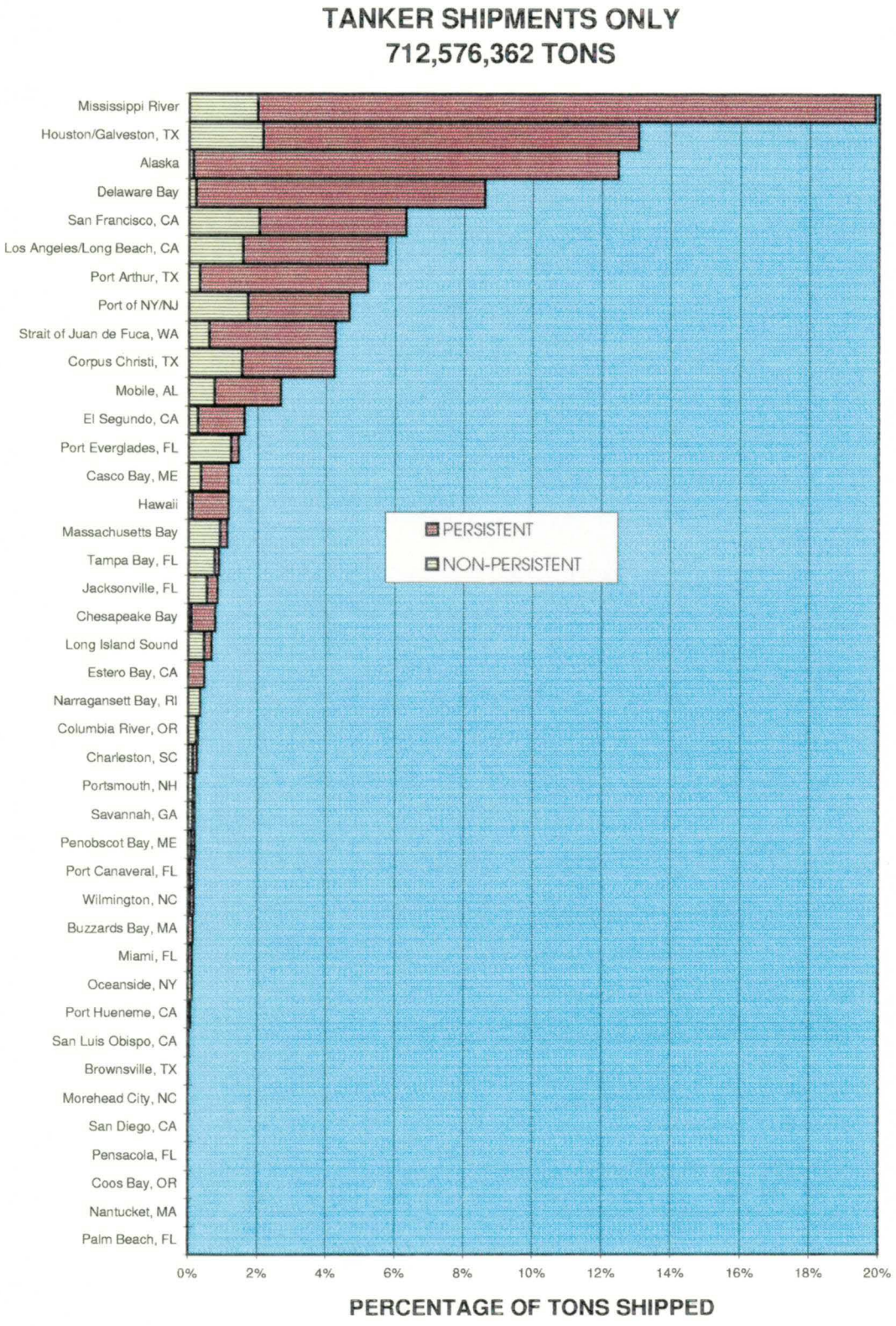


FIGURE 3-9 BARGE SHIPMENT TONS - DISTRIBUTED BY PERSISTENT, NON-PERSISTENT, DOMESTIC & FOREIGN

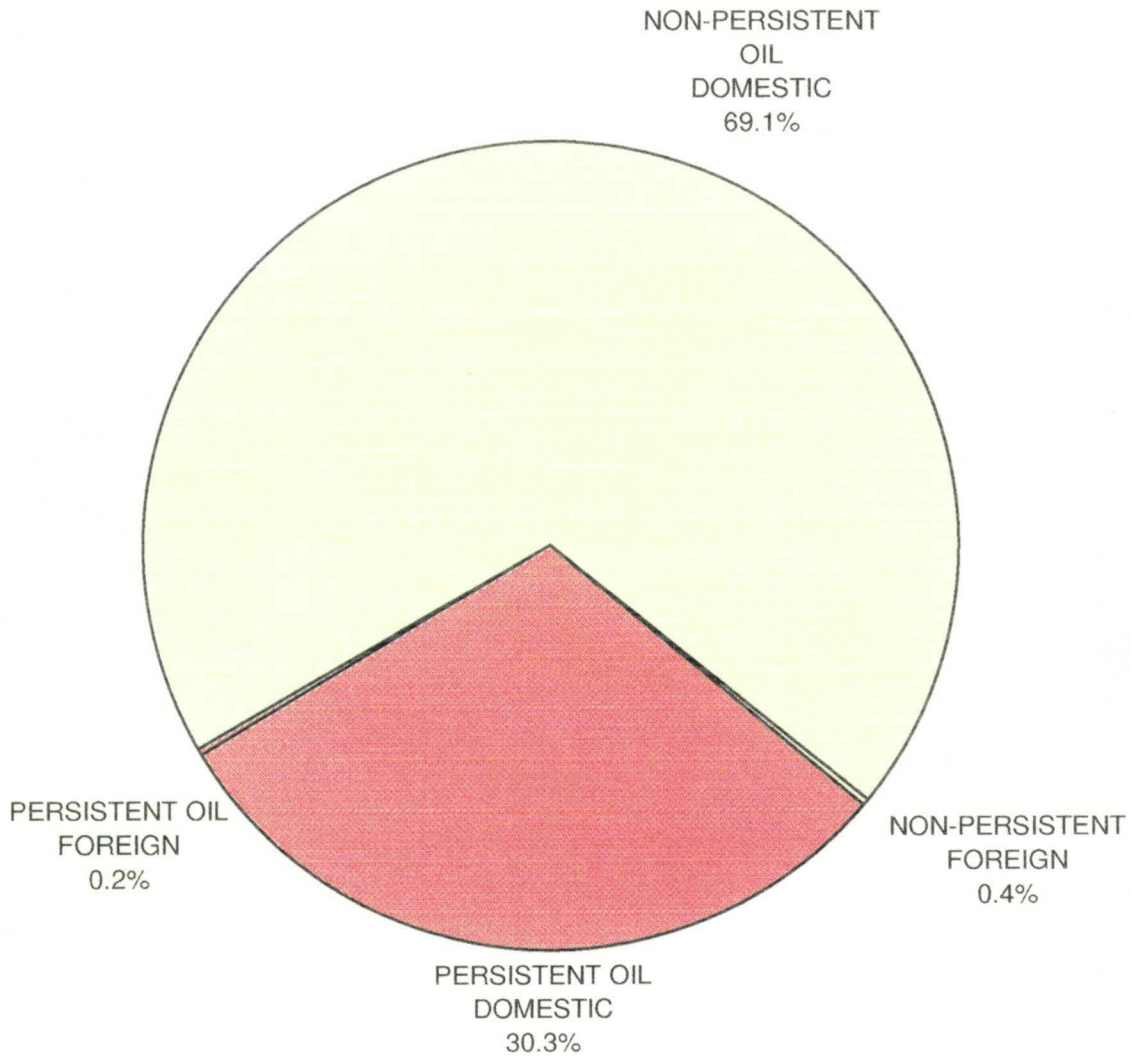


FIGURE 3-10 BARGE SHIPMENT TONS - DISTRIBUTED BY PORT

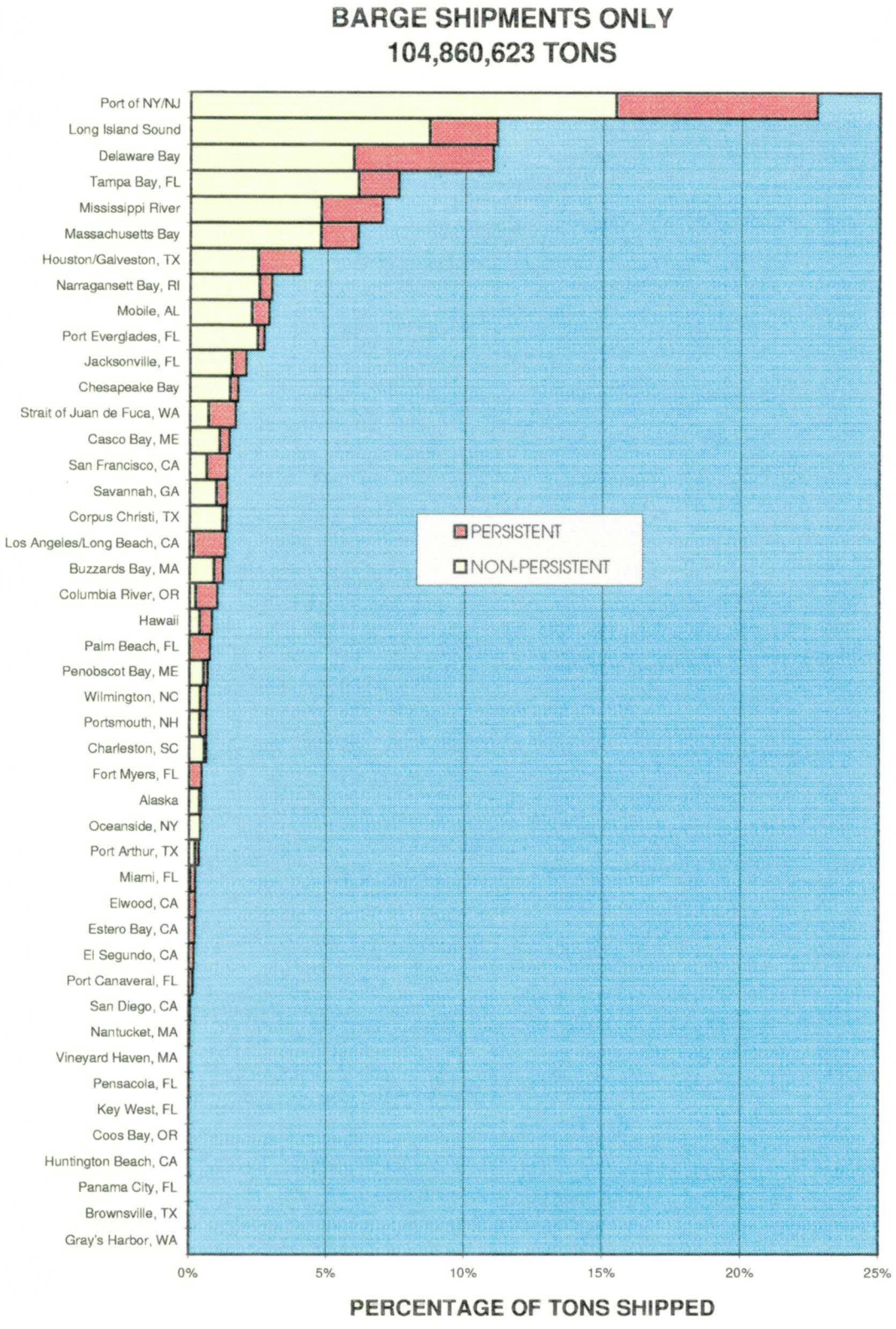


FIGURE 3-11.1 MAJOR SEA LANES FOR OIL SHIPPING ALL PETROLEUM - ATLANTIC COAST

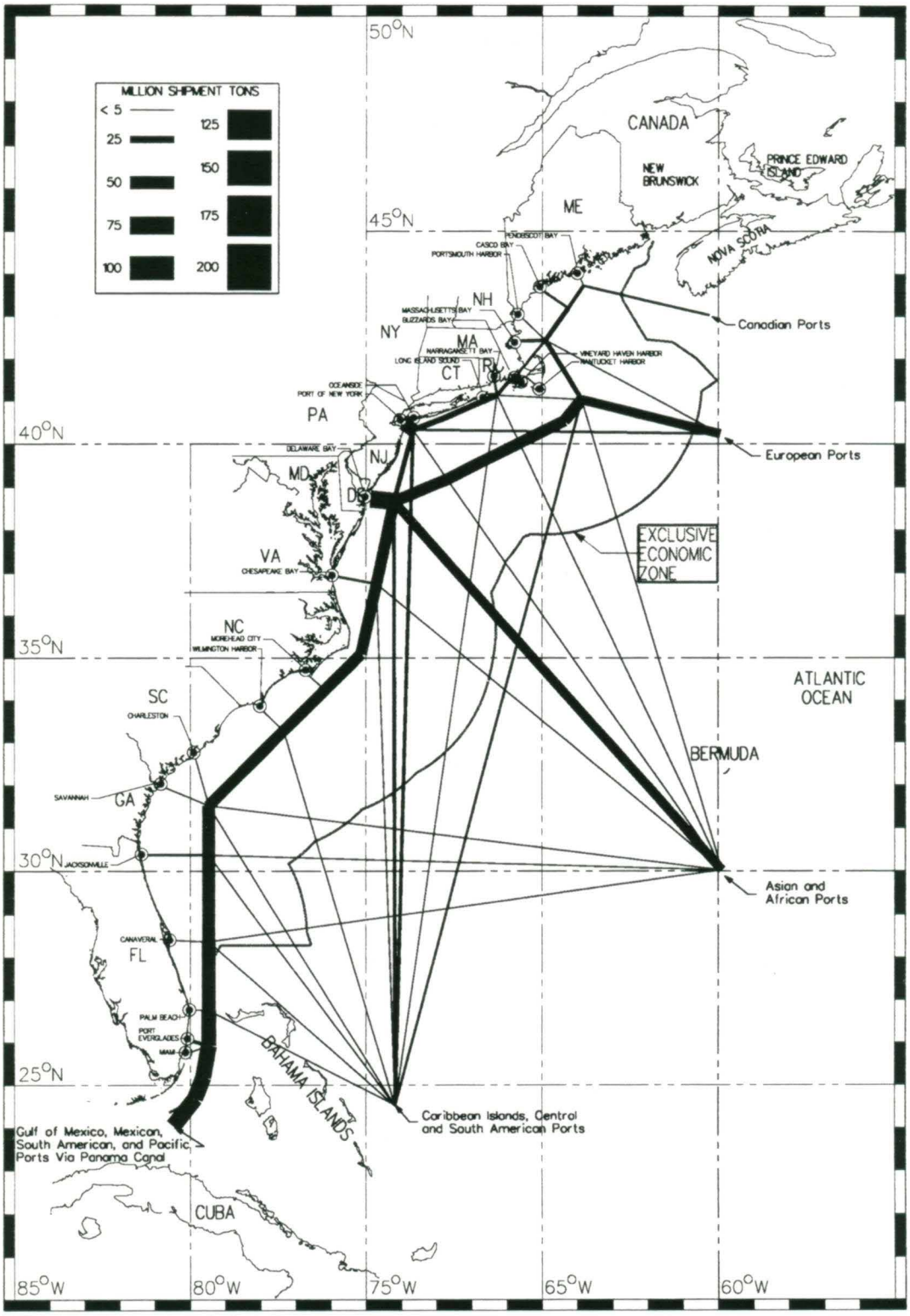


FIGURE 3-11.2 MAJOR SEA LANES FOR OIL SHIPPING
ALL PETROLEUM - GULF OF MEXICO COAST

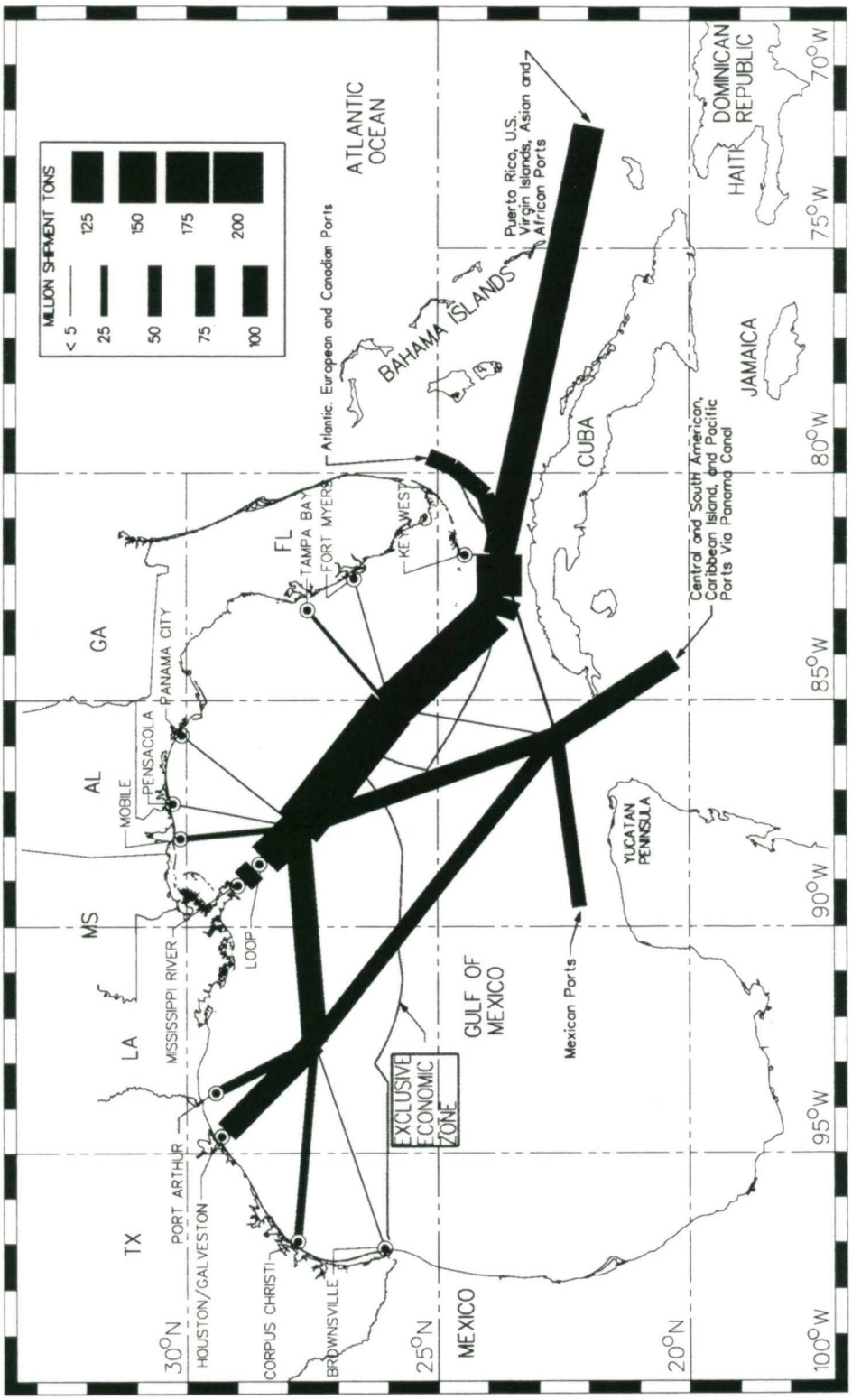
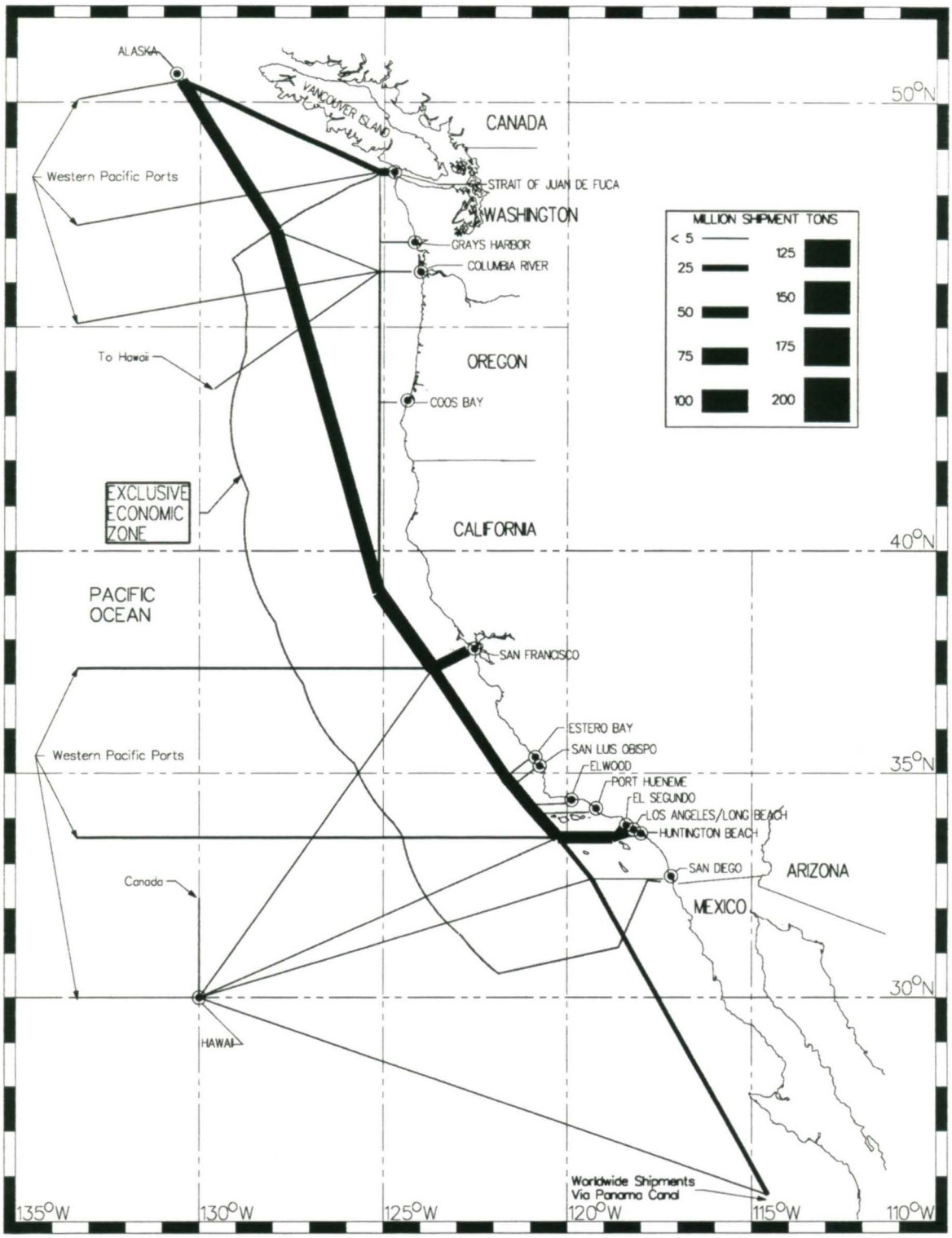


FIGURE 3-11.3 MAJOR SEA LANES FOR OIL SHIPPING ALL PETROLEUM - PACIFIC COAST



4.0 DOMESTIC PETROLEUM SHIPMENTS

Section 4 presents a top level perspective of the aggregate of the total of domestic shipments of persistent oils, non-persistent oils to and from U.S. ports, in total and disaggregated by port. Figures 4-1 through 4-10 are pie and bar charts displaying percent distributions of the tons shipped of persistent oils, non-persistent oils, by tanker and by barge. Figures 4-11.1, 4-11.2, & 4-11.3 are GIS chartlets displaying the major corridors, or sea lanes, used for these oil shipments along the Atlantic, Gulf of Mexico, and Pacific coasts respectively. Tables 4-1 and 4-2 provide tons shipped and Tables 4-3 and 4-4 provide port calls of persistent oils, and non-persistent oils, for each port O-D pair, by direction, and by vessel type.

The pie chart in Section 4 represent the total tons shipped between pairs of U.S. ports (including Puerto Rico and The U.S. Virgin Islands). The bar chart in Section 4 represent total tons of domestic shipments moving in vessels on the waterways of each port. The pie chart counts each O-D shipment ***once*** (including internal port traffic and transshipments). The bar chart represents the sum of inbound and outbound traffic on the waters of the port (also including the internal port traffic and the outbound as well as inbound transshipments). The bar chart totals are ***not*** double the pie chart totals, because the internal and transshipment portion of the pie chart totals must be counted only once.

