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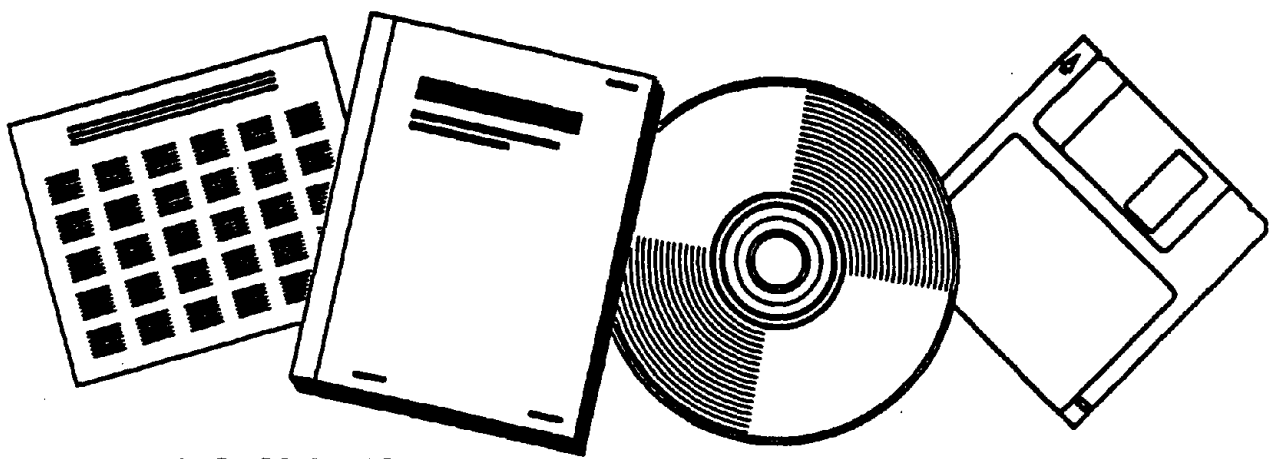
ASSESSMENT OF THE ADEQUACY OF EAST COAST AND GULF OF MEXICO PORT INFRASTRUCTURE TO ACCOMMODATE THE TRADE WITH MEXICO INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT SECTION 6015 STUDY ASSESSMENT OF BORDER CROSSINGS AND TRANSPORTATION CORRIDORS FOR NORTH AMERICAN TRADE (SOUTHEAST)

(U.S.) JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER
CAMBRIDGE, MA

FEB 94



U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

U.S. Department
of Transportation

**Federal Highway
Administration**

*Intermodal Surface Transportation Efficiency Act
Section 6015 Study: Assessment of Border Crossings
and Transportation Corridors for North American
Trade (Southeast)*

An Assessment of the Adequacy of East Coast and Gulf of Mexico Port Infrastructure to Accommodate the Trade with Mexico

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The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 calls for a study of U.S. international border crossings. The objective of the study is to identify existing and emerging trade corridors and transportation subsystems that facilitate trade between the United States, Canada, and Mexico.

This report contains an assessment of infrastrstructure in place and planned, an identification of current trade and transportation flows, and an assessment of emerging trade corridors.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
	AREA			
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yards	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
	VOLUME			
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: Volumes greater than 1000 l shall be shown in m^3.				
	MASS			
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5(F-32)/9 or (F-32)/1.8	Celcius temperature	°C
	ILLUMINATION			
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
	FORCE and PRESSURE or STRESS			
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
	AREA			
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
	VOLUME			
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.71	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
	MASS			
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
	TEMPERATURE (exact)			
°C	Celcius temperature	1.8C + 32	Fahrenheit temperature	°F
	ILLUMINATION			
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
	FORCE and PRESSURE or STRESS			
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

(Revised September 1993)

An Assessment of the Adequacy of East Coast and Gulf of Mexico Port Infrastructure to Accommodate the Trade with Mexico

Sponsored by the
Office of Policy Development
Federal Highway Administration

August 1994

PREFACE

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 called for a study of U.S. international border crossings. The objective of the study was to 'identify existing and emerging trade corridors and transportation subsystems that facilitate trade between the United States, Canada, and Mexico.' The Federal Highway Administration, U.S. Department of Transportation, conducted this study. The study assessed the adequacy of transportation infrastructure at the borders to accommodate current and future trade and traffic levels. In order to accomplish this objective, three subtasks were defined:

- Conduct an inventory of current and planned infrastructure at the borders.
- Identify existing international trade corridors among the North American trading partners.
- Identify emerging trade corridors.

In the conduct of this study, available data were collected from Canadian, the U.S. and Mexican public and private sources. The study team undertook an extensive outreach effort to bring local and state interests into the process. Shippers and carriers participated in meetings across the country to identify issues and to provide recommendations and suggested solutions. Meetings were held in Canada and Mexico to gain a better perspective to the total picture of border concerns.

For practical purposes, the study was divided into several regional activities. This was to reflect separately some of the concerns and problems presumed to be unique to those regions. The results of one of these efforts is presented in this report.

The John A. Volpe National Transportation Systems Center (Volpe Center) was tasked to perform the assessment of the ability of the Gulf ports and East Coast ports to meet current and future transportation needs of the maritime trade with Mexico.

The inventory assessment was conducted by the National Ports and Waterways Institute (NPWI) of Louisiana State University. This work employed a port inventory database and a waterborne trade database both maintained by the Maritime Administration (MARAD). These sources were augmented by data from port authorities and inspections of facilities.

The trade flow analysis was performed by the Volpe Center using foreign trade data from the U.S. Bureau of the Census. There are several related trade databases available but none is designed for supporting the type of analysis requested in the ISTEA legislation.

- The primary federal source of data is the foreign trade database maintained by the Bureau of the Census. This database has most of the information collected under authority granted to U.S. Customs for data on imports and to the Bureau of the Census for data on exports. The primary objectives of this database are accounting for tariffs and items in the national income and product account. Thus, much of the data important to transportation analysis is limited and the

level of reliability varies. There are also severe restrictions placed on the release of detailed data to the public. Fortunately for waterborne flows, more is known and maintained by Census than is the case for land modes.

- The Bureau of the Census maintains a second waterborne trade database that improves upon the reliability of the U.S. port statistics. However, the quality of foreign port statistics is not enhanced. For analyses that require detail in port statistics, this enhanced data base may be a preferred source of information.

- The U.S. Army Corps of Engineers maintains traffic and commodity information for deep water, lake, and inland ports. Both data on foreign and domestic trade are maintained. The primary source of the foreign trade data is the U.S. Bureau of the Census. This source has the advantage of consolidating domestic and foreign data to yield a picture of total activity within ports.

- The Journal of Commerce maintains "PIERS," a private sector database developed from ship manifests rather than Customs forms. This database provides excellent detail on ship movement on a timely basis.

- The Saint Lawrence Seaway Development Corporation and the St. Lawrence Seaway Authority maintain specialize waterborne traffic and commodity information.

Three of the databases above are being used for this analysis. The port inventory data is drawn from the waterborne trade statistics made available to the study team through the Maritime Administration. The trade patterns and comparisons of waterborne statistics uses the broader Census foreign trade database. Where these later data are inadequate in describing the Mexican ports of call for U.S.-Mexico trade, these data can be augmented by data from "PIERS."

From the beginning of the process, it was determined that a purely statistical analysis could not adequately capture the concerns and knowledge in the transportation and trade community. The outreach efforts were intended to overcome this constraint. Two Roundtable meetings, held in Norfolk, VA, and St. Louis, MO, were important in obtaining insight from the local and regional interests. A Futures Assessment meeting held in New Orleans provided additional input to the trade and traffic discussion. The results of these sessions are reported on separately.

This study, including the activities of the study team members conducting each of the regional analyses, is a first step in the development of a more comprehensive understanding of trade and traffic flows in North America. The information amassed in this process has not been fully exploited. Applications for policy and planning at all level of government and in the private sector can be enhanced by these data and continued improvement of the information.

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1. EXISTING PORT INFRASTRUCTURE RELATED TO U.S.-MEXICO TRADE

1.1 INTRODUCTION

Unlike the typical land port of entry or exit, maritime ports are inherently transfer points requiring access to other modes and to storage facilities. As a result, ports are often providers of a wide range of transportation and logistics functions, and thereby are significant sources of employment to their host communities.

Major ports are also typically combinations of governmental investment, through public port authorities, and private sector ownership of facilities within the ports. They represent a long established form of public-private enterprise. As a result, the port industry is quite competitive. Individual ports compete to capture trade in order to meet public objectives of local jobs and tax revenue and to meet private objectives of market share and profits.

Competition among ports has led to improvements in the quality of service being provided and to plans for continued improvements in port facilities. This same competition has also led to what is generally conceded to be excess capacity in the system. Thus, as will be seen in the analysis that follows, there currently is sufficient capacity to accommodate increased trade in general.

Since the maritime trade with Mexico represents a relatively small share of total port activity, there is more than sufficient capacity to serve existing and projected growth in waterborne traffic between our two nations. In addition, there is capacity to relieve some of the land border constraints if a portion of the current land traffic could be diverted to water.

Continued growth of port capacity and the ability of ports to capture some of the land traffic depend, to a great extent, on the adequacy of access to ports. Thus, many of the infrastructure needs identified below relate to improved road and rail access to the ports themselves. However, this raises a difficult policy issue. Given the excess capacity of port facilities, not all investments in access facilities may be justified. In the absence of any national policy to rationalize and direct limited funds to those needs having greatest returns, local competitive pressure is likely to lead to more investment in access infrastructure than is warranted.

The characterization of the current status of port infrastructure and capacity to accommodate trade with Mexico must recognize the unique features of the industry. An overview of the port infrastructure is presented in this Chapter. Since only a portion of the industry now serves the Mexican trade, the discussion focuses upon those ports that currently participate in this trade.

Chapter 1 contains:

- General information on trade activity between U.S. East Coast and Gulf ports.

- Information on the physical infrastructure of major ports.
- Description of intermodal (IM) facilities.
- Discussion of institutional issues.

Much of the information included in this chapter is drawn from data maintained by the Maritime Administration (MARAD), United States Department of Transportation (U.S. DOT); a study conducted by the National Ports and Waterways Institute (NPWI), Louisiana State University; and information collected through a series of outreach activities sponsored by the Federal Highway Administration (FHWA).

1.2 CURRENT PORT TRADE WITH MEXICO

This section describes the trading activity with Mexico, which occurs through relatively few U.S. ports. Detailed waterborne commerce data were furnished by MARAD. The data include the 1991 foreign trade, in long tons, of exports and of imports for every 4-digit Harmonized Commodity Code for every port. East Coast and Gulf of Mexico data were first analyzed to identify those ports having significant trade with Mexico. Table 1-1 shows these ports and their total 1991 tonnage for Mexico, together with the percent of the waterborne trade with Mexico accounted for by each port. The highly concentrated pattern of trade activity through U.S. ports is obvious. More than 80 percent of the trade is accounted for by the top 10 ports, and the top 20 ports cover nearly 97 percent. This level of concentration permits the assessment of capacity to focus upon a small number of ports.