FIGURE 4-1 DOMESTIC SHIPMENT TONS - DISTRIBUTED BY TANKER, BARGE, PERSISTENT & NON-PERSISTENT

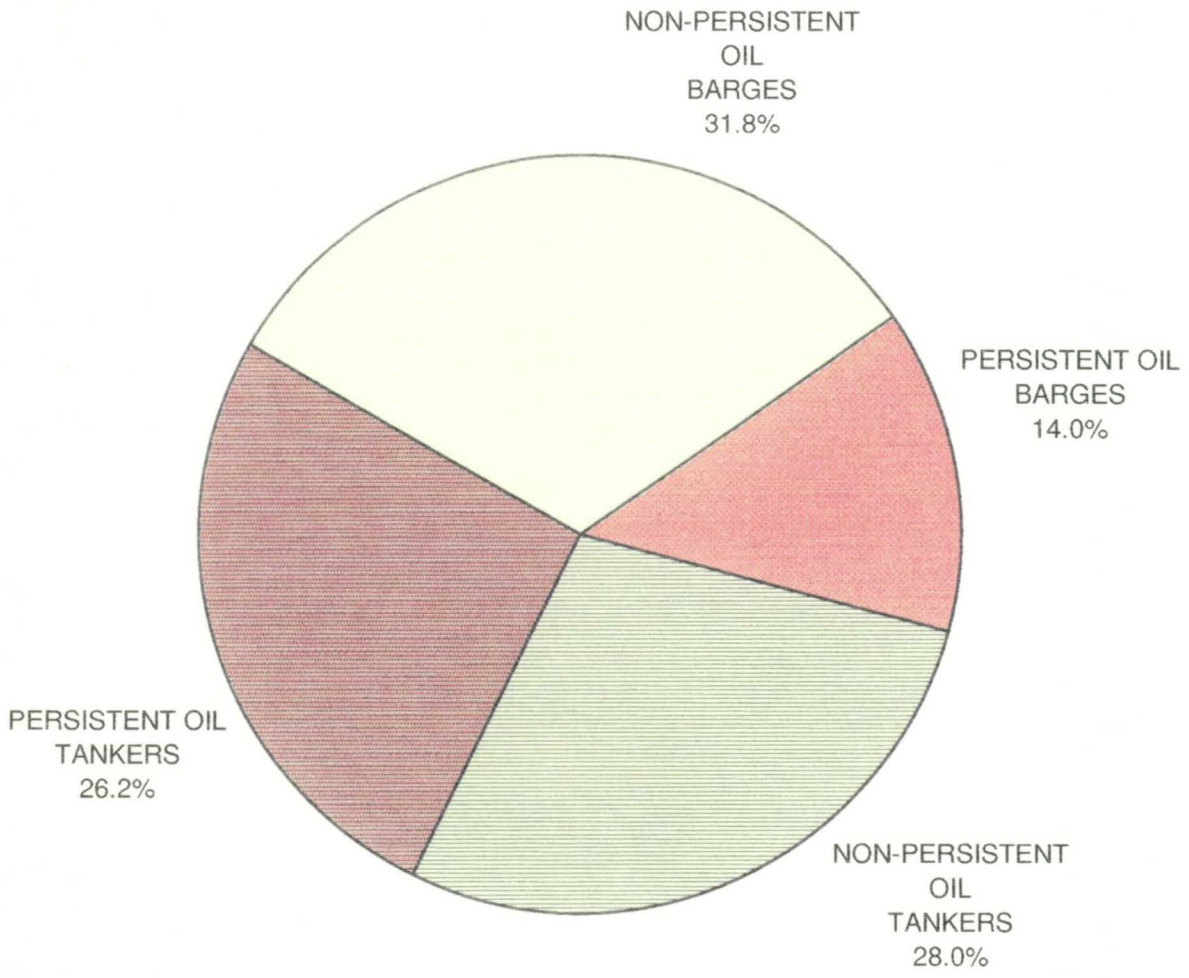


FIGURE 4-2 DOMESTIC SHIPMENT TONS - DISTRIBUTED BY PORT

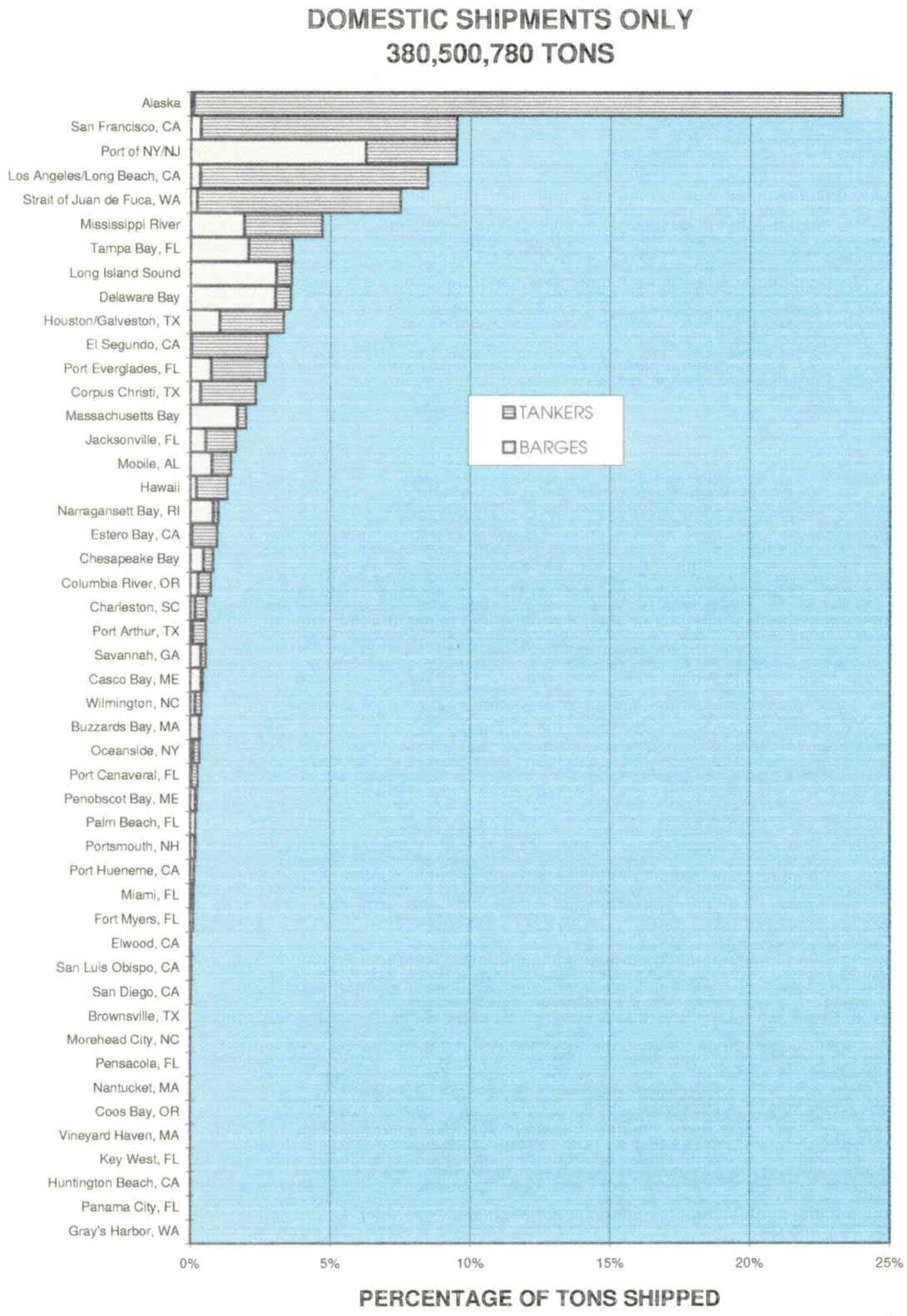


FIGURE 4-3.1 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING PERSISTENT OILS ONLY - ATLANTIC COAST

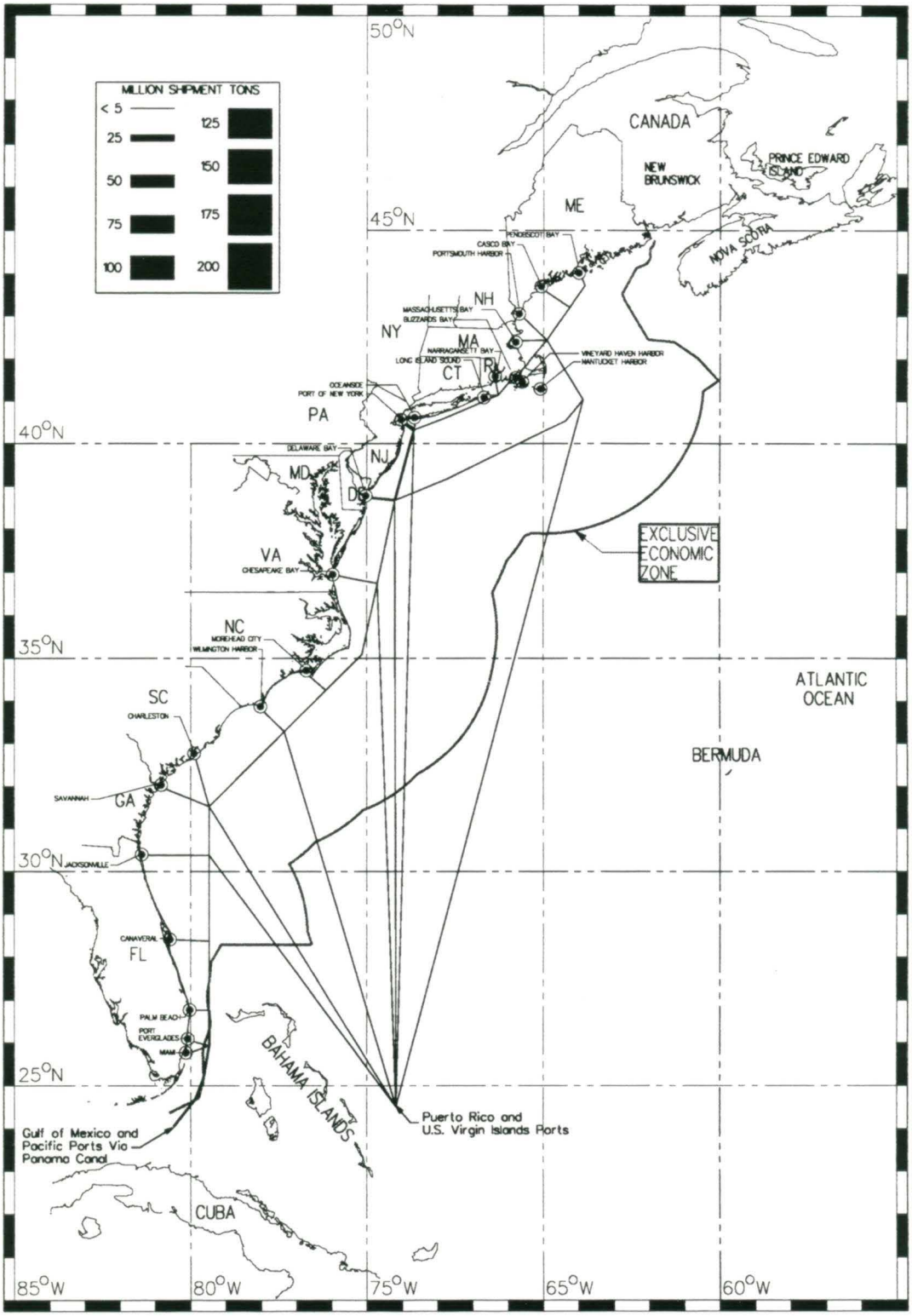


FIGURE 4-3.2 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING PERSISTENT OILS ONLY - GULF OF MEXICO COAST

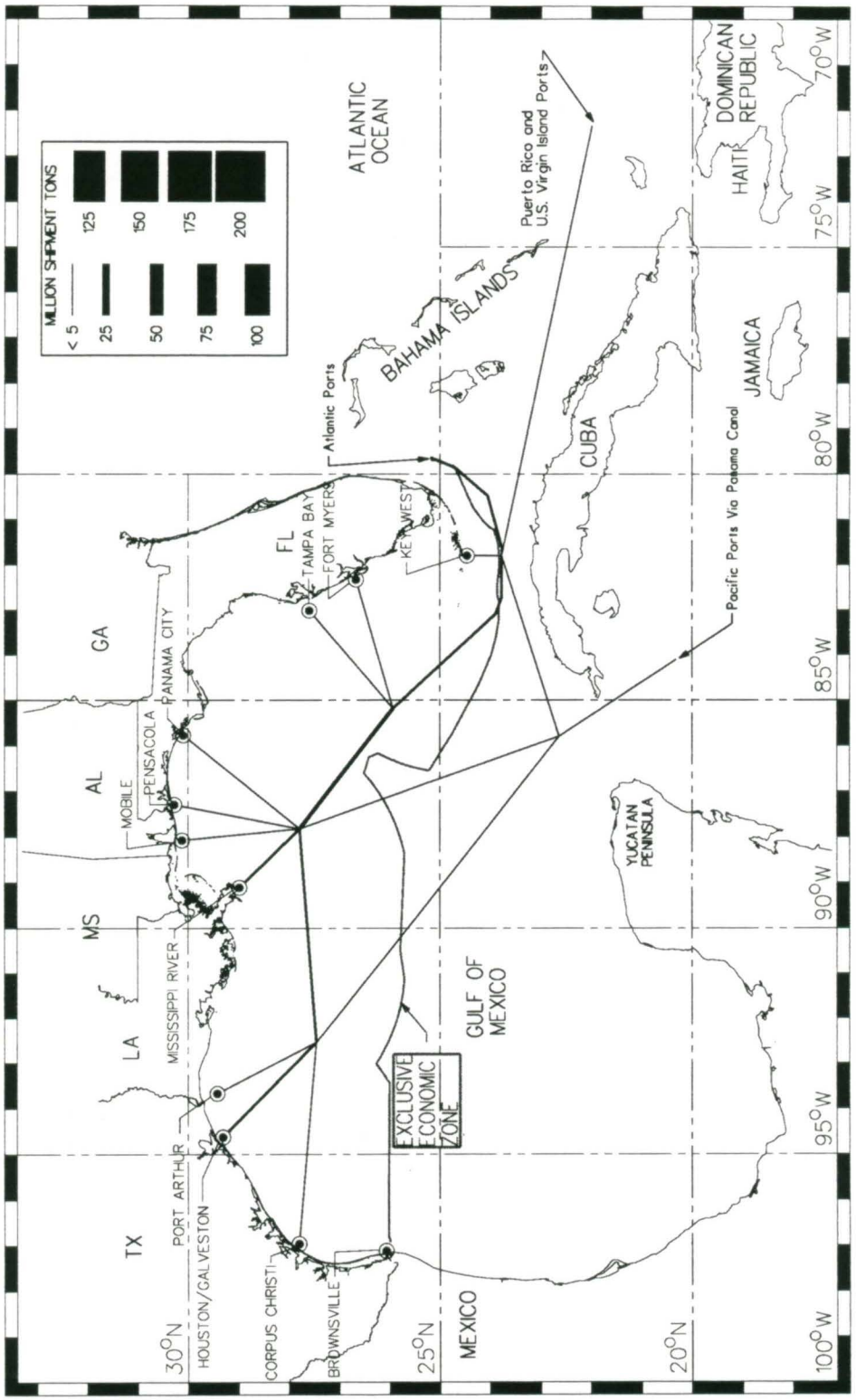


FIGURE 4-3.3 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING PERSISTENT OILS ONLY - PACIFIC COAST

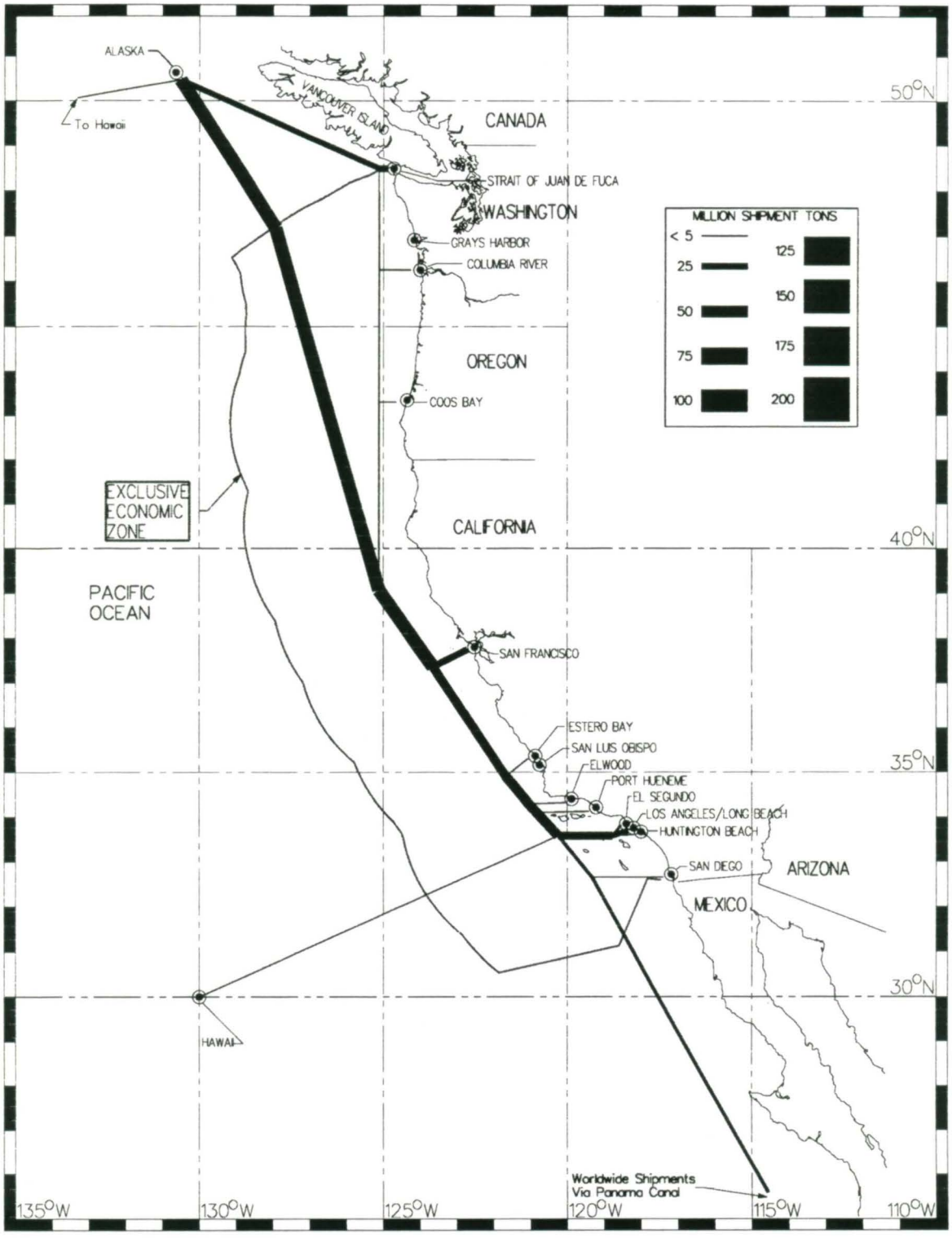


FIGURE 4-4.1 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING NON-PERSISTENT OILS ONLY - ATLANTIC COAST

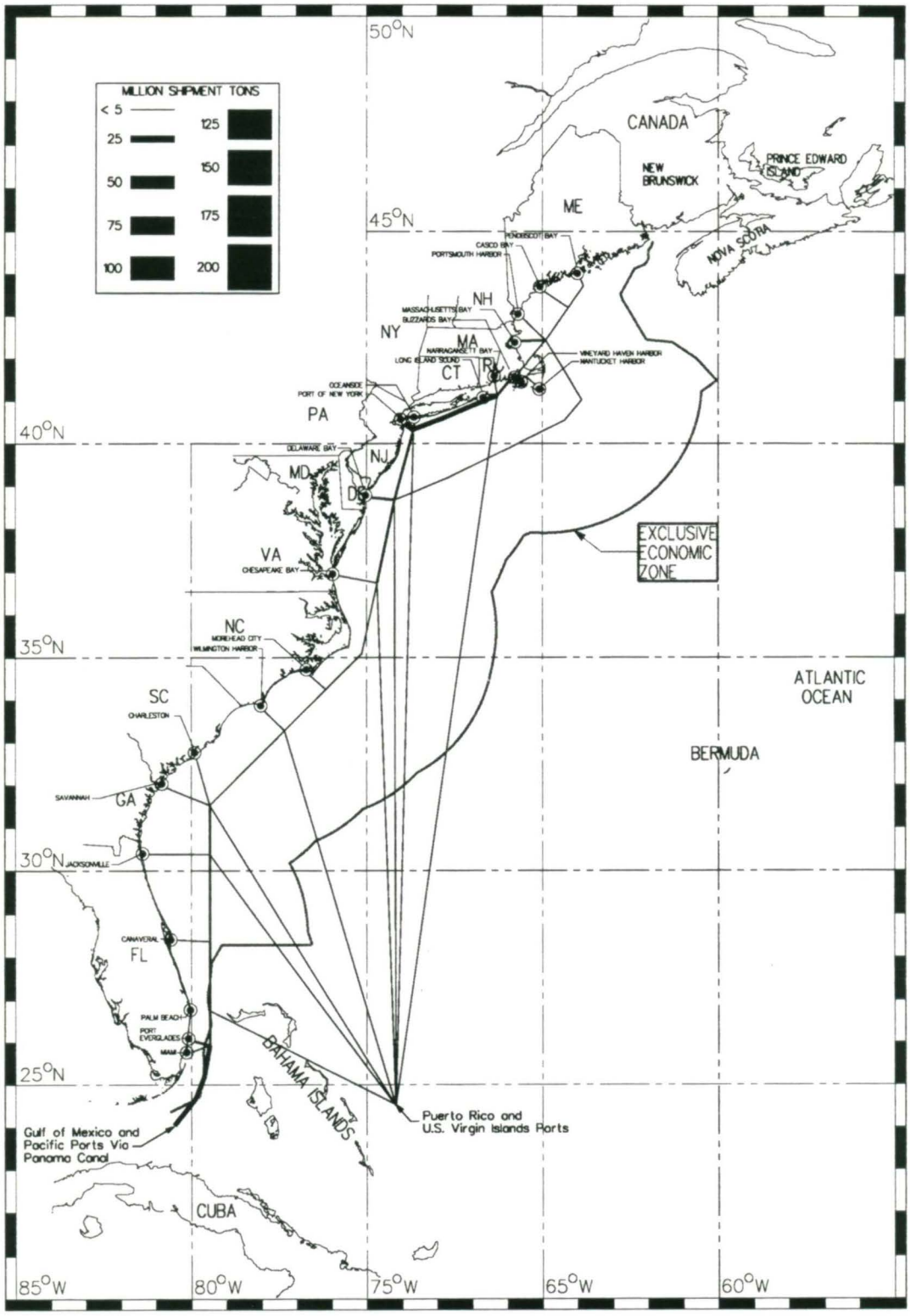


FIGURE 4-4.2 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING NON-PERSISTENT OILS ONLY - GULF OF MEXICO COAST

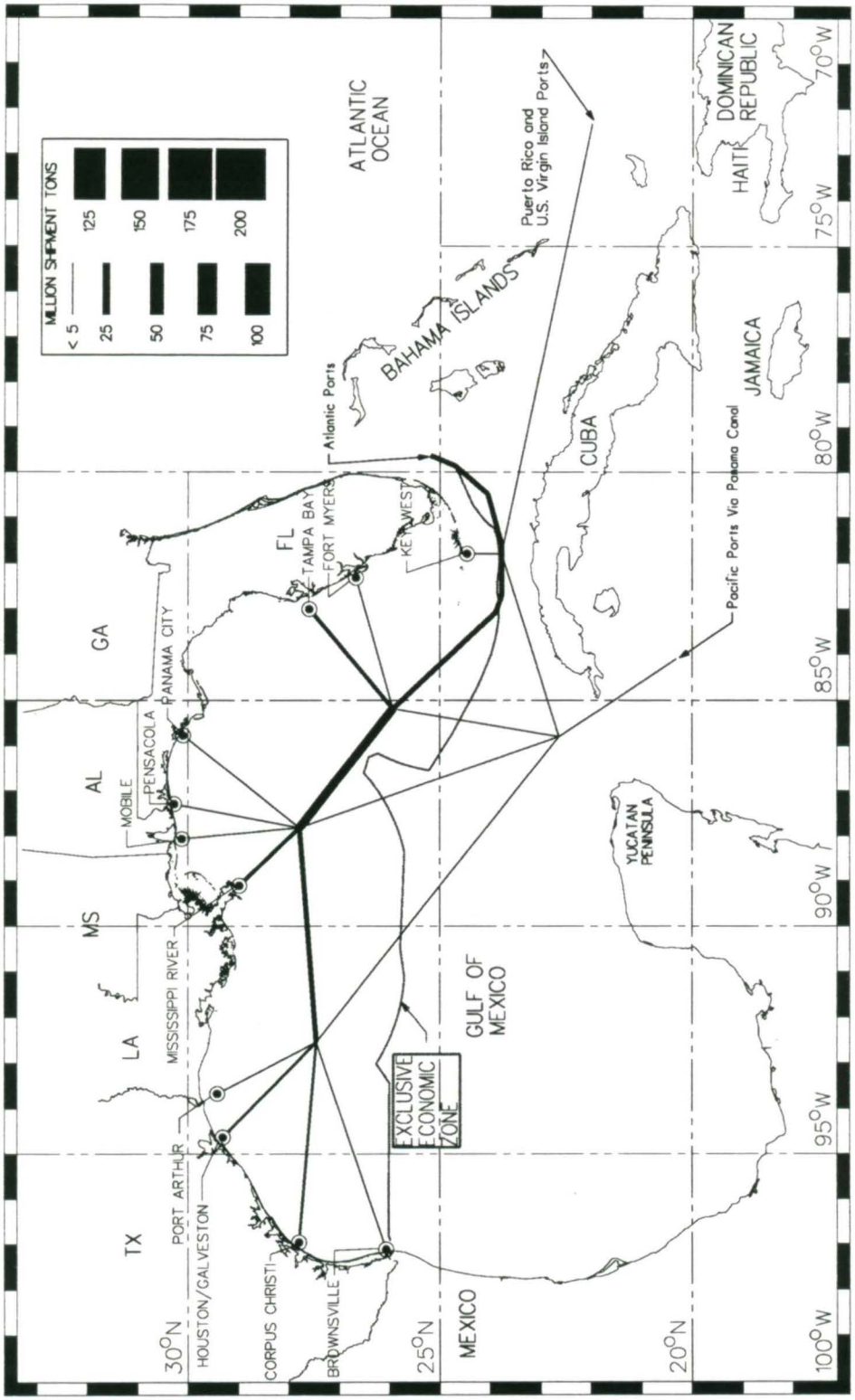


FIGURE 4-4.3 MAJOR SEA LANES FOR DOMESTIC OIL SHIPPING NON-PERSISTENT OILS ONLY - PACIFIC COAST

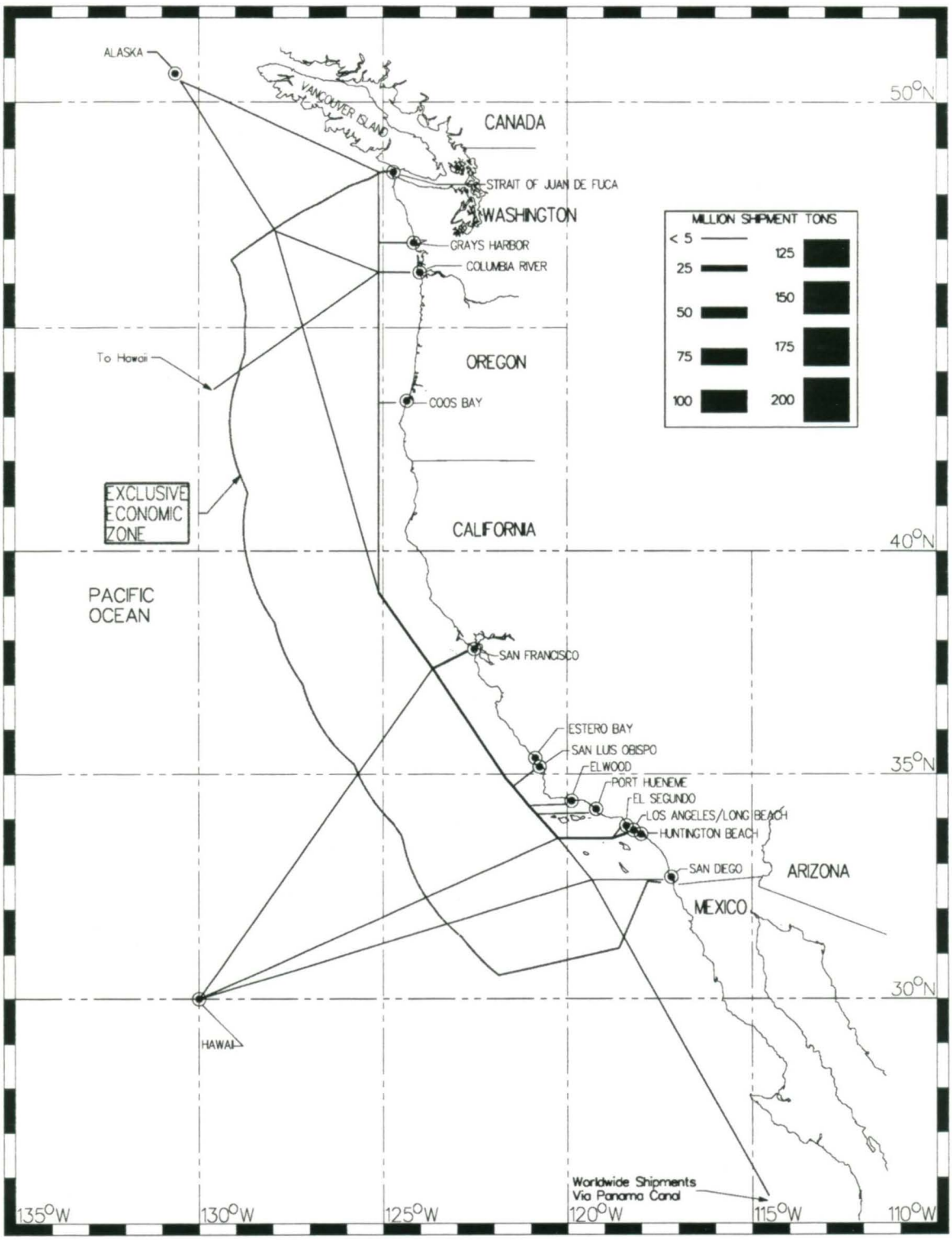


TABLE 4-1 U.S. DOMESTIC PETROLEUM SHIPMENTS - OUTBOUND - 1993 TONS BY PORT

Table 4-1 has 43 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

TABLE 4-2 U.S. DOMESTIC PETROLEUM SHIPMENTS - INBOUND - 1993 TONS BY PORT

Table 4-2 has 48 pages, and it is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

TABLE 4-3 U.S. DOMESTIC PETROLEUM VESSEL TRAFFIC - OUTBOUND - 1993 PORT CALLS BY PORT

Table 4-3 has 41 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

TABLE 4-4 U.S. DOMESTIC PETROLEUM VESSEL TRAFFIC - INBOUND - 1993 PORT CALLS BY PORT

Table 4-4 has 47 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

5.0 FOREIGN IMPORT & EXPORT PETROLEUM SHIPMENTS

Section 5 presents a top level perspective of the aggregate of the total of U.S. foreign import and export shipments of persistent oils, non-persistent oils to and from U.S. ports, in total and disaggregated by port. Figures 5-1 through 5-10 are pie and bar charts displaying percent distributions of the tons shipped of persistent oils, non-persistent oils, by tanker and by barge. Figures 5-11.1, 5-11.2, & 5-11.3 are GIS chartlets displaying the major corridors, or sea lanes, used for these oil shipments along the Atlantic, Gulf of Mexico, and Pacific coasts respectively. Tables 5-1 and 5-2 provide tons shippped and Tables 5-3 and 5-4 provide port calls of persistent oils, and non-persistent oils, for each port O-D pair, by direction, and by vessel type.