Port activity is also concentrated in terms of commodities. Petroleum and petroleum products account for approximately 75 percent of the trade volume. This factor alone can explain the degree of concentration noted above, since ports serving this trade need to be closely related to domestic refinery and distribution systems, which are themselves geographically concentrated. Complete detail on the distribution of cargo by type is found in Table 1-2.

Although the trade with Mexico is substantial in terms of total volume, it is still a relatively small portion of the activity for most U.S. ports. Table 1-3 contains figures on the relative level of trade with Mexico to total foreign trade. For the Gulf ports, trade to and from Mexico accounts for a little more than 10 percent of total port activity. For East Coast and Gulf ports in aggregate, the Mexican trade amounts to approximately 7.3 percent. In this study, port facilities are assessed in terms of their adequacy to handle the total trade passing through the port. Ports with excess capacity to handle a specific type of trade presumably can accommodate increases in that trade regardless of the origin or destination of the commodity.

TABLE 1-1. TOTAL 1991 WATERBORNE TRADE OF U.S. EAST COAST REGIONS

WITH MEXICO

Port	Port Name	Tot. LT	%Tot	%Cum.
5301	HOUSTON TEX.	7,038,507	14.93	14.93
1903	PASCAGOULA MISS.	5,861,182	12.44	27.37
2010	GRAMERCY LA.	4,812,443	10.21	37.58
2017	LAKE CHARLES, LA.	4,650,665	9.87	47.45
2002	NEW ORLEANS LA.	4,076,049	8.65	56.10
5306	TEXAS CITY TEX.	3,522,589	7.47	63.57
5312	CORPUS CHRISTI, TEX.	2,584,243	5.48	69.06
1801	TAMPA FL.	2,005,301	4.26	73.31
2004	BATON ROUGE LA.	1,798,887	3.82	77.13
2101	PORT ARTHUR TEX.	1,587,349	3.37	80.50
1001	NEW YORK N.Y.	1,460,538	3.10	83.60
1105	PAULSBORO N.J.	1,438,966	3.05	86.65
1101	PHILADELPHIA PA.	1,234,921	2.62	89.27
5310	GALVESTON TEX.	1,026,015	2.18	91.45
1402	NEWPORT NEWS VA.	578,188	1.23	92.67
2009	DESTREHAN LA.	428,420	0.91	93.58
1803	JACKSONVILLE FL.	427,957	0.91	94.49
1901	MOBILE AL.	396,749	0.84	95.33
2104	BEAUMONT TEX.	336,190	0.71	96.05
2013	ST. ROSE LA.	335,962	0.71	96.76
2014	GOOD HOPE LA.	195,539	0.41	97.18
1511	BEAUFORT-MOREHEAD CITY N.C.	175,542	0.37	97.55
1303	BALTIMORE MD.	153,800	0.33	97.87
0101	PORTLAND ME.	129,647	0.28	98.15
5313	PORT LAVACA, TEX.	101,405	0.22	98.36
1501	WILMINGTON N.C.	98,058	0.21	98.57
1902	GULFPORT MISS.	76,717	0.16	98.73
1113	GLOUCESTER CITY N.J.	75,487	0.16	98.90
1118	MARCUS HOOK PA.	72,178	0.15	99.05
5203	PORT EVERGLADES FL.	71,568	0.15	99.20
0412	NEW HAVEN CN.	69,860	0.15	99.35
1703	SAVANNAH GA.	49,631	0.11	99.45
0401	BOSTON MA.	35,645	0.08	99.53
1103	WILMINGTON DEL.	32,995	0.07	99.60
5201	MIAMI FL.	31,993	0.07	99.67
0131	PORTSMOUTH N.H.	29,526	0.06	99.73
1408	HOPEWELL VA.	25,189	0.05	99.78
1601	CHARLESTON S.C.	24,606	0.05	99.84
1002	ALBANY N.Y.	20,678	0.04	99.88
5311	FREEPORT TEX.	16,745	0.04	99.91
2001	MORGAN CITY LA.	11,256	0.02	99.94
1821	PORT MANATEE FL.	7,620	0.02	99.96
1401	NORFOLK VA.	5,094	0.01	99.97
1816	PORT CANAVERAL FL.	4,488	0.01	99.98
2301	BROWNSVILLE TEX.	3,436	0.01	99.98
0502	PROVIDENCE R.I.	3,064	0.01	99.99
1701	BRUNSWICK GA.	2,173	0.00	99.99
1819	PENSACOLA FL.	1,081	0.00	100.00
2012	AVONDALE LA.	1,043	0.00	100.00
5202	KEY WEST FL.	372	0.00	100.00
1805	FERNANDINA BEACH FL.	225	0.00	100.00
5204	W. PALM BEACH FL.	125	0.00	100.00
1818	PANAMA CITY FL.	34	0.00	100.00
2103	ORANGE TEX.	25	0.00	100.00
3801	DETROIT MICH.	22	0.00	100.00
2102	SABINE TEX.	9	0.00	100.00
5801	SAVAN-WILM, COTLNTRS	4	0.00	100.00
5901	NORF-NEWPORT NEWS VALUE		0.00	100.00
	Total 1000 T	47,128		

TABLE 1-2. U.S. EAST COAST-MEXICAN TRADE (1991)

U.S. Ports trading with		1991 Trade 1000ton/yr			General Cargo			Non-petroleum liquids			Petroleum oil & products			Bulk Grain			Dry Bulk		
code	Mexico	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports
5301	HOUSTON TEX.	7,039	2,056	4,983	919	372	548	189	61	128	4,110	654	3,456	927	927		893	42	851
1903	PASCAGOULA MISS.	5,861	29	5,832	26	26	0				5,832		5,832	3	3				
2010	GRAMERCY LA.	4,812	854	3,958	55	8	47				3,884	28	3,856	814	814		59	4	55
2017	LAKE CHARLES, LA.	4,651	219	4,432	86	84	2				4,266	100	4,166	3	3		296	32	264
2002	NEW ORLEANS LA.	4,076	479	3,597	28	5	23	13	13		3,079	6	3,074	439	439		517	16	501
5306	TEXAS CITY	3,523	106	3,416	13	11	1	41	1	40	3,426	51	3,375	34	34		9	9	
5312	CORPUS CHRISTI, TEXAS	2,584	389	2,196	66	66					2,415	219	2,196	101	101		3	3	
1801	TAMPA FL.	2,005	519	1,486	143	1	142										1,863	518	1,345
2004	BATON ROUGE LA.	1,799	308	1,491	270	76	194	37	11	26	1,104	74	1,030	64	64		323	83	240
2101	PORT ARTHUR TEX.	1,587	55	1,532	54	7	47	3		3	1,349	15	1,335	23	23		158	11	147
1001	NEW YORK N.Y.	1,461	37	1,424	9	1	8	2	2		1,366	34	1,332				83		83
1105	PAULSBORO N.J.	1,439	11	1,428							1,439	11	1,428						
1101	PHILADELPHIA PA.	1,235	5	1,230	5	5					1,230		1,230						
5310	GALVESTON, TEXAS	1,026	243	783	3	1	2	20	1	18	390	0	390	241	241		373		373
1402	NEWPORT NEWS VA.	578		578							578		578						
2009	DESTREHAN LA.	428	428		2	2								426	426				
1803	JACKSONVILLE FL.	428	173	255	0	0	0				23		23				405	173	232
1901	MOBILE AL.	397	50	347	36	1	36				307		307	14	14		40	36	4
2104	BEAUMONT TEX.	336	50	286	0		0	2	2		287	1	286	47	47				
2013	ST. ROSE LA.	336	232	104	3	3		2	2		104		104	227	227				
2014	GOOD HOPE LA.	196	61	135							196	61	135						
1511	BEAUFORT-MOREHEAD CITY	176		176													176		176
1303	BALTIMORE MD.	154	6	148				6		6							148	6	143
0101	PORTLAND ME.	130		130	89		89				41		41						
5313	PORT LAVACA, TEXAS	101	101		101	101													
1501	WILMINGTON N.C	98		98	13		13										85		85
1902	GULFPORT MISS.	77	31	46	75	30	45				0	0					2	1	0
1113	GLOUCESTER CITY N.J.	75		75							75		75						
1118	MARCUS HOOK PA	72	4	68	26	4	21				47		47						
5203	PORT EVERGLADES FL.	72	7	64	5	1	3	0	0		61		61				6	6	0
0412	NEW HAVEN	70		70							70		70						
1703	SAVANNAH GA.	50	0	50	0	0	0										50		50
0401	BOSTON MA.	36	22	14							14		14				22	22	0
1103	WILMINGTON DEL	33		33	16		16										17		17
5201	MIAMI FL.	32	24	8	31	23	8	0	0	0	0	0					0	0	
0131	PORTSMOUTH N.H	30		30													30		30
1408	HOPEWELL VA.	25		25													25		25
1601	CHARLESTON S.C.	25	25	0	4	4	0							21	21				
1002	ALBANY N.Y.	21		21				21		21									
5311	FREEPORT, TEXAS	17	6	11	1	1		3		3							13	5	8
2001	MORGAN CITY LA.	11	11		5	5											6	6	
1821	PORT MANATEE	8		8							8		8						
1401	NORFOLK VA.	5	1	4	1	1	0										4		4
1816	PORT CANAVERAL	4		4							4		4						
2301	BROWNSVILLE TEX.	3	2	1	2	2	0	1		1									
0502	PROVIDENCE R.I	3		3	3		3												
1701	BRUNSWICK GA.	2	0	2	2	0	2												
1819	PENSACOLA, FLA.	1	1		1	1													
2012	AVONDALE LA.	1	1		1	1													
	TOTAL 1000 tons/yr	47,127	6,547	40,581	2,097	846	1,251	341	94	246	35,704	1,254	34,450	3,382	3,382		5,603	971	4,633

TABLE 1-3. REGIONAL TRADE SUMMARY FOR U.S. EAST COAST

Total foreign trade for East Coast and Gulf Ports trading with Mexico	1991 Trade 1000 ton/yr			General Cargo			Non-petroleum liquids			Petroleum oil & products			Bulk Grain			Dry Bulk		
	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports
Atlantic Coast: Total Foreign Trade	247,850	102,629	145,221	50,540	22,698	27,841	1,501	199	1,302	94,106	1,751	92,354	4,057	3,750	307	97,647	74,231	23,416
Mexican Trade	6,148	283	5,865	168	15	153	28	2	26	4,886	45	4,842	21	21	0	1,044	200	844
Gulf of Mexico: Total Foreign Trade	394,666	177,810	216,856	48,777	34,690	14,087	3,731	2,103	1,628	186,962	16,655	170,307	70,883	70,148	735	84,312	54,213	30,099
Mexican Trade	40,979	6,264	34,715	1,928	830	1,098	312	92	220	30,818	1,209	29,609	3,362	3,362	0	4,559	771	3,788
Total (in 1000 tons)	642,516	280,439	362,077	99,317	57,389	41,928	5,232	2,302	2,930	281,068	18,406	262,662	74,940	73,898	1,043	181,959	128,445	53,515

1.3 PHYSICAL INFRASTRUCTURE OF PORTS TRADING WITH MEXICO

Typically, a port consists of one or more terminals. Each terminal comprises four basic elements: access channel, docking facility, storage yard, and land transport gates. A fifth, related element can exist for some terminals; namely, the inland transfer area (for intermodal container terminals). For the purpose of this study,[1] terminals were classified into four major categories based on the type of cargo served as follows:

1. General Cargo Terminal: serves break-bulk cargo, neo-bulk cargo (machinery, automobiles, steel products, etc.), containerized cargo or refrigerated units, or a combination of these commodities. Such terminals usually have open yard storage areas, sheds or warehouses. Smaller terminals of this category may rely on ships gear or movable cranes. Neo-bulk terminals usually are equipped with heavy lift cranes and may have Roll-On/Roll-Off (RO/RO) ramps to load and unload automobiles and similar cargo. Container terminals serve mainly marine containers and refrigerated units and usually have aprons equipped with gantry cranes and open yards for container storage arranged on chassis or by stacking.

2. Bulk Grain Terminal: serves large bulk grain cargos (i.e., corn, wheat, rice, soybean, etc.) and is usually equipped with silos and proper loading/unloading equipment. Such terminals can also serve other agricultural products that require silo storage.

3. Dry Bulk Terminal: serves major dry bulk cargos, except grain. The terminal apron is usually equipped with stackers and loaders. Cargo served includes coal and coke, ores, fertilizers, salt, cement, sand and gravel or other loose bulk cargo material. Some terminals may have silo storage facilities to handle cargo such as cement.

4. Liquid Bulk Terminal: mostly serves petroleum oil and derivatives, large pumping facilities and storage tank farms are in common use. A small liquid bulk terminal servicing liquid chemicals, edible oils and the like may not require pumps or tank facilities.

The MARAD database is the primary source for the inventory of port facilities. This database provides information for all terminals in a given port district. Of particular interest are (1) terminal general information, (2) berthage characteristics, (3) pier/vessel information, (4) data for general cargo terminals, (5) data for dry bulk terminals, (6) data for bulk grain terminals, and (7) data for liquid bulk terminals. The last four categories reflect

[1]This material is drawn from U.S. Border Crossings with Canada and Mexico-Port Facilities, Inventory, and Constraints, prepared by the National Ports and Waterways Institute, Louisiana State University. No attempt is made to note the specific data on language taken from this report. However, the significant contribution of this study is hereby acknowledged.

the fact that facilities differ according to the cargo handled. The facilities' information from the MARAD database was analyzed, verified, and augmented by the latest information obtained directly from port authorities and terminal operators. The inventories of facilities cover both private and public facilities.

The port capacity estimates are based on the summation of individual terminal critical capacities. Each terminal is first categorized based the general class of cargo handled (i.e., general cargo, dry bulk, bulk grain, or liquid bulk terminal). The capacity is then evaluated based on the terminal size by calculating the *Terminal Capacity* (based on the berthage specifications), and the *Storage Capacity* (based on the data for the storage areas for the terminal). The *Critical Capacity* for a terminal is the minimum of either capacity calculations.

An overview of the capacity of the major ports trading with Mexico is presented in Table 1-4. The actual level of port throughput is compared to the estimated capacity levels for the individual ports. From this information, it is easy to see the degree of current excess capacity in the port system. Of the ports listed, none is operating at more than 90 percent capacity; most are far below this level.

TABLE 1-4. CAPACITY OF MAJOR PORTS TRADING WITH MEXICO

Port	1991 Cargo Total Flows 1000 tons	1991 Mexico Flows 1000 tons	Capacity	Total Flow to Capacity
Houston	60974	7039	97672	62.4%
New Orleans	42570	4076	64630	65.9%
Baton Rouge	34211	1799	55679	61.4%
Mobile	18418	397	31486	58.5%
Pascagoula	17334	5861	21843	79.4%
Tampa	19041	2005	34297	55.6%
Jacksonville	7232	428	9070	79.7%
Newport News	25323	578	28392	89.2%
Baltimore	21315	154	43671	48.8%

As indicated in the following port profiles, the U.S. ports trading with Mexico (and Canada) have excess capacities to accommodate the anticipated increase in commerce with the North

American trading partners. Generally speaking, this excess capacity can absorb an additional increase of foreign trade in the range of 30 percent. Given the current levels of waterborne commerce with Mexico of 47.1 million tons (and Canada and Mexico of 70.5 million tons), which represent about 7.3 percent (or 11 percent for Canada and Mexico) of the total waterborne foreign trade for these regions (642.5 million tons), these ports can handle a substantial increase in North American commerce.

Port analyses present difficulties due to the incompleteness and incompatibility of reported data. In addition, assessing private terminals capabilities without disclosing proprietary trade information is difficult. Private terminals are important to an understanding of port capacity because they represent a large portion of physical capacity. They often possess a higher degree of responsiveness to demand, more flexibility for work hours, and more responsiveness to switching from one type of commodity handling to another, as needed.

The analysis was confined to ports and, within ports, to facilities active in foreign trade. It should be noted, however, that some of the terminals analyzed are both active in foreign and domestic commerce. Although the general conclusions about available excess capacity still hold for such terminals, the size of the excess capacity may vary.

The Gulf of Mexico region is the most active region in the trade with Mexico. The main products handled are petroleum and petroleum products, ores, and bulk grain. Domestic commerce averages about 50 percent of the Gulf waterborne commerce. The Mexican trade represents about 10 percent of the foreign commerce for these ports. The 1991 commerce of Mexico with the Gulf region was 40.98 million tons, of which 30.8 million tons were crude oil and petroleum products.

Ports in the Atlantic Coast region have about 6.1 million tons of trade with Mexico. Of this amount, 4.9 million tons are of petroleum and petroleum products.

Since excess capacity is systemic, representative ports were selected by NPWI to characterize the range of existing physical capacity among ports trading with Mexico. These ports are discussed below.[2]

1.3.1 Port of Houston, Texas

The port of Houston is a 25-mile-long complex of private and public facilities connected to the continental United States, Canada, and Mexico by four major railroads and more than 120 truck lines. The Southern Pacific, Union Pacific, Burlington Northern, and Santa Fe railroads serve the port tenants. Private companies have invested more than $17 billion in manufacturing and processing facilities along the Houston Ship Channel.

[2]Detailed inventories of facilities are contained in the NPWI study.

Nationwide, the port is ranked third in total tonnage and second in foreign waterborne commerce. Domestic trade averages about 40 percent annually. Mexican and Canadian trade totals are about 13 percent of total foreign trade, and major commodities include: petroleum products and natural gas, crude oil, grain, chemicals, and fertilizers. Major commodities handled by Houston include: crude oil, petroleum products, chemicals and polymers, iron/steel products, machinery and tools, grain and farm products, forest and paper products, electric equipment and electronics.

The port area includes: (1) the Houston Ship Channel and its tributary channels and basins extending from Morgan's Point, at the head of Galveston Bay, to and including a turning basin within the city limits of Houston; (2) the Buffalo Bayou extending from the turning basin to the Main Street Bridge; and (3) the port facilities at Bayport near Red Bluff on the west side of upper Galveston Bay. About 61 million tons of foreign trade passed through the port in 1991, of which 36 million tons were petroleum crude and petroleum products.

The major terminals in the port include: the Turning Basin Terminal for handling general cargo and neo-bulk in its 37 public wharves, Wharf 32 for heavy-lift long-term cargo, 5 grain elevator terminals, and the Fentress Bracewell Barbours Cut terminal (5 berths covering 203 acres) serving containerized and refrigerated cargo. Bulk cargo is handled by one public terminal and 9 private terminals. Three major terminals serve liquid bulk cargo and petro-chemicals in the Bayport turning basin. An additional 21 private, liquid bulk terminals are located along the Houston channel.

1.3.2 Port Arthur, Texas

The port is served by two major railroads, Kansas City Southern and Southern Pacific, and more than 20 truck lines having good access to the I-10 and other major state highways (73, 68 and 87).

Within the port district, major private bulk cargo facilities handle crude oil and petroleum products, grain, soda ash, forest products, chemicals, coke and bitumen. The public facility handles iron and steel products, forest products, chemicals and containers. Major commodities traded with Mexico and Canada are about 10 percent of all foreign cargo and include: crude oil and petroleum products, gravel, forest/paper products, machinery and steel products. Domestic cargo is about 42 percent of the total annual tonnage handled by the port.

The Channel is about 19 miles from deep waters and the average draft for most of the terminals is about 40 feet. The public terminal has 3 rail tracks on-dock, facilitating direct ship-to-rail loading and unloading.

1.3.3 Port of New Orleans, Louisiana

The port of New Orleans extends along both banks of the Mississippi River over a 34-mile stretch, 20 miles via the Southwest Pass and 12 miles via the South Pass and covers 334

wharves, piers and docks. Twenty-six companies operate 37 terminals for dry bulk handling (sand, gravel, scrap metal, fertilizers, gypsum, rock, coke, salt, sugar, cement and barite). Ten companies operate liquid bulk facilities (petroleum, petrochemicals, chemicals, molasses, tung and edible oils). Eleven companies and the Port Authority operate warehouses having a total of 2.2 million square-feet of dry storage and 5 million cubic feet of refrigerated storage. The port has 32 locations which provide open storage for containerized/general cargo. Open bulk storage is operated by private terminal operators. More than 40 terminals serve general cargo and neo-bulk (mostly operated by the port authority).

Six major railroads connect the port to the continental United States: CSX, Kansas City Southern, Illinois Central, Southern Pacific, Norfolk Southern, and Union Pacific. New Orleans Public Belt is a terminal switching railroad and provides rail services for the East Bank terminals.

Annual volume is around 43 million tons of foreign trade and 31 million tons of domestic cargo. Canadian and Mexican trade is about 10 percent of the total foreign trade, including the following major commodities: crude oil, grain, gravel and gypsum. The port's major commodities are: crude oil and petroleum products, coal/coke, grain and farm products, gravel and sulfates, chemicals and rubber, forest and paper products, iron and steel products, machinery, and textiles.

1.3.4 Port of Baton Rouge, Louisiana

The port of Baton Rouge is both a deepwater (40 feet) and a shallow-draft port extending on both banks of the Mississippi River for over 87 miles. The port is served by the Southwest and South Passes in addition to a direct connection to the Gulf Intercoastal Waterway through the Port Allen Lock.

The Union Pacific, Illinois Central, and Kansas City Southern railroads serve the port. Major interstate highways serving the port are: Interstates 10, 12, 49, 55, 59, and Highways 61, 65 and 190. Within the port complex there are about 17 miles of rails with spurs serving the port tenants.