FIGURE 5-1 **U.S. FOREIGN SHIPMENT TONS - DISTRIBUTED BY TANKER, BARGE, PERSISTENT, & NON-PERSISTENT**

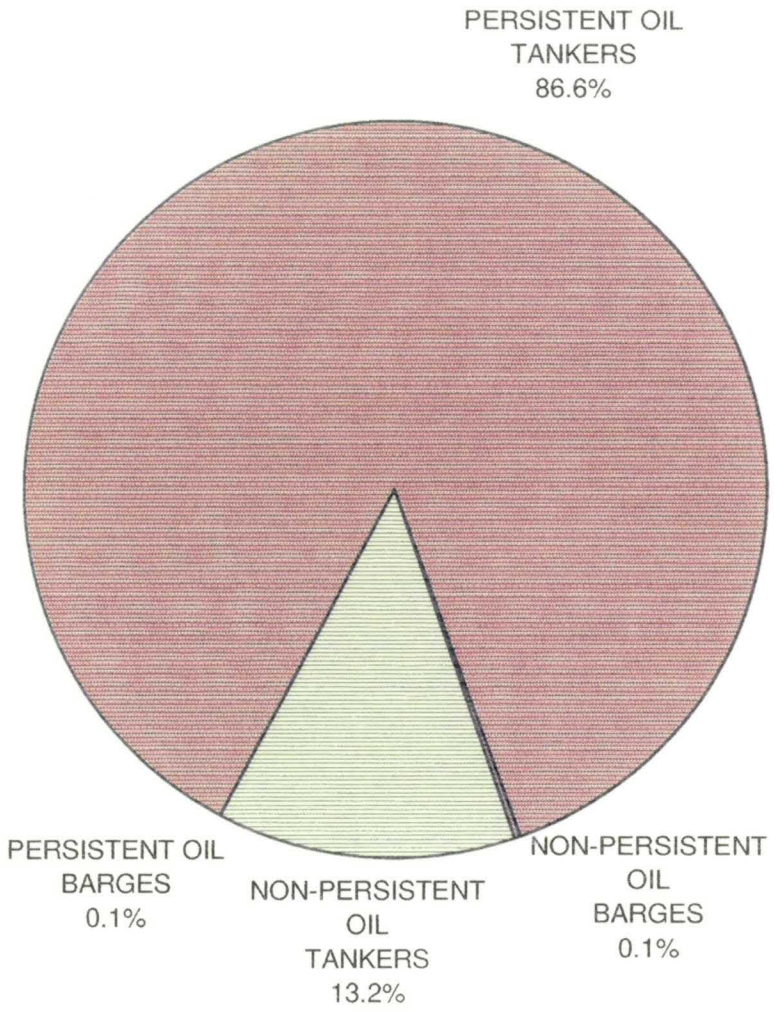


FIGURE 5-2 U.S. FOREIGN SHIPMENT TONS - DISTRIBUTED BY PORT

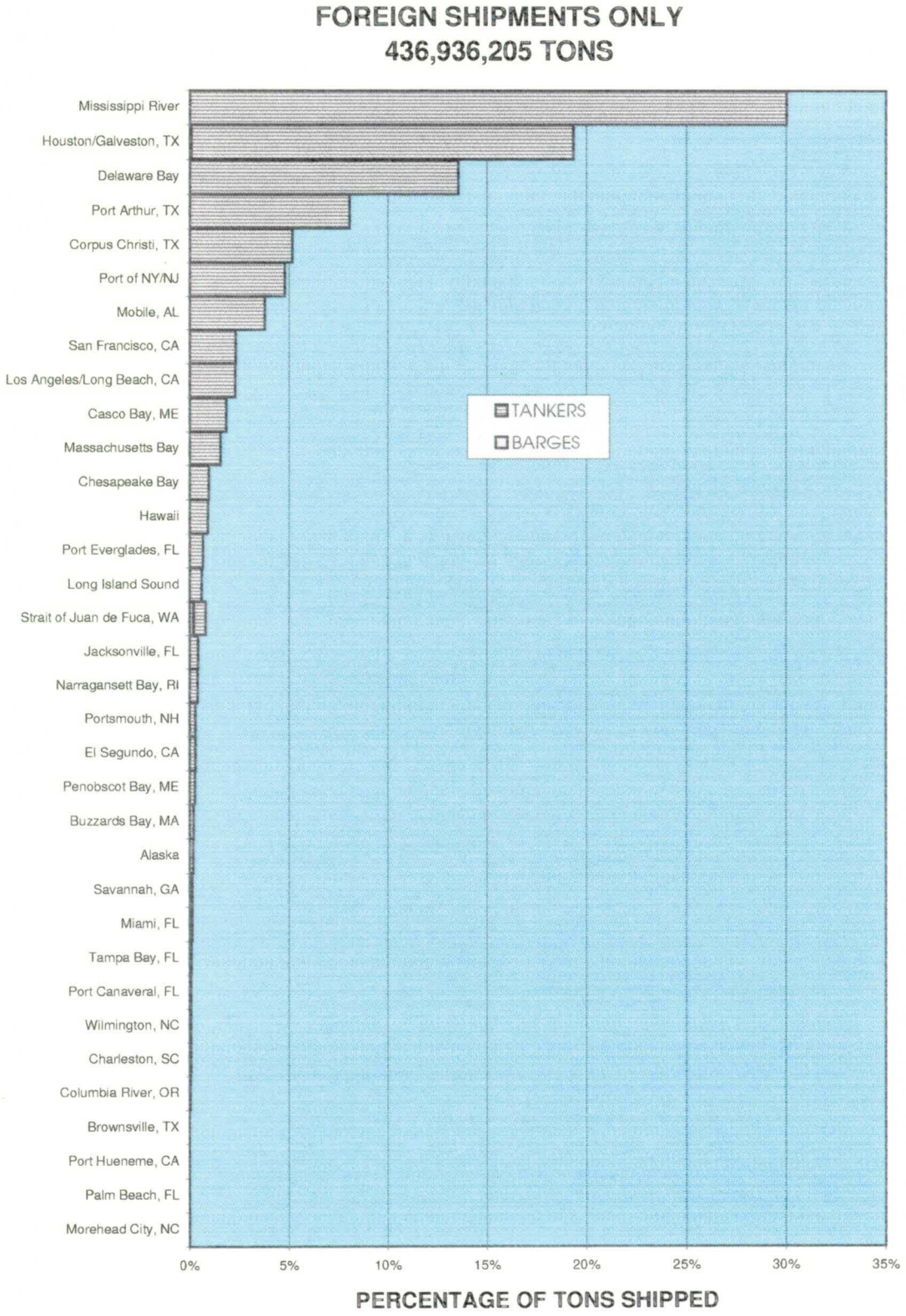


FIGURE 5-3.1 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING PERSISTENT OILS ONLY - ATLANTIC COAST

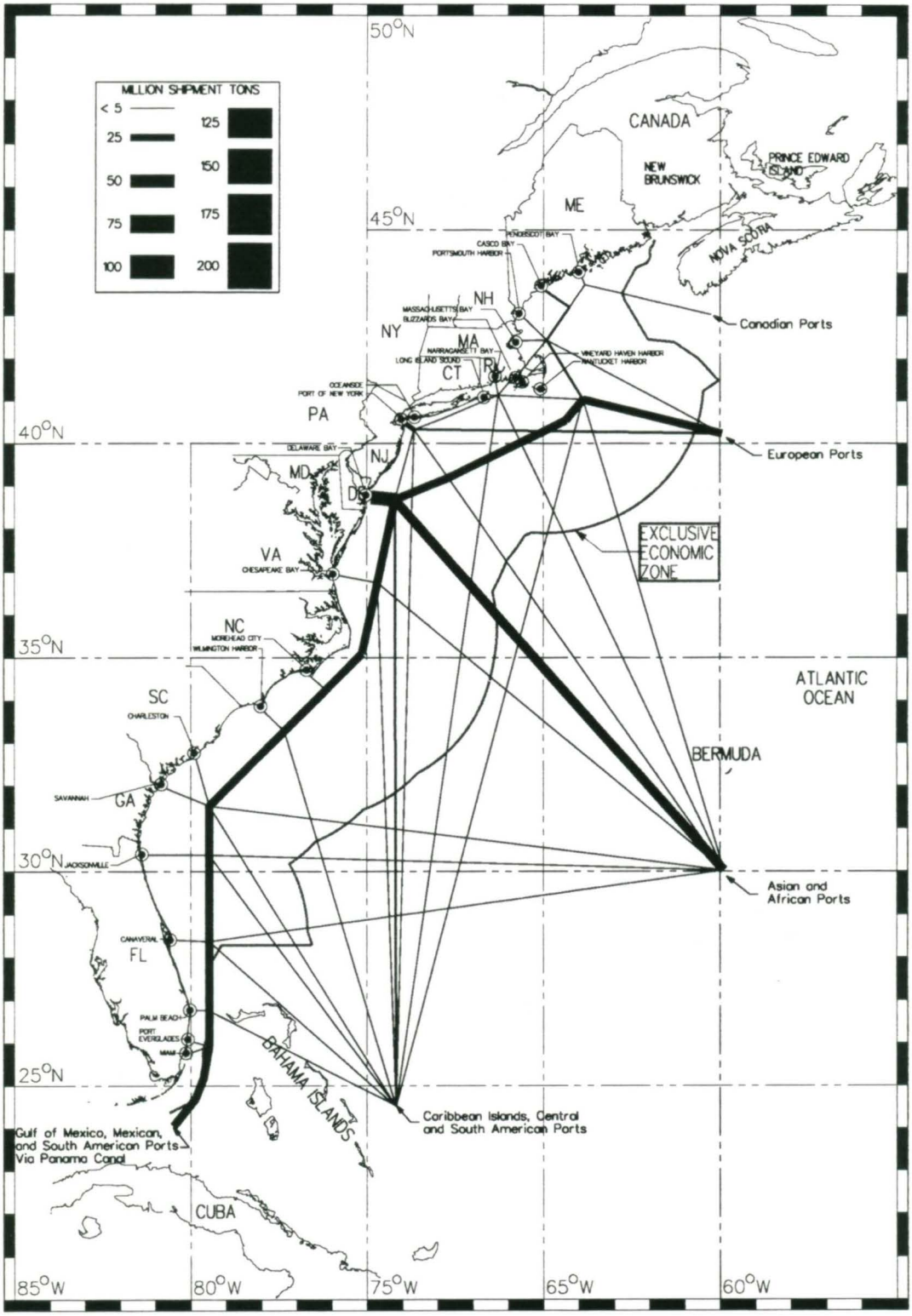


FIGURE 5-3.2 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING PERSISTENT OILS ONLY - GULF OF MEXICO COAST

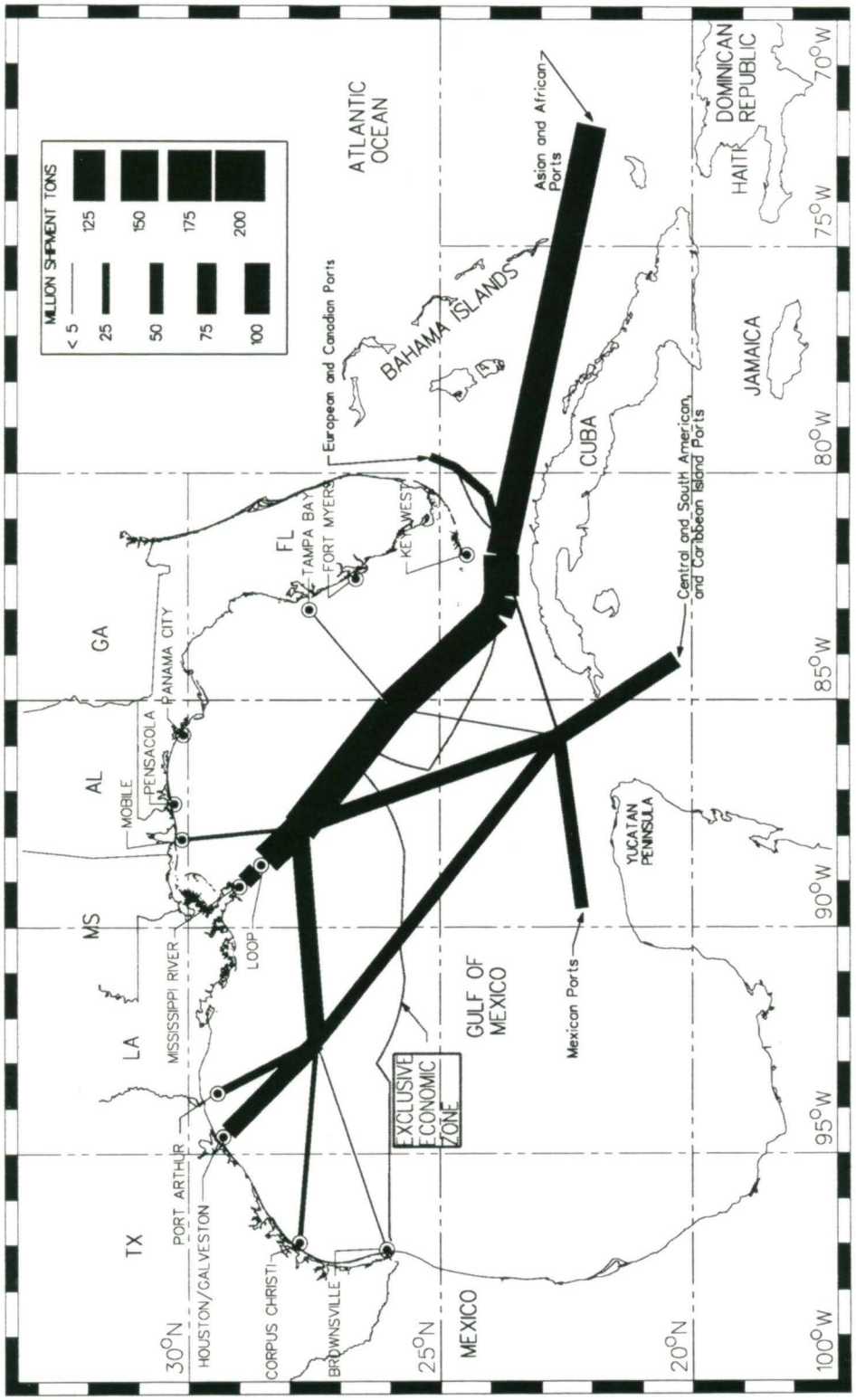


FIGURE 5-3.3 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING PERSISTENT OILS ONLY - PACIFIC COAST

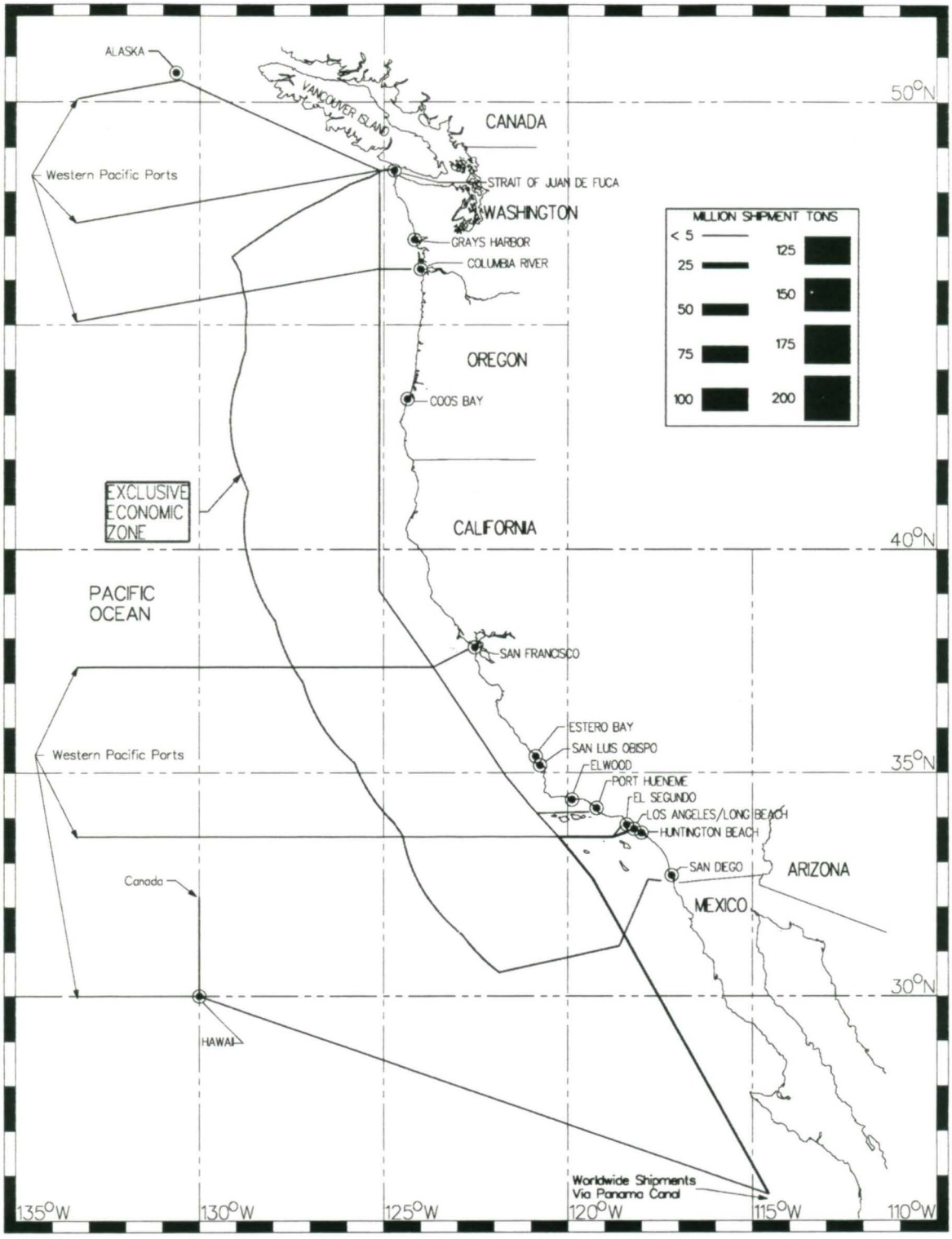


FIGURE 5-4.1 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING NON-PERSISTENT OILS ONLY - ATLANTIC COAST

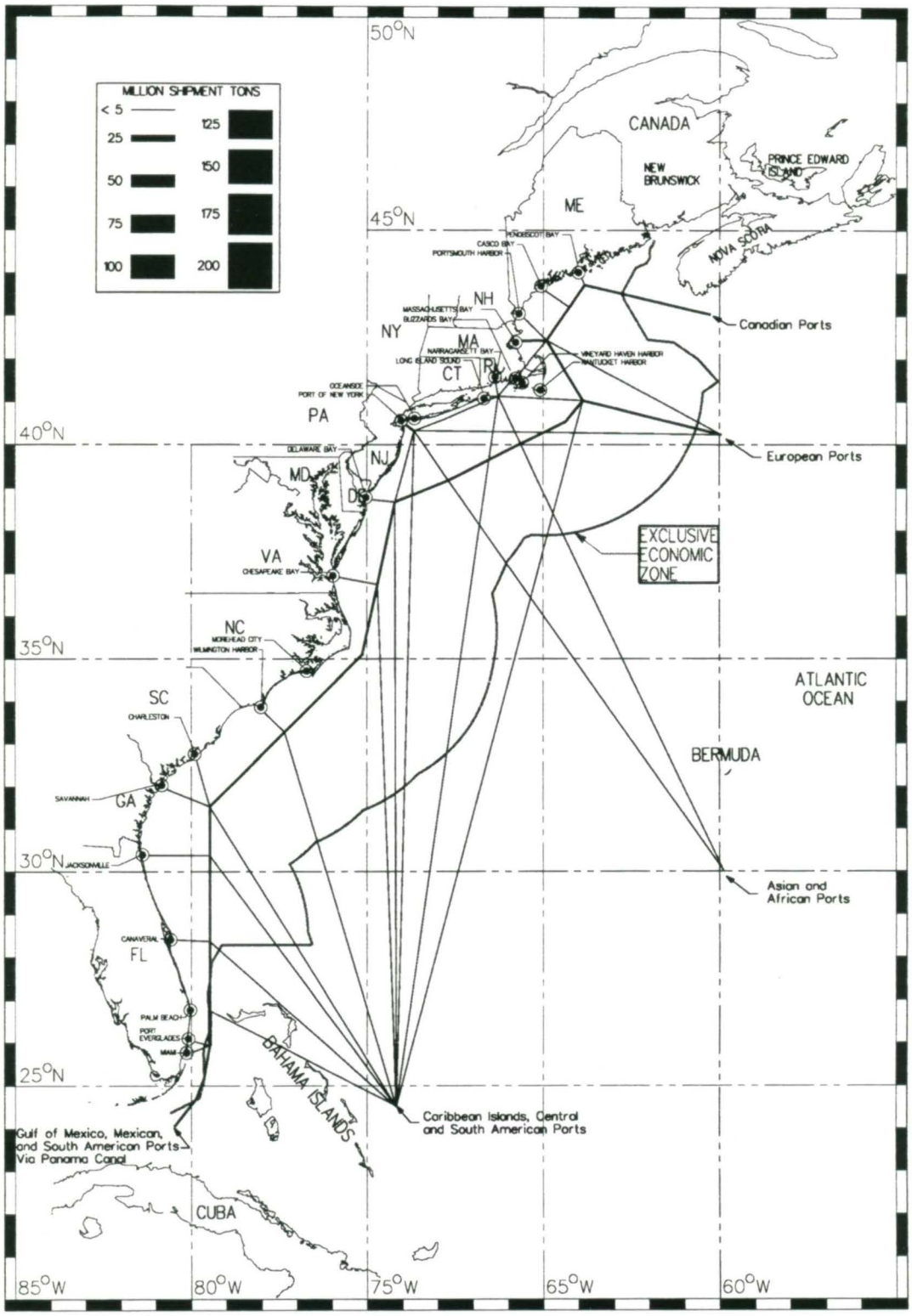


FIGURE 5-4.2 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING NON-PERSISTENT OILS ONLY - GULF OF MEXICO COAST

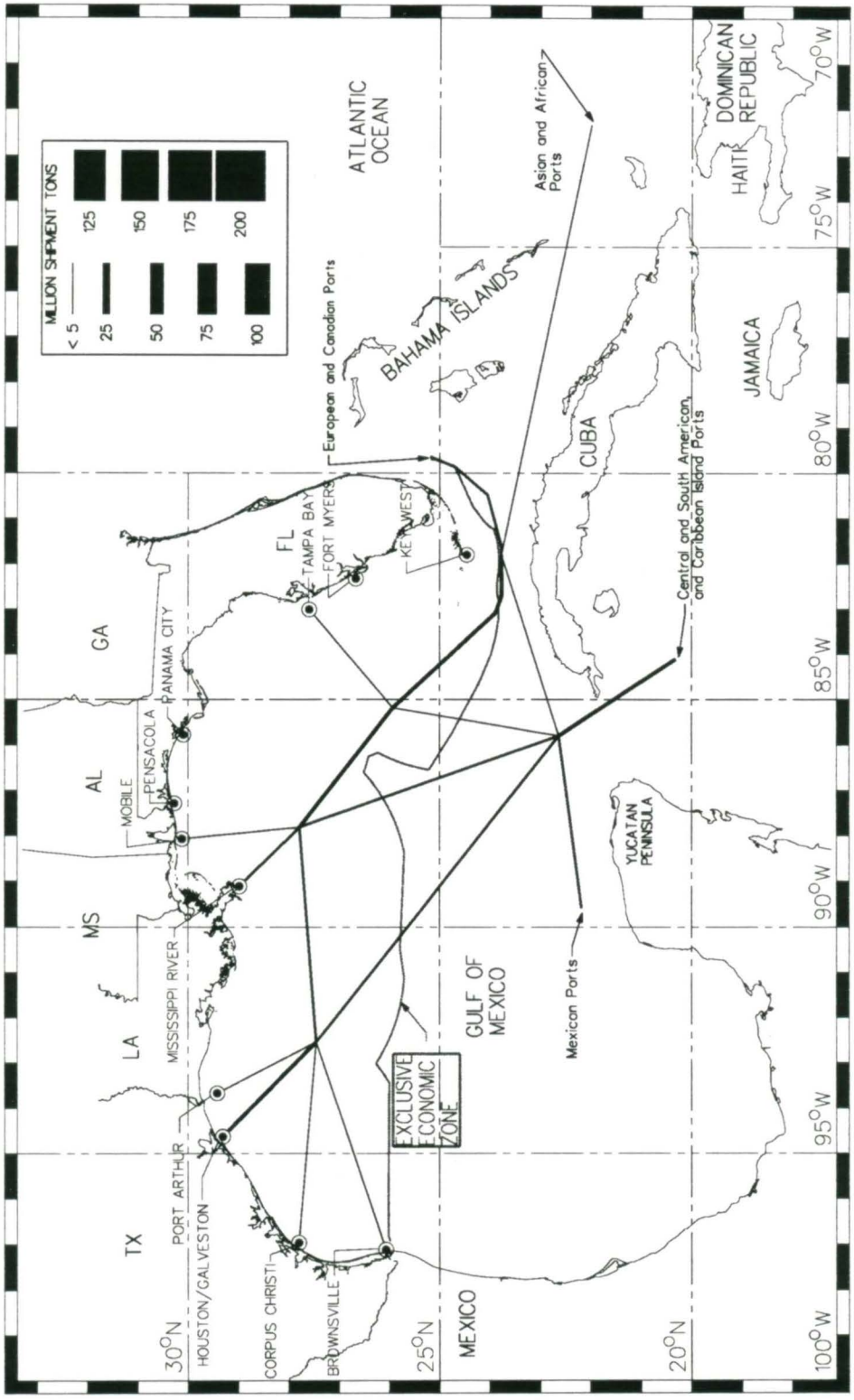


FIGURE 5-4.3 MAJOR SEA LANES FOR U.S. FOREIGN OIL SHIPPING NON-PERSISTENT OILS ONLY - PACIFIC COAST

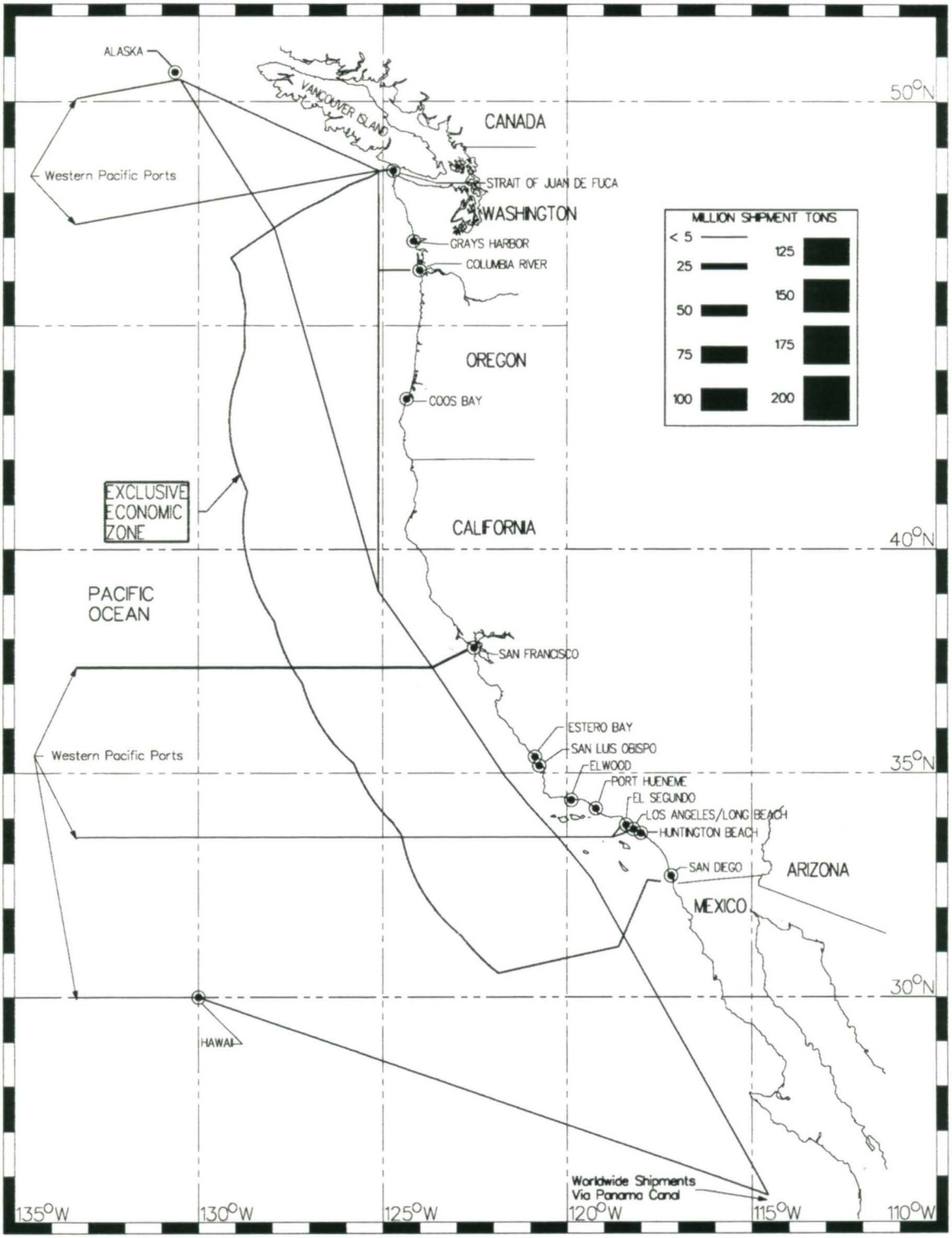


TABLE 5-1 U.S. FOREIGN EXPORT SHIPMENTS OF PETROLEUM 1993 TONS BY PORT

Table 5-1 has 28 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Casco Bay, ME and ending with Hawaii.

TABLE 5-2 U.S. FOREIGN IMPORT SHIPMENTS OF PETROLEUM 1993 TONS BY PORT

Table 5-2 has 48 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

TABLE 5-3 U.S. FOREIGN EXPORT PETROLEUM VESSEL TRAFFIC 1993 PORT CALLS BY PORT

Table 5-3 has 28 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Casco Bay, ME and ending with Hawaii.

TABLE 5-4 U.S. FOREIGN IMPORT PETROLEUM VESSEL TRAFFIC 1993 PORT CALLS BY PORT

Table 5-4 has 48 pages, and is bound separately. It lists origin ports (or port groups) of the Atlantic, Gulf of Mexico and Pacific from the north east to the north west beginning with Penobscott Bay, ME and ending with Hawaii.

APPENDIX A - PETROLEUM COMMODITIES - STUDY GROUPS BRIDGE

APPENDIX A - PETROLEUM COMMODITIES - STUDY GROUPS BRIDGE

C.O.E. Codes	Study Group
33300 Petroleum Oils/Oils from Bituminous Minerals,Crude	Persistent Oils
33430 Gas Oils	Non-Persistent Oils
33450 Lubricating Petroleum Oils from Petrol & Bitum Min	Persistent Oils
33440 Fuel Oils, NEC	Persistent Oils
33429 Other Medium Oils from Petroleum & Bitum Minerals	Non-Persistent Oils
33411 Gasoline Including Aviation (Except Jet)	Non-Persistent Oils
33412 Jet Fuel (Gasoline Type)	Non-Persistent Oils
33419 Other Light Oils from Petroleum & Bitum Minerals	Non-Persistent Oils
33421 Kerosene (Including Kerosene Type Jet Fuel)	Non-Persistent Oils
33525 Oils & Other Prods,NEC of Distillation of Coal Tar	Non-Persistent Oils
33524 Xylole	Non-Persistent Oils
33523 Toluole	Non-Persistent Oils
33522 Benzole	Non-Persistent Oils