The Mexican and Canadian trade is about 7 percent of the total foreign trade and includes the following major commodities: crude oil and petroleum products, coke and coal, grain, molasses and salt. Major foreign trade commodities include: crude oil and petroleum products, coal and coke, grain and farm products, iron and aluminum ores, fertilizers, calcium and phosphates, ammonia and potash, and forest products.

1.3.5 Port of Pascagoula, Mississippi

The port, with a channel depth of 38 feet and width of 350 feet, is located in the southeastern part of Mississippi, about 12 miles from the Gulf of Mexico's deep waters, and about 4 miles from the Gulf Intercoastal Waterway. The port has two harbors, the Pascagoula River Harbor (west) and the Bayou Casotte Harbor (east), and has facilities for

handling general cargo, break-bulk cargo, refrigerated cargo, oil products and bulk and bagged grains.

Pascagoula has connections to major railroads, including Gulf and Mississippi Railroad, Kansas City Southern, and Norfolk Southern, and to more than 20 truck lines with good access to the I-90 (east-west) and other major state highways (10, 63 and 613).

Pascagoula is also designated as a Naval Homeport with a Naval Base on Singing River Island.

The west harbor includes: four general cargo wharves handling break-bulk, RO/RO, and heavy lift cargo, a 3.1 million bushel capacity grain elevator, and a cold storage facility. The east harbor includes: 2 general cargo wharves, 2 deep draft public liquid bulk wharves, 3 Chevron petroleum and coke terminals, a phosphate plant and terminal, and a liquid chemical terminal.

The port handles about 30 million tons of cargo annually, of which domestic cargo is about 40 percent of the total annual tonnage. Major exports include: petroleum products, petroleum coke, bitumen and petro-chemicals, fertilizers, bulk and bagged grains, machinery and vehicles, forest/paper products, and general cargo. Major imports include: crude oil, chemicals and rubber, forest products and general cargo. Mexican trade is mostly crude oil imports and totals about 34 percent of the port's foreign commerce.

1.3.6 Port of Mobile, Alabama

The port of Mobile, State Docks facilities include 26 general cargo piers, a container terminal, a RO/RO berth, a Bulk Materials Handling Plant, and a grain elevator.

The port's 1992 statistics show the continuing increase of handled cargo (19.8 million tons) that reflects the nationwide 2.5 percent annual increase. The major commodities handled include: coal and coke, forest/paper products, grain, iron ores, steel and heavy metal products, crude oil, chemicals and rubber, and containerized general cargo. Canadian trade was 1.65 million tons and the total Mexican trade was 410,000 tons; both were mostly imported cargos including: iron ores, manganese ores, and crude oil. Domestic commerce is about 50 percent of the total trade.

Major railroads serving the port include CSX, Burlington Northern, Illinois Central, Gulf and Mississippi Railroad, and Norfolk Southern through a joint interchange yard adjacent to the State Docks with accommodation for 1200 rail cars. The State Docks Authority operates a fleet of nine hundred 50-foot Hydro-Cushion box cars. Uncongested access to the I-10 (east-west) and the I-65 (north-south) corridors is used by 65 truck lines serving the port. About 1500 miles of navigable inland barge routes are connected to the port.

1.3.7 Port of Tampa, Florida

The port of Tampa is a landlocked harbor located at Tampa Bay about 35 miles from the open sea. Port District boundaries extend over parts of the Tampa Bay, Hillsborough Bay, McKay Bay, Hillsborough River, and Old Tampa Bay for a total water front of about 33 miles. Principal channels have depths of 43 feet; all others have 34 feet with 34 to 39 feet at quays. The port includes seven large elevators for phosphate loading, eleven general cargo terminals with adequate storage facilities, and elevators for loading grain and unloading bulk cement.

The port is served by CSX. Oil facilities have bunkers with delivery by pipelines, barges and trucks. Annual marine traffic averages 1,500 vessels, 1,250 barges, and 1,200 tugs. The Sunshine Skyway Bridge spans lower Tampa Bay with clearances of 175 feet high, and 875 feet wide.

The port is served by a quarantine facility for health inspections and by District 18 customs office. Other public services and inspection agencies include the U.S. Army Corps of Engineers, United States Department of Agriculture (USDA), and the U.S. Coast Guard.

About 95-98 percent of the total annual commerce of the port is bulk cargo; the total annual commerce is about 50 million tons, of which over 18 million tons is in foreign trade. Foreign trade has a ratio of 3:1 of exports to imports by weight. The major commodities are: fertilizers, calcium and phosphates, fruits and vegetable products, grain, iron and steel products, ammonia, cement, and sulfur. The average Annual Canadian trade is about 600,000 tons for imports and 250,000 tons for exports. Mexican trade is 1,750,000 tons for imports and 400,000 tons for exports. Major Canadian imports are gypsum and granite rock, lumber and forest products, sulfuric acid and potash; while Mexican imports are liquid sulphur and sulfuric acid, ammonia, and limestone. Major exports to both countries are phosphate rock and chemicals, and scrap metal; in addition there is growing containerized cargo to Mexico (1000 tons in 1992).

1.3.8 Port of Jacksonville, Florida

The 30-year old Jacksonville Port Authority (JAXPORT) developed and expanded the Talleyrand Docks and Terminals, and the Blount Island Terminals. Blount Island facilities currently handle containers and automobiles (300 acres for automobile export/import storage). Private developers (Maxwell House plant) established a load center in Jacksonville for containerized and break-bulk coffee from South America.

Major railroads serving the port include CSX, Norfolk Southern, and Florida East Coast.

The size of trade has doubled in the past ten years for the public facilities at JAXPORT, which handled 5 million tons of cargo in 1992, including: containerized general cargos, automobiles, steel, lumber, dry and liquid bulk commodities, and frozen cargo. Major

cargos traded with Mexico and Canada include: gypsum, sulfur, crude oil, calcium and phosphates, and forest products.

1.3.9 Port of Newport News, Virginia

The port is one of the Ports of the Virginia Hampton Roads area, which is ranked among the fastest growing in the country and which are collectively operated by the Virginia Port Authority. From their central location on the Atlantic Coast, the Ports of Hampton Roads provide easy access by truck or rail to two-thirds of the U.S. population. Newport News Marine Terminals has heavy-lift capability for direct rail-to-ship loading and unloading. Newport News public terminals handle break-bulk cargo for General Electric Corporation and the Department of Defense. Major cargos handled by the port district include: coal/coke, crude oil and petroleum products, aluminum and steel products, machinery and parts, and forest/paper products. Most of the port's trade is imports of Mexican crude oil.

Major railroads serving the port include: CSX, Norfolk Southern, and Eastern Shore Railroad. Major truck lines serve the port with access to the I-95 and the I-85.

1.3.10 Port of Baltimore, Maryland

The port of Baltimore is served by Conrail and CSX railroads and is close to the I-95. The new container facility at the Seagirt Marine terminal, which opened in 1990, extends over 265 acres and has a computerized container tracking system, 7 computerized high speed cranes, and computerized gate facility consolidating all the Transport International Routier (TIR) paperwork. The facility can handle more than 150,000 TEU's annually. Dundalk Marine terminal handles general cargo, neo-bulk, RO/RO, and containerized cargo, and extends over a 570 acre area. Additional improvements are planned. North and South Locust Point terminals are multi-use facilities similar to Dundalk with additional capability for heavy-lift of steel products, and both have recently expanded in size (total of 169 acres) and equipment (heavy-lift and container cranes). Two major grain elevators operate in the port: Indiana Grain (7.5 acres, up to 13 million bushels/month) and Mississippi River Grain (6.7 acres, up to 2 million bushels/month), located at Locust Point and Canton. Other terminals include: the Pennwood Wharf (steel and iron); Fairfield (automobiles); Rukert (dry bulk and break bulk); Consolidation Coal (coal and coke); and CSX and Curtis Bay terminals (bulk ores and coal).

Adjacent to the Seagirt terminal is the 70-acre Intermodal Container Transfer Facility capable of handling more than 200,000 transfers/year, with 4.5 miles of rail tracks.

Major commodities handled by the port district include: coal and coke, grain, iron ores, iron and steel products, automobiles and machinery, petroleum products, and gypsum. Major commodities traded with Canada and Mexico are about 12 percent of the total foreign trade tonnage and include: iron ores and concentrates, coke and coal, crude oil and petroleum products, gypsum and salt, and ash.

1.4 INTERMODAL FACILITIES

This section discusses the intermodal (IM) transportation connections that involve U.S. ports trading with Mexico. IM transportation is a broad term describing any transportation system that encompasses more than one mode of transportation and any form of cargo (freight). This discussion is focused on one modal combination of ship and rail and one type of cargo, marine (international) containers. The focus is on containers because the rail facilities are considered as part of the port for other cargos, such as dry and liquid bulk, and are thus evaluated in the port facility section above. This section specifically looks at intermodal systems, ship-to-rail connection for containerized cargo for ports positioned to serve the most likely land bridges, i.e., to the Mid West and West Coast.

1.4.1 Port of Houston

Houston is a port of call to many container lines that offer services to almost anywhere in the world. Some of the container lines already have IM routes through Houston, mainly to California.

Houston has excellent rail connections, including all four Western railroads, Southern Pacific, Santa Fe, Burlington Northern and Union Pacific. Houston does not connect directly with the Eastern railroads and the Kansas City Southern/Illinois Central railroads. Nevertheless, the Houston area serves as a large transportation hub for rail traffic, for both domestic and international cargo. The proximity of Houston to Mexico, as well as its excellent rail connection with Western railroads, places Houston in a desirable position trade to the West Coast.

The large volume of intermodal traffic is served by 10 IM yards, all of which are located within 20 miles of the ports. These yards serve mainly domestic cargo and international cargo that relates to the Far East Bridge. Only one yard, at Barbours Cut terminal, is dedicated to marine containers.

Houston is the only Gulf port that has an on-dock yard. The yard is located at Barbours Cut, near Houston's main container terminal, which is also the largest container terminal in the Gulf (440,000 TEUs/year). The IM yard handles about 55,000 moves/year, including unit-train with double-stack cars. The yard is not on-terminal and located outside the marine terminal. The access to the yard is through a public road and requires drayage of about a mile. The yard is operated by only one railroad, the Southern Pacific though theoretically railcars of other railroads can be brought in for handling. Another disadvantage of the yard is the need to use the local switch railroad, the Port Terminal Railroad Association (PTRA) to bring in trains from the Southern Pacific mainline. Nevertheless, being a dedicated yard, it is quite efficient, and it is not working at full capacity. If needed, the port already has plans for expansion to provide for additional lines calling at Barbours Cut in order to establish their dedicated rail services, including those used for Mexican trade as well.

In addition to the IM yard in Barbours Cut, there are rail connections to other Houston terminals that handle containers. Although no IM transfer is presently performed at these terminals, IM yards can be established, depending on the specific needs of the line calling.

1.4.2 Port of Lake Charles

Lake Charles is a much smaller port with a single container line that calls on a regular basis. This line does not serve Mexico. However, the port has good connections to the two Western railroads, Southern Pacific and Union Pacific, as well as to the Kansas City Southern. All these railroads used to have active IM yards in Lake Charles, mainly for domestic cargo. Presently, only the Kansas City Southern has its yard active; whereas, the other two railroads closed their yards because of insufficient cargo volumes. Consequently, the Southern Pacific and Union Pacific intermodal cargo is drayed either to the IM yards in Houston or New Orleans. The Kansas City Southern yard is located about 5 miles away from the port.

A possibility to develop a Mexican service in Lake Charles exists, though probably not on a large scale and probably with a local orientation. It is unlikely that any meaningful intermodal bridge will evolve in the Lake Charles area.

1.4.3 Port of Galveston

The port of Galveston is located on an island, 50 miles south of Houston's main container terminal. The port is the closest container port to Mexico. Galveston's main liner services are to Mexico and Central and South American countries.

The port's main rail connection is to the Burlington Northern. The access to the terminal is by a local switch line, called Galveston Rail Inc. Burlington Northern is also responsible for the recent Protexa service connecting Galveston to Coatzacoalcos, Mexico, by deck barges carrying railcars. This service presently handles grain, but plans have already been drawn to add a special barge for containers. The containers moving to Mexico by barge will not be placed on railcars (as the hopper cars) but rather on deck (stacked).

The port of Galveston is the only Gulf port to have an on-terminal IM yard within the port's container terminal. The IM facility is limited to 4 working tracks, each for 10 flat cars (TTX). The IM yard is only partially active at present with about 2000 moves per year. In the past both the container terminal and its IM yard were much more active. Galveston can serve as an excellent port for relatively small lines serving Mexico, with limited volumes of IM cargo, taking advantage of the on-terminal IM yard.

1.4.4 Port of New Orleans

New Orleans has the widest selection of rail services and related IM yards of all the Gulf ports. New Orleans, with its location on the Mississippi River, can offer connection to both

the major Eastern railroads, Norfolk Southern and Chessie System, and the Western railroads, Southern Pacific and Union Pacific. New Orleans also has the south-north connection with Kansas City Southern and Illinois Central. In fact, New Orleans is the only Gulf Coast port connected to the Illinois Central (for containers), which provides the port with the shortest route to Chicago. This makes New Orleans a very desirable candidate for a Mexico to Midwest/Canada IM bridge.

The abundance of railroads in New Orleans is also reflected in the number of IM yards in the area. There are seven IM yards, with a total of over 300,000 moves annually. The largest yard, the CSX yard, has 28 acres, 90 carspots and about 100,000 lifts a year. However, more than two-thirds of the cargo handled in New Orleans yards is domestic. As for the rest, the international cargo, almost all of the boxes, especially in the yards of the eastern and western railroads, belong to the Far East or the European bridges, and to a lesser extent, Puerto Rican trade. The only significant (although still small) Mexican bridge is the one to/from the Midwest, mainly through Illinois Central, and mainly to/from Chicago.

All the IM yards in New Orleans are off-dock. The Southern Pacific and Union Pacific yards are located west of the river, about 18 miles from the main New Orleans terminals in France Road, or the equivalent of 1 to 2 hours drayage time; the Kansas City Southern, Illinois Central, NS and CSX are located east of the river, 2 to 5 miles from France Road, and 1/2 to 1 hour of drayage. The Illinois Central yard, however, is very close (1/8 mile) to the River Terminal and also handles a substantial number of containers, including those of lines calling in South and Central America.

As seen from the above discussions, the major Gulf ports, especially New Orleans and Houston, have excellent IM connection with no immediate identifiable problem. These ports are already serving large volumes of IM containers, mainly for the Far East and Europe bridges in addition to domestic IM services. The ports have rail connections to several railroads, including large, off-dock IM yards. The ports already serve Mexican bridge cargo, although it is relatively small and only responsible for a negligible portion of total IM activities. It is likely to assume that any conceivable growth in bilateral trade between the U.S. and Mexico, including its IM portion, will be served by these ports with no capacity constraints.

Except for Galveston, none of the Gulf ports has an efficient on-dock/on-terminal IM yard like those available presently in the large West and East Coast ports. Additions to such yards can facilitate trade with Mexico, especially the portion that can take advantage of the IM bridges. This assumes that the IM volume justifies the investment in such a yard. Another problem related to the on-dock yard is the need to use an additional switch by local railroad to gain access to the waterfront, which entails an additional switch charge and lost time.

Most of the smaller ports on the Gulf do not have any containerized trade, rendering the issue of IM connection irrelevant, at least for the near future. However, recently, some of the smaller ports have been successful in attracting smaller lines, providing cross-Gulf services to Mexico. If these lines have meaningful IM cargo, problems due to the lack of

IM connectivity may arise. A case in point is Gulfport, the future port of call for a new liner service to Mexico.

1.5 INSTITUTIONAL CONDITIONS AND CONSTRAINTS

The NPWI found that the port industry can be characterized as having excess capacity. Outreach efforts sponsored by the FHWA brought together shippers, carriers, and local government officials to discuss issues of capacity. These efforts resulted in a similar conclusion. This is not to imply that ports have no infrastructure improvement plans. However, port improvements are needed to improve service for existing trade and to remain competitive with respect to other ports and other modes.

The outreach efforts did identify a series of issues that are considered critical to the industry. This section contains a review of the most discussed topics.

1.5.1 Port Access

Both NPWI and port officials cite port access as the most pressing physical infrastructure problem. Ports are typically located in older sections of urbanized areas where congested roads or inadequate rail linkages to marine terminals, or both, result in inefficient delays and higher transportation costs. These problems are aggravated for ports that are experiencing growing traffic and for ports located in urban area experiencing rapid growth. In these areas, port traffic must share transportation infrastructure with non-trade related freight movements and with growing auto traffic. Decisions that determine what improvements are to be undertaken are made by local and state officials who must balance port interests against the demands from other users. Roundtable participants cited a need to improve the planning process by assuring the port needs are adequately represented in all phases of the process. Several participants indicated that Metropolitan Planning Organizations fail to weigh port concerns enough, preferring to address auto and commuter demands that represent larger political influence.

A recent survey by the American Association of Port Authorities, summarized in Table 1-5, identified various examples of landside impediments. Inadequate clearances for high-cube (i.e., 9.5 feet per container), double stack trains because of numerous bridge and tunnel restrictions in the Northeast are significant landside impediments to cost-effective intermodal container movements for ports in this region.

Numerous at-grade rail-highway crossings on the East and Gulf coasts contribute to congestion that is already significant for the large metropolitan and urban settings that spawned the growth of most East Coast and Gulf ports. Major truck routes into and out of marine terminals are, as a consequence, significant bottlenecks to the intermodal movement of containers and other general cargos.

TABLE 1-5. EXAMPLES OF LANDSIDE ACCESS IMPEDIMENTS IDENTIFIED IN AAPA SURVEY*

Impediment	Container ports (n = 25) No.	Container ports (n = 25) Percent	All Ports (n = 54) No.	All Ports (n = 54) Percent
Truck routes usually or always congested	16	64	27	50
Numerous at-grade rail-highway crossings	14	56	25	46
Inadequate clearances for high-cube double stacks	9	36	12	22
Competition increasing for available land	21	84	40	74
Restricted access improvements due to lack of land	11	44	17	31
Regulations in place or proposed restrict truck or rail operations	4	16	5	11
Development of access improvements impeded by wetland regulations				
Usually or always	6	24	11	20
Sometimes	8	32	16	30

*Source: Transportation Research Board National Research Council Report #238, *Landside Access to U.S. Ports* (February 1993)

Crucial to the competitiveness of U.S. international trade are the land transportation connections at deep water ports. These connections are key points of transfer in the intermodal system that transports the Nation's international and domestic cargo. The efficiency and effectiveness of this system could be threatened, however, by increasing bottlenecks on those few miles nearest ports, where inadequate rail and highway links to marine terminals increase cargo delays and transportation costs.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) places much of the authority for planning and resource allocation in the hands of state and local officials. Thus, ports must become active in the transportation planning process so that both local and national needs, like interstate commerce, are given full consideration in the allocation of available transportation funds.

ISTEA does not guarantee funding of improved land transportation connections to ports. It does, however, have key program provisions that afford ports the opportunity to present their access requirements to state and local transportation planning organizations for consideration of project development with the partial use Federal funds, based on specified criteria and demonstrated need.

In spite of the access problems, participants at the outreach meetings, especially the 2-day session held in New Orleans to discuss trade and traffic trends, did not believe that the cost imposed by inadequate port access affected the level of trade passing through the ports. The effect was simply to add costs to the consumers and impose costs upon local residents who had to suffer the safety, delay, noise, and pollution impacts of congestion.

1.5.2 Port Clearance Process

Staffing levels and processing procedures of the Federal Inspection Services (FIS) are not significant problems for the maritime industry. Unlike land crossing, where the major concerns are with adequate staffing by the FIS and improved procedures, the maritime community voiced little concern with either. The nature of the products carried by water, the ability to anticipate the arrival times and the relative stability in the level of callings, and the degree of automation already employed by the FIS may account for the feeling that there are no major problems in these areas.

Nationally, there are approximately 500 'Centralized Examination Stations' (CES's) operated by U.S. Customs providing cargo inspection and release functions. In most cases, these inspection stations are provided to Customs by the local port authority or port district. There may be as many as 10 to 15 satellite CES's for larger ports of entry (e.g., New York, New Orleans, Baltimore, Houston, Savannah, Miami et al.) These CES's typically are located every 8 to 10 miles along access channels to ports of entry.

Based on contacts and interviews by NPWI and the outreach meetings sponsored by FHWA, existing U.S. Customs facilities for inspection and cargo release can handle current and increased levels of trade. Ongoing improvements in the automation of U.S. Customs'

functions (such as the Automated Cargo Release system) will reduce the number of CES's needed and may allow fewer agents to process increased cargo volumes.

Some concerns were identified through the out reach process and by NPWI. Reallocation of Customs' staff is one such issue. Current budget proposals to reduce further the overall staffing of the Custom Service while at the same time increasing Customs' staffing at the Southwest U.S. border by moving current staff from other areas was of particular concern. This staffing shift, if implemented by FIS, will further reduce effective cargo handling clearance capacities for ports not in the Southwest.

Differences in the rigidity of Customs' enforcement can affect which ports are successful in attracting traffic. This applies to Federal Drug Administration (FDA) inspectors as well; it was noted that some cargo may go to the port of New York because of the experience of FDA inspectors, which expedites the clearance process.

Customs' policy of rotating inspectors can impose costs on shippers and carriers, since each port has some unique factors that must be learned by new inspectors.

1.5.3 Maritime Fees and User Charges

Maritime fees, taxes and user charges increase the costs to shippers of using water transportation. Examples of the fees which affect the cost water transportation are the harbor maintenance tax, the vessel tonnage tax, Coast Guard user fees, and various inspection services.