33530 Pitch & Pitch Coke from Coal Tar/Oth Mineral Tars	Persistent Oils
33521 Tar Distilled from Coal,Lignite or Peat;Other Tars	Persistent Oils
33510 Petroleum Jelly;Waxes Obtained by Synthesis/Other	Persistent Oils
33590 Petroleum Products, Not Elsewhere Classified	Persistent Oils
33540 Petro.Bitumen,Petro.Coke,Asphalt,Butumen mixes NEC	Persistent Oils

NOTE: C.O.E. Codes are from the U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, 1993 data base

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: PENOBSCOT BAY, ME

Locations:

60	CUTLER HARBOR MAINE
330	PENOBSCOT RIVER ME
331	BUCKSPORT HARBOR, ME.
332	SEARSPORT HBR ME
335	BELFAST HBR ME
392	PLEASANT POINT ME

Study Group: CASCO BAY, ME

Locations:

534	COUSINS ISLAND CASCO BAY ME
545	PORTLAND HARBOR ME
546	PORTLAND HARBOR, FORE RIVER, ME.

Study Group: PORTSMOUTH, NH

Locations:

600	PORTSMOUTH HBR N H
610	PISCATAQUA RIVER NEW HAMPSHIRE

Study Group: MASSACHUSETTS BAY

Locations:

675	SALEM HARBOR MASS
701	BOSTON MASS MAIN WATER FRONT
702	BOSTON MASS CHELSEA RIVER
703	BOSTON MASS MYSTIC RIVER
711	BOSTON MASS WEYMOUTH FORE RIVER
712	BOSTON MASS TOWN RIVER

Study Group: BUZZARDS BAY, MA

Locations:

765	CAPE COD CANAL MASS
1084	NAUSHON ISLAND MASS
1238	CUTTYHUNK HBR MASS
1258	WOODS HOLE CHANNEL MASS (GREAT HARBOR)
1294	NEW BEDFORD & FAIRHAVEN HBR MASS
1346	FALL RIVER HBR MASS

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: VINEYARD HAVEN, MA

Locations:

1085 VINEYARD HAVEN HBR MASS

Study Group: NANTUCKET, MA

Locations:

1131 NANTUCKET MASS HBR OF REFUGE

Study Group: NARRAGANSETT BAY

Locations:

1379 PROVIDENCE RIVER AND HARBOR R I
1402 NEWPORT HARBOR R I
1405 JAMESTOWN R I
1410 NARRAGANSETT BAY R I - OTHER

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: LONG ISLAND SOUND

Locations:

1005	LONG ISLAND SOUND CONN SHORE
1525	NEW LONDON HARBOR CONN
1526	THAMES RIVER CONN
1555	PLUM ISLAND N Y
1569	CONNECTICUT RIVER BELOW HARTFORD
1646	NEW HAVEN CONN MAIN HARBOR
1647	NEW HAVEN CONN QUINNIPIAC RIVER
1648	NEW HAVEN CONN WEST RIVER
1675	HOUSATONIC RIVER CONN
1682	BRIDGEPORT, CONN. CEDAR CREEK
1684	BRIDGEPORT, CONN. PEQUONNOCK RIVER
1685	BRIDGEPORT CONN JOHNSON RIVER
1686	BRIDGEPORT CONN BLACK ROCK HBR
1687	BRIDGEPORT CONN MAIN HARBOR
1710	NORWALK HBR CONN
1728	STAMFORD HBR CONN
1738	GREENWICH HBR CONN
3815	OYSTER BAY L I N Y
3818	COLD SPRING HARBOR L I N Y
3837	ASHAROKEN, L I
3840	PORT JEFFERSON HARBOR L I N Y
3844	NORTHVILLE L I
3885	PECONIC RIVER L I/RIVERHEAD TO MIAMOGUE POINT

Study Group: OCEANSIDE, LI

Locations:

3805	HEMPSTEAD HARBOR L I/HEMPSTEAD BAY TO BAR BEACH
3808	HEMPSTEAD HARBOR L I/BAR BEACH TO TOWN WHARF
3925	GREAT SOUTH BAY L I N Y
3959	OCEANSIDE L I N Y

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: PORT OF NY/NJ

Locations:

2002	OFFSHORE ANCHORAGE OPPOSITE AMBROSE CHANNEL
2210	EAST RIVER N Y UPPER NY BAY TO USN SHIPYARD
2213	EAST RIVER N Y/USN SHIPYD TO THROGS NECK EXCLUDING EAST CHAN