The current policy favors employing user charges, as an equitable means of paying for those Federal services where a direct beneficiary can be identified. The port industry is concerned with such charges because they can lead to the diversion of traffic from high cost ports or from U.S. ports to foreign ports. Many port officials have expressed concern over the recent increase in the harbor maintenance tax. A study conducted by the Treasury Department found no significant cargo diversion from the earlier fee of .04 percent. However, no follow-up study has examined the diversion issue under the new rate structure, which more than tripled to 0.125 percent, and some roundtable participants recommended that the issue be studied further.

1.5.4 Regulatory Policy

The number of Federal, State, and local government regulatory policies affecting maritime ports has increased. This leads to a need for coordination among agencies to minimize cases of conflicting policies between those agencies.

In terms of waterfront development, as with many other complex policy issues, no single agency has complete authority. Different agencies may pursue different, sometimes competing, objectives. Even among transportation agencies, officials at different levels of government often have different priorities. These differences are magnified when the goals

and objectives of environmental agencies and environmentalists and the interests of private carriers and neighborhood groups are included.

As a result, public ports cannot predict resolution of port development projects with any degree of certainty. Thus, project costs associated with planning, construction, operation, and maintenance and the risks of undertaking investments have increased.

Environmental concerns and environmental liabilities have also increased the costs of port development. Port development projects are subject to time-consuming environmental assessments, delays, and increased costs associated with restrictions on channel dredging and spoil disposal.

Local port authorities can be helped in dealing with the complex regulatory environment by having consistent definitions, guidelines, enforcement and application procedures among Federal and State regulatory authorities.

1.5.5 Port Financing

Maintenance, modification, and replacement of aging facilities impose financial burdens upon port authorities, terminal operators, and state and local communities that can be beyond the financial capabilities of these groups. Port authorities are concerned with declining funding sources at the Federal level.

The port industry also faces a serious challenge in convincing local voters and governments of their need for public funds. State and local governments are exerting more pressure on ports to become increasingly self-sufficient. Financial assistance to public ports from these governmental entities will continue to be more difficult to obtain as state and local jurisdictions face revenue shortfalls and increased demands for services. In the future, ports will have to demonstrate the economic benefits of port investments to the local community.

In the current economic climate, public ports are assuming a more "pay-as-you-go" approach to carry out investment programs. This fact is reflected in the fact that the port industry's anticipated funding sources for their projected 1992-1997 expenditures show port revenue bonds accounting for nearly 85 percent with Government grants and assistance totaling less than 5 percent.

2. PLANNED INFRASTRUCTURE IMPROVEMENTS

2.1 INTRODUCTION

Port improvement programs are necessary in a competitive industry to upgrade existing facilities and adapt to changing shipper and carrier demands. Capital expenditure programs are also critical if each port wishes to maintain its competitive position vis-a-vis alternative ports. The recent level of expenditures has been fairly consistent, running at nearly $700 million a year for the system as a whole. Table 2-1 contains geographic detail on the pattern of expenditures during the recent past.

TABLE 2-1. U.S. PORT CAPITAL EXPENDITURES FOR 1991 - 1988
(Thousands of Dollars)

	1991		1990		1989		1988	
Region	Expenditures	Percent	Expenditures	Percent	Expenditures	Percent	Expenditures	Percent
North Atlantic	$124,399	18.2%	$116,365	17.4%	$155,981	22.6%	$178,370	26.0%
South Atlantic	$109,639	16.1%	$169,303	25.3%	$146,355	21.2%	$135,569	19.8%
Gulf	$156,091	22.9%	$97,669	14.6%	$97,122	14.1%	$82,098	12.0%
South Pacific	$206,406	30.3%	$209,906	31.4%	$149,279	21.7%	$176,417	25.8%
North Pacific	$84,851	12.4%	$60,402	9.0%	$106,142	15.4%	$75,010	11.0%
Great Lakes	$653	0.1%	$4,271	0.6%	$2,569	0.4%	$830	0.1%
AK, HI, PR, and VI*	--	--	$10,177	1.5%	$16,971	2.5%	$23,113	3.4%
Guam, Saipan	--	--	--	--	$14,799	2.1%	$13,356	2.0%
Total	$682,039	100.0%	$668,093	100.0%	$689,218	100.0%	$684,763	100.0%
Annual Change		+2.1%		-3.1%		+0.6%		

* Alaska, Hawaii, Puerto Rico, & Virgin Islands
Source: United States Port Development Expenditure Report U.S. DOT (MARAD) March 1993.

Estimates of the planned expenditures for the period 1993-1998 were assembled by American Association of Port Authorities (AAPA). These figures show planned investments running at close to the same level as seen in the 1988-1991 period. There is, however, a noticeable difference in that estimates for capital expenditures for the South Pacific ports represent a larger share of the system total than had previously been the case. For the near future, these West Coast ports are expected to account for 37.4 percent of the total; whereas, in the recent past, they amounted to no more that 31.4 percent. From 1946 to 1991, these ports

represented only 22.5 percent of total expenditures. This changing pattern reflects the relative increase in West Coast trade in general. U.S.-Mexican trade remains concentrated in the Gulf of Mexico, however. Table 2-2 contains the expenditure forecasts.

TABLE 2-2. U.S. PORT CAPITAL EXPENDITURES FOR 1991 - 1946
(Thousands of Dollars)

Region	Expenditures	Percent
North Atlantic	$649,898	11.8%
South Atlantic	$1,151,248	20.9%
Gulf	$723,178	13.1%
South Pacific	$2,065,863	37.4%
North Pacific	$811,631	14.7%
Great Lakes	$60,373	1.1%
AK, HI, PR, and VI*	$57,000	1.0%
Guam, Saipan	$48	0.0%
Total	$5,519,239	100.0%

* Alaska, Hawaii, Puerto Rico, & Virgin Islands
Source: AAPA Annual Port Expenditure Survey, Spring 1993.

Ports finance the planned construction and modernization efforts through a variety of means. However, as noted previously, port authorities increasingly are shifting to "pay-as-you-go" methods that must rely more heavily upon revenue sources. This point is demonstrated by the sources of listed in Table 2-3. In 1991, Port Revenues and Revenue Bonds were the major sources of funds for capital expenditures. Estimates from the AAPA survey of planned expenditures show that the trend is likely to continue. Table 2-4 contains the breakdown by funds source for the period 1993-1998.

The NPWI has found that ports are attempting to shift portions of the capital improvements to address some of the access problems discussed earlier. These include landside access/egress areas (i.e., road access, removal of at grade rail crossings, land-banking of surrounding properties for future expansion) away from marine terminal infrastructure (i.e., added berthage, cargo sheds, cargo handling equipment, etc.). A new emphasis on infrastructure investments that are land-side driven and integrated with water transportation activities (i.e., inland terminals, intermodal container transfer facilities, removal of at grade crossings, improved highway access, etc.) may be the direct and long-term solution to improving the productivity and capacity of the existing U.S. port system now constrained by access limitations.

TABLE 2-3. U.S. PORT CAPITAL EXPENDITURES BY TYPES OF FINANCING METHOD - 1991
(Thousand of Dollars)[1]/
Facility Financing Methods

Region	Port Rev.	Pct.	G.O. Bonds	Pct.	Rev. Bonds	Pct.	Loans	Pct.	Grants	Pct.	Other	Pct.	Total
North Atlantic	61,950	20.2%	22,586	22.0%	22,567	17.0%	--	--	13,330	40.3%	3,966	8.2%	124,399
South Atlantic	13,756	4.5%	15,338	14.9%	53,322	40.1%	16,404	60.5%	3,299	10.0%	7,520	15.6%	109,639
Gulf	73,657	24.1%	44,076	42.9%	5,160	3.9%	8,468	31.2%	6,280	19.0%	18,450	38.3%	156,091
South Pacific	128,659	42.9%	1,434	1.4%	50,926	38.3%	2,237	8.3%	4,958	15.0%	18,192	37.8%	206,406
North Pacific	27,880	9.1%	19,263	18.8%	1,052	0.8%	--	--	4,656	14.1%	--	--	52,851
Great Lakes	117	0.0%	--	--	--	--	--	--	536	1.6%	--	--	653
AK,HI,PR,VI	--	--	--	--	--	--	--	--	--	--	--	--	--
Guam, Saipan	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	$306,019	100.0%	$102,697	100.0%	$133,027	100.0%	$27,109	100.0%	$33,059	100.0%	$48,128	100.0%	$650,039
% by Funding Source		47.1%		15.8%		20.5%		4.2%		5.1%		7.4%	

1/ Excludes expenditures of $32,000,000 for which there was no information on funding source.
Source: AAPA Annual Port Expenditure Survey

TABLE 2-4. U.S. PORT CAPITAL EXPENDITURES BY TYPE OF FINANCING METHOD FOR 1993 - 1998
(Thousands of Dollars) 1/
Facility Financing Methods

Region	Port Rev.	Pct.	G/O Bonds	Pct.	Rev. Bonds	Pct.	Loans	Pct.	Grants	Pct.	Other	Pct.	Total
North Atlantic	112,005	7.7%	19,053	2.4%	41,509	2.7%	--	--	35,738	25.4%	118,040	26.9%	326,345
South Atlantic	60,747	4.2%	439,858	54.5%	263,710	17.4%	206,000	97.1%	41,844	29.7%	86,619	19.8%	1,098,778
Gulf	289,515	20.0%	269,345	33.4%	54,750	3.6%	--	--	26,180	18.6%	82,029	18.7%	721,819
South Pacific	851,414	58.9%	2,988	0.4%	1,071,406	70.5%	4,138	2.0%	10,639	7.6%	125,326	28.6%	2,065,911
North Pacific	128,322	8.9%	19,912	2.5%	87,748	5.8%	2,055	1.0%	26,350	18.7%	26,344	6.0%	290,731
Great Lakes	4,373	0.3%	56,000	6.9%	--	--	--	--	--	--	--	--	60,373
AK,HI,PR,VI	--	--	--	--	--	--	--	--	--	--	--	--	--
Guam, Saipan	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	$1,446,376	100.0%	$807,156	100.0%	$1,519,123	100.0%	$212,193	100.0%	$140,751	100.0%	$438,358	100.0%	$4,563,957
% by Funding Source		31.7%		17.7%		33.3%		4.6%		3.1%		9.6%	100%

1/ Excludes expenditures of $955,282,000 for which there was no information on funding source.

This new direction raises questions of who has the responsibility or authority to undertake landside investment, since many of the problems occurring on the port landside are confounded with other transportation and environmental issues. Thus, the increased need for cooperation and coordination of efforts among state, local and community interests is further justified.

2.2 PLANNED IMPROVEMENTS AT MAJOR PORTS

This sections reviews plans for capacity improvements at the major East Coast and Gulf ports active in the U.S.-Mexico trade.

2.2.1 Port of Houston, Texas

The port facilities include four public terminals and a 44 berth Turning Basin with a depth of 38 feet, as well as a significant number of private terminals. Among the public terminals are: the bulk plant that handles primarily export bulk materials with the major cargo being pet coke for export, and Jacinto Port, which handles bagged and boxed goods. Public facilities also include Barbours Cut, the container terminal located half way up to the Houston Ship Channel, 25 miles from the Gulf. When fully constructed, this terminal will have 6 berths and 12 container cranes. The fourth public terminal is Bay Port. This facility will be developed after the completion of Barbours Cut and is anticipated to begin by 1996.

The Port of Houston is a 25-mile-long (40-kilometer) complex of diversified public and private facilities just a few hours' sailing time from the Gulf of Mexico. Houston's location makes it an ideal gateway between interior U.S. markets and foreign countries throughout the world.

Existing facilities offer shippers deep-water access to world markets and a direct link to 14,000 miles of U.S. intracoastal and navigable inland waterways. Four major railroads and more than 120 trucking lines connect the port to the continental United States, Canada, and Mexico. Air service is also easily accessible through two major public airports and dozens of private terminals.

Ample space and favorable conditions for industrial development as well as for cargo handling make Houston an attractive location for industry. Private companies have invested more than $17 billion in manufacturing and processing facilities along the Houston Ship Channel since 1975.

The port is adequately served by rail, highway and pipelines. The only significant physical impediment in the Houston port area involves the planned highway access enhancement project over the Houston Ship Channel. This project is part of Texas Department of Transportation's overall plan for the Grand Parkway. The problem involves the bridge on State Highway 146 connecting it to State Highway 225. The port would like a clearance of 28 to 30 feet because there are a number of oversized loads moved into this area by truck.

Port officials were advised that raising the clearance from the planned 16.5 feet to 30 feet would increase the cost $7-$8 million.

Currently, there are plans to widen the Ship Channel to 530 feet and increase its depth to 45 feet in order to handle the increasing size of ocean ships. Dredging and other environmental issues are delaying this project.

2.2.2 Port of Galveston, Texas

Galveston operates most of its facilities as a landlord and is trying to put as much back into private hands as possible. The port owns and operates for-hire public wharves, transit sheds, open and covered storage facilities, warehouses, and freight handling facilities. The port leases land facilities to other tenants.

Facilities at the Port Galveston include: a terminal railroad, warehouse and storage facilities, a container terminal, a banana terminal, a raw sugar terminal, a project cargo terminal, two grain elevators (one operated by the port and one private), a liquid bulk terminal and a private export sulfur terminal. A number of small boat berths, several restaurants and retail seafood shop, a waterfront development area known as the "window to the waterfront" for Galveston's citizens and tourists, and a cruise ship terminal complete the tourist-related projects located on the Galveston waterfront.

Because of terminal operating hours, there is a concentration of container truck traffic in the morning and after lunch. At times, these trucks are backed up from 9th Street all the way to 22nd Street. In the morning, the container terminal opens at 8:00 a.m. and the waiting line of trucks starts well before then, sometimes even before daylight. This creates a very hazardous situation, especially when combined with the traffic that is generated from the local medical center.

As a solution to this problem, a project is being studied to develop a fly-over to the Causeway. This would provide a direct connection to and from the container terminal, eliminate four at-grade crossings, and improve traffic flows. The study includes widening the Causeway and the "Y" junction where I-45, and State Highways 6, 146, and Loop 197 come together, about 15 miles north of Galveston.

The study, currently called the Galveston Highway Mobility Plan, was initiated by the state highway department. Currently, the Causeway is three lanes with narrow shoulders. In the new project, there will be four lanes on each Causeway, complete with shoulders, extending about 15 miles north to the "Y" junction. To access the port, traffic must take the Causeway to 81st Street and then cut over to Port Industrial Boulevard. The estimated cost of this project is $38 million to widen the causeways, $5 million to build connector to the "Y" junction, $24 million for Offatts Bayou crossing, and $6 million for the flyover to Port Industrial Boulevard.

The plan would eliminate four at-grade rail crossings and the dangerous turns needed to access the Causeway. With this new flyover, safety would be improved. In addition to the

removal of the at-grade crossings, a better and safer hazmat route would be created, and in the event of a hurricane or other emergency requiring evacuation, traffic flows would be improved.

2.2.3 Port of New Orleans, Louisiana

Recent completed projects include site preparation for the Nashville Avenue Terminal Complex. When finished, the complex will encompass 3150 linear feet of heavy-duty wharf and 32 acres of marshaling area between the Nashville and Napoleon Avenue wharves. Offering about 141,000 square feet of new shedded area, the Nashville Avenue Terminal Complex is designed to be a multipurpose development, with container crane capabilities and rail service at the front and rear of the wharf.

The complex will link two of the port's busiest wharves, Nashville Avenue and Napoleon Avenue, into one super terminal. Completion of the first wharf and shed is targeted for August 1993, and total construction at the site should be complete by April of 1995. The new dock connecting the Nashville and Napoleon Avenue wharves will create a continuous quay stretching from the Henry Clay Avenue Wharf to the Milan Street Wharf, a distance of over two miles.

Also completed during 1993 was the Harmony to Louisiana connecting wharf designed to bridge the gap between the Harmony Street and Louisiana Avenue wharves. The link makes it easier for one operator to use both facilities and creates additional berthing space. The Harmony Street-First Street Terminal is being developed to meet the special needs of steel and neo-bulk freight.

The Jourdan Road RO/RO facility was also finished, as well as some portwide terminal improvements. Overall, $1.4 million in portwide improvements, consisting of road, access, signage and landscaping projects, are planned to be finished during 1993.

The corridor project is a joint venture between the city of New Orleans and the port and is designed to improve the flow of traffic to and from the port's wharves. The project will create additional lanes exclusively for port-related traffic.

The Napoleon Avenue downstream extension project, which will extend the wharf 200 feet out into the Mississippi River, is under way with the completion of the geotechnical investigation as well as the test pile design. Construction on this project - which has been moved up in anticipation of relinquishing control of downtown wharves - is set to begin in July 1993.

The Louisiana Avenue terminal improvements include tearing down the existing shed and building a larger one, plus additional paving in the area. Seventy-five percent of the design is finished and construction of the shed should start in September 1993. The Louisiana Avenue Multipurpose Terminal is being remodeled to make it more attractive to ocean carriers handling container, break-bulk and neo-bulk cargos.

Also under way are portwide railroad track improvements, which are part of the Strategic Rail Plan. In conjunction with the $1 million railroad track enhancements, electronic data interchange (EDI) and rail car management systems are currently on line and undergoing refinement.

Construction of a proposed intermodal container transfer facility (ICTF) is also being examined. The ICTF would help centralized the port's dynamic intermodal activities to ensure faster, more effective, and more efficient movement of cargo via New Orleans.

Other capital improvement projects that have reached the design stages include plans for a new board office building and improvements totaling $14 million to the France Road roadway whose entrance to the intermodal area on the north end is 90 percent complete.

New ventures proposed include the Central Business District river front development and a series of improvements in anticipation of the introduction of riverboat gaming. Riverfront development includes construction of a temporary cruise terminal, to be located at the Julia Street Wharf. Port staff has finalized negotiations with the cruise line and has begun terminal design. Parking lot construction is due to start in the Fall.

The Cold Storage Facility is another project addition. Site and cost analysis, as well as a time study on the development of the on-dock cold storage warehouse, have been completed.

2.2.4 Port of Baton Rouge, Louisiana

Table 2-5 provides a summary of recently completed port related improvements along with proposed additions through 1993. Substantial funding comes from the Louisiana State Transportation Trust Fund.

The port has also proposed an Inland River Marine Terminal on the Intercoastal Canal that will provide slack water barge loading/unloading facilities for the handling and open storage of bulk cargos. The terminal will also serve as a facility for barge, tug boat and equipment repair.

Through the construction of the Inland Rivers Marine Terminal, the port also hopes to strengthen its link as a sister port of the Port of Alexandria. The link is particularly important for the movement of forestry products, such as logs and wood chips, from north Louisiana to an export port. If the terminal is constructed, the Port of Greater Baton Rouge and the Port of Alexandria will be in a better position to cooperate and jointly market their facilities to forestry product companies, since open storage facilities would be available to accommodate the needs of the shippers.

TABLE 2-5. SUMMARY OF RECENT PORT IMPROVEMENTS

Funding Year	Project	DOTD Share	Port Share	Total
1990-91	62,000 sq.ft. Transit Shed Ext.	$3,525,000	0	$3,525,000
1990-91	Westway Trading Molasses Term. Renovation I	350,250	116,750	467,000
1991-92	" " " Phase II	842,175	280,725	1,122,900
Proposed				
1991-92	Dock Access Impr	2,100,000	0	2,100,000
1992-93	Water Sys. Rehab	501,996	167,332	669,328
TOTAL		$7,319,421	$564,807	$7,884,228

2.2.5 Port of Mobile, Alabama

The State Docks' facilities at the port of Mobile include 26 general cargo piers where various types of cargo are handled on a regular basis; a container port operation for shippers using intermodal services; a RO/RO berth to accommodate Roll On/Roll Off vessels; a Bulk Materials Handling Plant to move both import and export bulk ores, coal and coke; the biggest export coal operation on the U.S. Gulf; and a large grain elevator operation.

Management at the State Docks is working to upgrade and improve the port complex. New facilities under development include a 175,000-square-foot forest products terminal, a steel and heavy lift operations berth, and a rubber-receiving facility.

Additional covered warehouse space is to be added at the State Docks during the next two years. Construction will begin soon on two warehouses that will total nearly 250,000 square feet. Property clearing is in progress and site preparation should begin mid-year.

To be located at Berth E, the 126,000-square-foot twin building will face each other. They will be separated by a 47,000-square-foot marshaling area and will be adjacent to a new 400-foot pier. Berth E is the area north of the grain elevator and just south of the Bulk Material Handling Plant. Cost of the new project is estimated to be $21.5 million.

A new 153,000-square-foot warehouse, with a new 500-foot pier, has been opened on Blakeley Island, which is across Mobile River from the main docks complex, at a total cost of $8.5 million. An existing warehouse was reworked in order to handle steel at a cost of more than a quarter of a million dollars. Railroad tracks and facilities have been upgraded and reworked and environmental projects have been completed.

A 21-acre site adjacent to the new Blakeley Terminal has been purchased for future expansion. The Docks now owns 1400 feet of waterfront on that side of the Mobile River, all of which is near the Federal Turning Basin.

In addition, the Docks owns about 650 acres of property available for development at Theodore Industrial Park. Many industries have located there, including DeGussa and Kerr-McGee, and there is a turning basin and ship channel that accommodates ocean-going vessels. CSX provides rail service to the park.

2.2.6 Port of Jacksonville, Florida

The Jacksonville Port Authority has begun a $206 million acquisition and development plan for up to 3000 acres for deep water port facilities that would compliment JAXPORT's existing 1040 acre port terminal complex.