2260	NEWTOWN CREEK N Y/EAST R TO MASPETH AVE EXC DUTCH KILLS AND
2430	GOWANUS CREEK CHANNEL NY GOWANUS BAY TO SIGOURNEY ST
2470	BAY RIDGE CHANNEL N Y
2510	GRAVESEND BAY N Y
2710	UPPER BAY N Y NARROWS TO/MUNICIPAL FERRY DOCK ST GEO SI/EXC B
2715	UPPER BAY N Y/BAYONNE N J TO CLAREMONT N J/BAY RIDGE FLATS AN
2811	RARITAN RIVER N J MAIN CHANNEL/RARITAN BAY TO OSTRANDERS DOC
2821	NEW YORK & NEW JERSEY CHANNELS MAIN SHIP CHAN TO SMITH CREE
2822	NEW YORK & NEW JERSEY CHANNELS SMITH CREEK TO PILES CREEK N
2823	NEW YORK & NEW JERSEY CHANNELS PILES CREEK/TO KILL VAN KULL E
2824	NEW YORK & NEW JERSEY CHANNELS SOUTH/OF SHOOTERS ISLAND P
2825	NEW YORK & NEW JERSEY CHANNELS/HOUSMAN AVENUE TO ST GEOR
2860	NEWARK BAY N J MAIN CHANNEL/NEW YORK & NEW JERSEY CHANNEL T
2861	NEWARK BAY N J PORT NEWARK BRANCH CHANNEL
2870	HACKENSACK RIVER N J/UPPER END OF NEWARK BAY CHANNEL/TO KOP
2880	PASSAIC RIVER N J/UPPER END OF NEWARK BAY CHAN TO/FT OF PENN
2881	PASSAIC RIVER NJ/FOOT OF PENN AVE KEARNY N J TO/CONGOLEUM NAI
3010	HAVERSTRAW N Y
3019	INDIAN POINT N Y
3035	NEW WINDSOR N Y
3041	ROSETON N Y
3048	MILTON N Y
3097	ATHENS N Y
3130	ALBANY N Y
3135	RENSSELAER N Y
4200	GREAT EGG INLET N J

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: DELAWARE BAY

Locations:

4330	PAULSBORO N J
4335	EAGLE POINT WESTVILLE N J
4340	GLOUCESTER N J
4343	CAMDEN N J
4345	PETTY ISLAND N J
4350	DELAIR N J
4370	BURLINGTON N J
4390	DUCK ISLAND N J
4402	LOWER DELAWARE BAY DEL
4415	DELAWARE CITY DEL
4440	MARCUS HOOK PA
4450	CHESTER PA
4453	EDDYSTONE PA
4460	THRU 04470 PHILADELPHIA PA ON DELAWARE RV/HOG ISLAND TO ALLEG
4470	PHILADELPHIA PA ON DELAWARE RIVER/ALLEGHENY AVE TO POQUESSI
4565	MANTUA CREEK N J
4660	CHRISTINA RIVER WILMINGTON DEL
4680	SCHUYKILL RIVER PHILA PA PROJECT
4685	SCHUYLKILL RIVER PA ABOVE PROJECT

Study Group: CHESAPEAKE BAY

Locations:

5550	BALTIMORE HBR AND CHANNELS MD
6001	POTOMAC RIVER BELOW WASHINGTON DC/MOUTH TO GIESBORO POIN
10270	YORK RIVER VA
10343	NEWPORT NEWS VA
10350	JAMES RIVER VA RICHMOND
10352	JAMES RIVER & PORT OF HOPEWELL VA
10383	NORFOLK HBR VA SOUTHERN BR ELIZ R
10385	NORFOLK HBR VA EASTERN BR ELIZ R
10387	NORFOLK HARBOR VA PORTSMOUTH VA
10450	RUDEE INLET

Study Group: MOREHEAD CITY, NC

Locations:

11590	MOREHEAD CITY HBR N C

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: WILMINGTON, NC

Locations:

11832 WILMINGTON HARBOR N C

Study Group: CHARLESTON, SC

Locations:

12212 CHARLESTON COOPER RIVER S C
12213 CHARLESTON SHIPYARD RIVER S C
12310 PORT ROYAL S C

Study Group: SAVANNAH, GA

Locations:

13040 SAVANNAH HARBOR GA

Study Group: JACKSONVILLE, FL

Locations:

14018 JACKSONVILLE HARBOR FLA
15002 ST MARKS RIVER FLA

Study Group: PORT CANAVERAL, FL

Locations:

14150 CANAVERAL HARBOR FLA

Study Group: PALM BEACH, FL

Locations:

14266 PALM BEACH HARBOR FLA ALSO 16229

Study Group: PORT EVERGLADES, FL

Locations:

14311 PORT EVERGLADES HBR FLA ALSO 16180

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: MIAMI, FL

Locations:

14325 MIAMI HARBOR FLA ALSO 16158

Study Group: KEY WEST, FL

Locations:

14467 KEY WEST HBR FLA

Study Group: FORT MYERS, FL

Locations:

14698 FORT MYERS BEACH FLA
14725 CHARLOTTE HBR FLA

Study Group: TAMPA BAY, FL

Locations:

14787 WEEDON ISLAND FLA
14790 TAMPA HARBOR FLA
14795 PORT MANATEE FLA

Study Group: PANAMA CITY, FL

Locations:

15230 PANAMA CITY HARBOR FLA

Study Group: PENSACOLA, FL

Locations:

15405 PENSACOLA HBR FLA

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: MOBILE, AL

Locations:

15495	MOBILE HARBOR ALA
15496	MOBILE HARBOR ALA THREE MILE CREEK
15497	MOBILE HARBOR ALA CHICKASAW CREEK
15555	PASCAGOULA HBR MISS
15556	BAYOU CASOTTE MISS

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: MISSISSIPPI RIVER

Locations:

20002	LOWER MISS RIVER MILE 2 (PORT OF PLAQUEMINE)
20018	LOWER MISS RIVER MILE 18 (PORT OF PLAQUEMINE)
20025	LOWER MISS RIVER MILE 25 (PORT OF PLAQUEMINE)
20027	LOWER MISS RIVER MILE 27 (PORT OF PLAQUEMINE)
20063	LOWER MISS RIVER MILE 63 (PORT OF PLAQUEMINE)
20065	LOWER MISS RIVER MILE 65 (PORT OF PLAQUEMINE)
20072	LOWER MISS RIVER MILE 72 (PORT OF PLAQUEMINE)
20075	LOWER MISS RIVER MILE 75 (PORT OF PLAQUEMINE)
20087	LOWER MISS RIV MILE 87 (PORT OF NEW ORLEANS)
20095	NEW ORLEANS LA MILES 88 THRU 106 (PORT OF NEW ORLEANS)
20108	LOWER MISS RIVER MILE 108 (PORT OF NEW ORLEANS)
20116	LOWER MISS RIVER MILE 116 (PORT OF SO. LOUISIANA)
20118	LOWER MISS RIVER MILE 118 (PORT OF SO. LOUISIANA)
20125	LOWER MISS RIVER MILE 125 (PORT OF SO. LOUISIANA)
20126	LOWER MISS RIVER MILE 126 (PORT OF SO. LOUISIANA)
20127	LOWER MISS RIVER MILE 127 (PORT OF SO. LOUISIANA)
20128	LOWER MISS RIVER MILE 128 (PORT OF SO. LOUISIANA)
20135	LOWER MISS RIVER MILE 135 (PORT OF SO. LOUISIANA)
20138	LOWER MISS RIVER MILE 138 (PORT OF SO. LOUISIANA)
20140	LOWER MISS RIVER MILE 140 (PORT OF SO. LOUISIANA)
20144	LOWER MISS RIVER MILE 144 (PORT OF SO. LOUISIANA)
20145	LOWER MISS RIVER MILE 145 (PORT OF SO. LOUISIANA)
20148	LOWER MISS RIVER MILE 148 (PORT OF SO. LOUISIANA)
20151	LOWER MISS RIVER MILE 151 (PORT OF SO. LOUISIANA)
20156	LOWER MISS RIVER MILE 156 (PORT OF SO. LOUISIANA)
20158	LOWER MISS RIVER MILE 158 (PORT OF SO. LOUISIANA)
20159	LOWER MISS RIVER MILE 159 (PORT OF SO. LOUISIANA)
20161	LOWER MISS RIVER MILE 161 (PORT OF SO. LOUISIANA)
20168	LOWER MISS RIVER MILE 168 (PORT OF SO. LOUISIANA)
20169	LOWER MISS RIVER MILE 169 (PORT OF BATON ROUGE)
20173	LOWER MISS RIV MILE 173 (PORT OF BATON ROUGE)
20185	LOWER MISS RIVER MILE 185 (PORT OF BATON ROUGE)
20187	LOWER MISS RIVER MILE 187 (PORT OF BATON ROUGE)
20203	LOWER MISS RIVER MILE 203 (PORT OF BATON ROUGE)
20205	LOWER MISS RIVER MILE 205 (PORT OF BATON ROUGE)
20208	LOWER MISS RIVER MILE 208
20228	BATON ROUGE LA MILES 226 THRU 235
20411	SOUTHWEST PASS
20799	UPPER ATCHAFALAYA RIVER LA
20955	CALCASIEU RIVER AND PASS LAKE CHARLES LA
20999	LA OFFSHORE OIL PORT (LOOP) GULF OF MEXICO

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: PORT ARTHUR, TX

Locations:

60019 GULF VIA SABINE PASS
60056 BEAUMONT TEX
66288 PORT ARTHUR TEX

Study Group: HOUSTON/GALVESTON, TX

Locations:

60369 GULF AT HOUSTON TEXAS CITY GALVESTON
60370 HOUSTON SHIP CHANNEL TEX
60414 TEXAS CITY TEX
60518 FREEPORT HARBOR TEX
66355 GALVESTON CHANNEL TEX
66534 HARBOR ISLAND TEX

Study Group: CORPUS CHRISTI, TX

Locations:

60658 MATAGORDA SHIP CHANNEL TEX
60770 CORPUS CHRISTI TEX

Study Group: BROWNSVILLE, TX

Locations:

66683 BROWNSVILLE SHIP CHANNEL TEX

Study Group: SAN DIEGO, CA

Locations:

80020 SAN DIEGO HARBOR CALIF

Study Group: HUNTINGTON BEACH, CA

Locations:

80180 HUNTINGTON BEACH CALIF

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: LOS ANGELES/LONG BEACH, CA

Locations:

80200	LONG BEACH HARBOR CALIF
80201	LONG BEACH OUTER HARBOR, CALIF
80210	LOS ANGELES HARBOR CALIF
80810	SAN CLEMENTE ISLAND CALIF
80820	SAN NICHOLAS ISLAND CALIF
80999	HONDO TRANSSHIPMENT PT., PACIFIC OCEAN

Study Group: EL SEGUNDO, CA

Locations:

80265	EL SEGUNDO CALIF

Study Group: PORT HUENEME, CA

Locations:

80355	PORT HUENEME CALIF
80468	GAVIOTA HARBOR CALIF OFFSHORE

Study Group: ELWOOD, CA

Locations:

80438	ELLWOOD HARBOR CALIF OFFSHORE
80441	ELLWOOD HARBOR CALIF OFFSHORE

Study Group: SAN LUIS OBISPO, CA

Locations:

80600	SAN LUIS OBISPO HBR CALIF

Study Group: ESTERO BAY, CA

Locations:

80633	ESTERO BAY CALIF
80635	ESTERO BAY CALIF OFFSHORE

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: SAN FRANCISCO, CA

Locations:

80700	INTERNATIONAL BOUNDARY LINE TO SAN MATEO POINT CALIF
81050	SUISUN BAY CHANNEL CALIF
82202	SAN FRANCISCO HBR CALIF
82300	RICHMOND HARBOR CALIF OUTER HBR CODES 000 THRU 299/& INNER H
82310	SAN PABLO BAY & MARE I STRAIT CAL
82323	CARQUINEZ STRAIT CALIF
82400	SAN FRANCISCO BAY AREA OTHER PORTS
82690	HUMBOLDT HBR & BAY CALIF

Study Group: COOS BAY, OR

Locations:

90911	COOS BAY OREGON INSIDE CHANNEL TO/MILLINGTON OREGON

Study Group: COLUMBIA RIVER, OR

Locations:

90015	ASTORIA OREGON
90066	LONGVIEW WASH
90075	KALAMA WASH
90102	OREGON SLOUGH OREGON AND HAYDEN IS
90106	VANCOUVER WASH
90508	PORTLAND OREGON

Study Group: GRAY'S HARBOR, WA

Locations:

91018	GRAYS HBR & CHEHALIS RIVER WASH SOUTH ABERDEEN

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: STRAIT OF JUAN DE FUCA, WA

Locations:

91097	PORT ANGELES HARBOR WASH
91181	TACOMA HARBOR WASH
91182	TACOMA HARBOR WASH TACOMA CITY WATERWAY
91188	TACOMA HARBOR WASH BLAIR WATERWAY
91189	TACOMA HARBOR WASH HYLEBOS WATERWAY
91209	SEATTLE HARBOR WASH. DUWAMISH RIVER
91210	SEATTLE HARBOR WASH WEST WATERWAY
91211	SEATTLE HARBOR WASH HARBOR ISLAND
91212	SEATTLE HARBOR WASH EAST WATERWAY
91213	SEATTLE HARBOR WASH ELLIOTT BAY
91215	SEATTLE HARBOR WASH/RICHMOND BEACH TO EDMONDS
91282	ANACORTES HARBOR WASH MAIN CHANNEL
91284	ANACORTES HARBOR WASH FIDALGO BAY
91290	BELLINGHAM BAY & HARBOR WASH/WHATCOM CREEK WATERWAY
91445	MANCHESTER WASH
91560	FERNDALE WASH
91565	CHERRY POINT

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: ALASKA

Locations:

93810	KETCHIKAN, ALASKA (TONGASS NARROWS)
93814	CLARENCE STRAIT, ALASKA
93819	WRANGELL HBR., ALASKA (STIKINE STR.)
93846	PETERSBURG, ALASKA
94811	JUNEAU, ALASKA (GASTINEAU CHANNEL)
94845	SITKA HARBOR, ALASKA
94963	HAINES, ALASKA (LYNN CANAL)
94965	SKAGWAY HARBOR, ALASKA (LYNN CANAL)
95120	CORDOVA, ALASKA (PWS)
95130	VALDEZ, ALASKA (PWS)
95175	WHITTIER, ALASKA (PWS)
95180	SEWARD, ALASKA (PWS)
95220	HOMER, ALASKA (COOK INLET)
95258	DRIFT RIVER PLATFORMS, ALASKA (COOK INLET)
95260	KENAI RIVER, ALASKA (COOK INLET)
95270	NIKISHKI, ALASKA (COOK INLET)
95290	ANCHORAGE, ALASKA (COOK INLET)
95300	AFOGNAK ISLAND, ALASKA (COAST)
95350	OLD HARBOR, ALASKA (COAST)
95351	KODIAK HARBOR, ALASKA (COAST)
95353	KODIAK ISLAND, ALASKA (COAST)
95355	PORT LIONS, ALASKA (COAST)
95410	CHIGNIK BAY, ALASKA (COAST)
95450	KING COVE LAGOON, ALASKA (COAST)
95470	COLD BAY, ALASKA (COAST)
96030	ATTU ISLAND, ALASKA (COAST)
96035	SHEMYA ISLAND, ALASKA (COAST)
96045	ST. PAUL IS., AK (PRIBILOF ISLAND-COAST)
96046	ST. GEORGE IS., AK (PRIBILOF IS.-COAST)
96050	ADAK ISLAND, ALASKA (COAST)
96070	UMNAK, ALASKA (COAST)
96080	UNALASKA BAY & ISLAND, ALASKA/(ILIULIUK & DUTCH HBR.) (COAST)
96090	AKUTAN ISLAND (COAST)
96100	FALSE PASS, ALASKA (COAST)
96365	NAKNEK RIVER, ALASKA (BRISTOL BAY)
96375	KVICHAK RIVER, ALASKA (BRISTOL BAY)
96390	DILLINGHAM, ALASKA
96450	KUSKOKWIM BAY, ALASKA
96460	KUSKOKWIM RIVER (KUSK BAY)
97646	TANANA RIVER, ALASKA (YUKON RIV. JCT MILE 0739)
97650	NUNAVAK ISLAND, ALASKA (COAST)
97660	NELSON ISLAND AND BAIRD INLET, ALASKA (COAST)
97670	HOOPER BAY, ALASKA (COAST)
97675	SCAMMON BAY, ALASKA (COAST)
97690	NORTON SOUND, ALASKA
97692	ST. LAWRENCE ISLAND, ALASKA
97695	NOME, ALASKA (COAST)

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

97820	TELLER, ALASKA (COAST)
97849	PORT CLARENCE, ALASKA
98540	KOTZEBUE SOUND ALASKA
98860	CAPE LISBURNE, ALASKA (COAST)
98870	POINT LAY, ALASKA (COAST)
98880	WAINWRIGHT, ALASKA (COAST)
98890	BARROW, ALASKA (COAST)
98935	LONELY, ALASKA (COAST)
98938	OOLIKTOK, ALASKA (COAST)
98940	PRUDHOE BAY, ALASKA (COAST)

Study Group: HAWAII

Locations:

84012	HILO HBR HAWAII
84058	KAWAIHAE HARBOR HAWAII
84315	KAHULUI HBR MAUI
84746	BARBERS POINT CHANNEL OAHU
84750	PEARL HARBOR OAHU
84752	HONOLULU HBR OAHU
84828	PORT ALLEN KAUAI
84840	NAWILIWILI HBR KAUAI

Study Group: TRANS-SHIPMENT POINT, GULF OF MEXICO

Locations:

60779	TRANS-SHIPMENT POINT-GULF OF MEXICO

Study Group: CHIRIQUI GRANDE, PANAMA

Locations:

69999	ALASKAN OIL TRANS-SHIPMENT POINT

Study Group: PUERTO ARMUELLAS, PANAMA

Locations:

89999	SPECIAL USE CODE

APPENDIX B - PORT LOCATIONS - STUDY GROUPS BRIDGE

Study Group: TRANS-SHIPMENT POINT, ST. LUCIA

Locations:

17999 SPECIAL USE CODE

Study Group: PUERTO RICO AND US VIRGIN ISLANDS

Locations:

17130 SAN JUAN HBRPUERTO RICO
17490 YABUCOA HARBOR PUERTO RICO
17530 LAS MAREASPUERTO RICO
17610 GUAYANILLA HBRPUERTO RICO
17850 PORT HESS ST CROIX ISLAND VI (LIMETREE BAY)