All tracts of land under consideration for port expansion are attractive because all are slated to port development under the city's comprehensive master plan. All are easily accessible by rail and highway, and all should benefit from the proposed plan to deepen the harbor from 38 feet to 42 feet. The feasibility study for the harbor deepening project - the first step towards actual dredging - has been fully funded by the Federal Government.

In addition, an area-wide Development of Regional Impact (DRI) study is nearing completion for Blount Island and Dames Point, and a DRI is underway for the area around Talleyrand Dock & Terminals.

Areas of the Jacksonville harbor targeted for development include the following: Approximately 1094 acres on the eastern half of Blount Island, which JAXPORT does not currently own; and approximately 900 acres surrounding Talleyrand Docks & Terminals. The Talleyrand re-development area is bordered by the St. Johns River, the approach to the Mathews Bridge, the Haines Street Expressway and 21st Street. The area would be converted to port terminal facilities, light manufacturing, warehousing and distribution.

Engineering and design work would begin concurrently with property acquisition, probably in the second quarter of 1993, and construction would begin soon after.

Additional property not acquired immediately, will be developed in phases from the port's existing revenue stream, which will be augmented in future years by the port's share of the city's telecommunications excise tax.

The port has also purchased two new 40-ton Panamax container cranes for their Talleyrand container handling terminal. These cranes due for delivery in late 1993, early 1994 will give JAZPORT a total of nine containers cranes.

2.2.7 Virginia Port Authority, Virginia

2.2.7.1. Newport News Marine Terminal - Currently underway is a 186-foot extension of the north berth of Pier C at Newport News Marine Terminal at a cost of $5,651,500 to handle vessels up to 1000-feet in length. Further work on Pier C includes modification of the transit sheds to provide for more productive materials handling at a cost of $1 million.

Also, Pier 8 will be moved and the sheetpiling/bulkheading between Pier C and the adjacent property will be rebuilt at a cost of $1 million. Paving, drainage, and lighting of 35 additional acres of cargo storage area was recently completed at a cost of $10,793,500.

The completion of these projects will finalize the development of the property owned by the VPA at this terminal.

2.2.7.2. Norfolk International Terminals - The Virginia Port Authority has acquired 300 acres north of this terminal. Approximately $400 million will be spent to develop this property. The rail yard on this property will be realigned for greater efficiency. This terminal has direct connection with Norfolk Southern Railroad, which brings two Midwest intermodal trains in daily, as well as a double-stack train in daily for loading and unloading.

2.2.7.3. Portsmouth Marine Terminal - A $34 million expansion program is underway at this terminal. The terminal's marginal pier will have 1000 feet of berth space added and will connect with the Sea-Land pier. A container crane has been purchased. Also, 35 acres of land is being created by bulkheading and filling a portion of property along the east waterfront area.

3. EXISTING TRADE CORRIDORS

3.1 INTRODUCTION

The purpose of this analysis is to identify and describe the U.S.-Mexico trade corridors employing the ports of entry and exit along the U.S. East Coast and Gulf Coast. In terms of total value and number of shipments, the present trade between the U.S. and Mexico is heavily dominated by the land modes. This appears to be true for all states and for all commodity classes, except for the shipment of petroleum and petroleum products. Thus, the major portion of the nation's imports and exports flow over the highway and rail crossings, primarily along the Texas-Mexico border. Nonetheless, the waterborne trades between the East Coast and Gulf ports are significant in that they represent a far higher proportion of trade when measured in terms of tonnage, and weight is often a more appropriate measure of the demands being placed on the transportation systems than the dollar value of the commodities being shipped. In addition, although the waterborne trade may be relatively small when compared to the land trade, it is, nevertheless, large in absolute terms, amounting to $5.3 billion in imports and $1.9 billion in exports for 1992. Finally, as noted in the previous sections, there is excess capacity within the port systems, which could be used to handle greater trade with Mexico. Depending upon which commodities are expected to grow and what origins and destinations are involved, East Coast and Gulf ports could provide relief to offset the increasing demands facing the border crossings.

This chapter presents an analysis of the existing U.S.-Mexican trade corridors that include East Coast and Gulf Coast ports. These ports include those extending from Eastport, Maine, to Brownsville, Texas.[1] Before characterizing the waterborne trade flows in this region, background information is given on the total trade between the U.S. and Mexico. This is followed by a discussion on the total trade between the Eastern U.S., defined as all states east of the Mississippi, and Mexico. With this background material in mind, the waterborne flows are discussed.

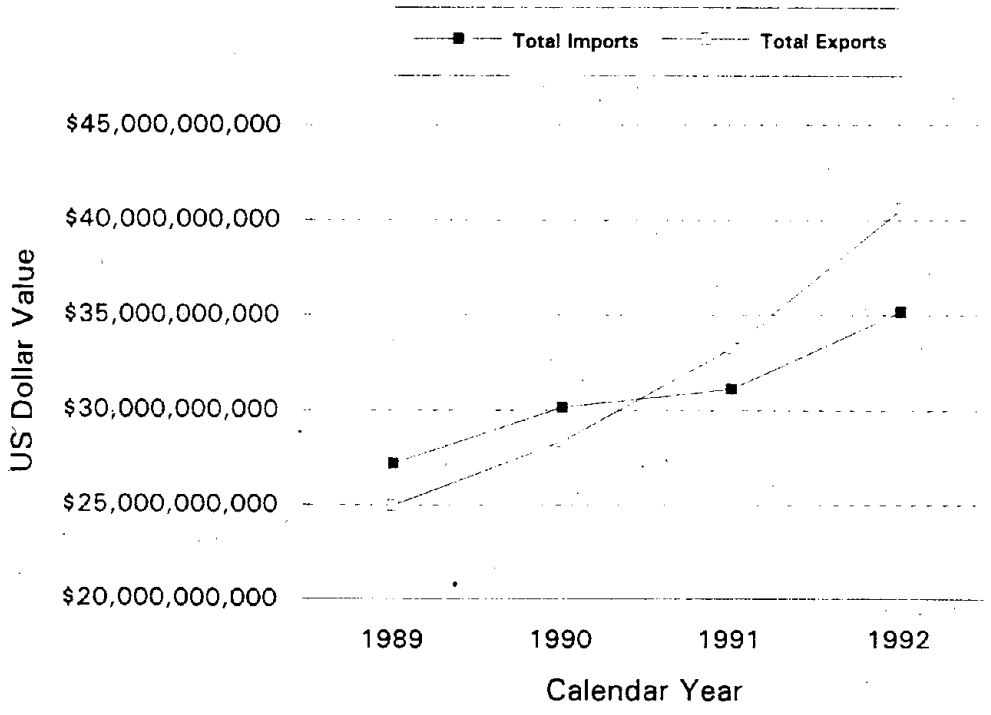
3.2 AGGREGATE TRADE FLOW PATTERNS

Total trade between the U.S. and Mexico over the 4-year period 1989-1992 shows a consistent growth. This can be seen in the data presented in Table 3-1. The growth began in earnest upon the acceptance by Mexico of the GATT. In recent years, the liberalization of Mexico's tariff and trade restrictions have proven to be advantageous to the U.S. Both U.S. exports and imports have been growing, at annual average rates of 17.6 percent and 8.9

[1]For this analysis, the U.S. Bureau of the Census made a special run of the detailed foreign trade data. Those fields of little use to the study and data that might disclose proprietary information were deleted. Otherwise the detailed records were made available to the study team.

TABLE 3-1. Growth in Total Trade with Mexico

Year	Total Imports	Total Exports
1989	$27,186,257,531	$24,968,823,301
1990	$30,172,293,091	$28,375,467,534
1991	$31,129,557,034	$33,275,780,142
1992	$35,184,149,069	$40,597,477,437



percent, respectively, and terms of the balance of trade, the higher U.S. export rate resulted in exports overtaking imports in 1991.

In terms of transportation, motor carriers and railroads have carried the vast bulk of the increase in trade between the two countries. Tables 3-2 and 3-3 contain information on the mode of transport of both imports and exports. Land transport modes have been the largest carriers of both imports and exports when measured in value of commodities carried. Over the four years, the value of commodities shipped by land has increased at an average annual rate of 18.1 percent for exports and 9.1 percent for imports. On the other hand, waterborne exports and imports increased at average annual rates of 5.0 percent and 4.4 percent, respectively; and air freight grew at 24.1 percent for exports and 48.1 percent for imports. The impact of the substantially higher growth rates for air are offset by the relatively small base. However, in the last two years, the value of air shipments has exceeded that of waterborne shipments. On balance, the increase in demand placed upon the infrastructure of ports of entry or exit has been substantially at the land crossings between Mexico and the U.S.

The composition of the trade is shown in Tables 3-4 and 3-5. For these tables, all shipments to or from Mexico have been classified into broad groups, which are aggregations of the more detailed commodity information shown in the Data Appendices. The classes were selected to capture as fully as possible the types of commodities while limiting the number of classes for ease of analysis and exposition. The class definitions are tailored to the detail of waterborne movements and, consequently, obscure some detail on land movements. However, the analysis of the Southwestern border crossings addresses these movements specifically.

A review of major commodity groups shipped to or from Mexico reveals one of the reasons that land shipments have grown significantly, while water shipments have grown at a more modest rate. Much of the growth in trade has been with commodities of higher value that are presumably more sensitive to the time in transit. Currently (in 1992), nearly half of exports and imports are classified in the manufactured category of Machinery/Appliances/ Vehicles, as shown in Table 3-6. To the extent that this trade is serving the maquilla industries, the rates (and patterns) of growth could shift abruptly under provisions like those of the North American Free Trade Agreement (NAFTA).

A second major reason for the higher growth rate for land shipments than for water relates to the geographic patterns of shipments from and to the U.S. Table 3-7 and Figure 3-1 list states exporting to Mexico, ranked by dollar value of exports. The dominant states are border states, Texas and California in particular, from which water movements should generally not be cost-effective. Closely following the border states are those states in the industrial Northeast, which have established strong Northeast to Texas highway and rail routes. Admittedly, there are problems with the geographic information in the data.[2]

[2]There are reporting problems that result from mis-specification of the origin or destination of shipments. There are also institutional factors that make it more likely to have a change in ownership of the commodity, either to an independent or related second party, at the border. This could lead to citing the border state as the origin of the shipment. This mis-statement of the true origin is also possible when a commodity changes modes of transport at or near a port of exit.

TABLE 3-2. US Exports to Mexico by Mode

YEAR	Air	Water	Land	Total
1989	$1,121,469,799	$1,616,829,905	$22,230,523,597	$24,968,823,301
1990	$1,377,932,697	$1,527,407,597	$25,470,127,240	$28,375,467,534
1991	$1,543,049,852	$1,509,395,682	$30,223,334,608	$33,275,780,142
1992	$2,147,997,560	$1,870,645,721	$36,578,834,156	$40,597,477,437

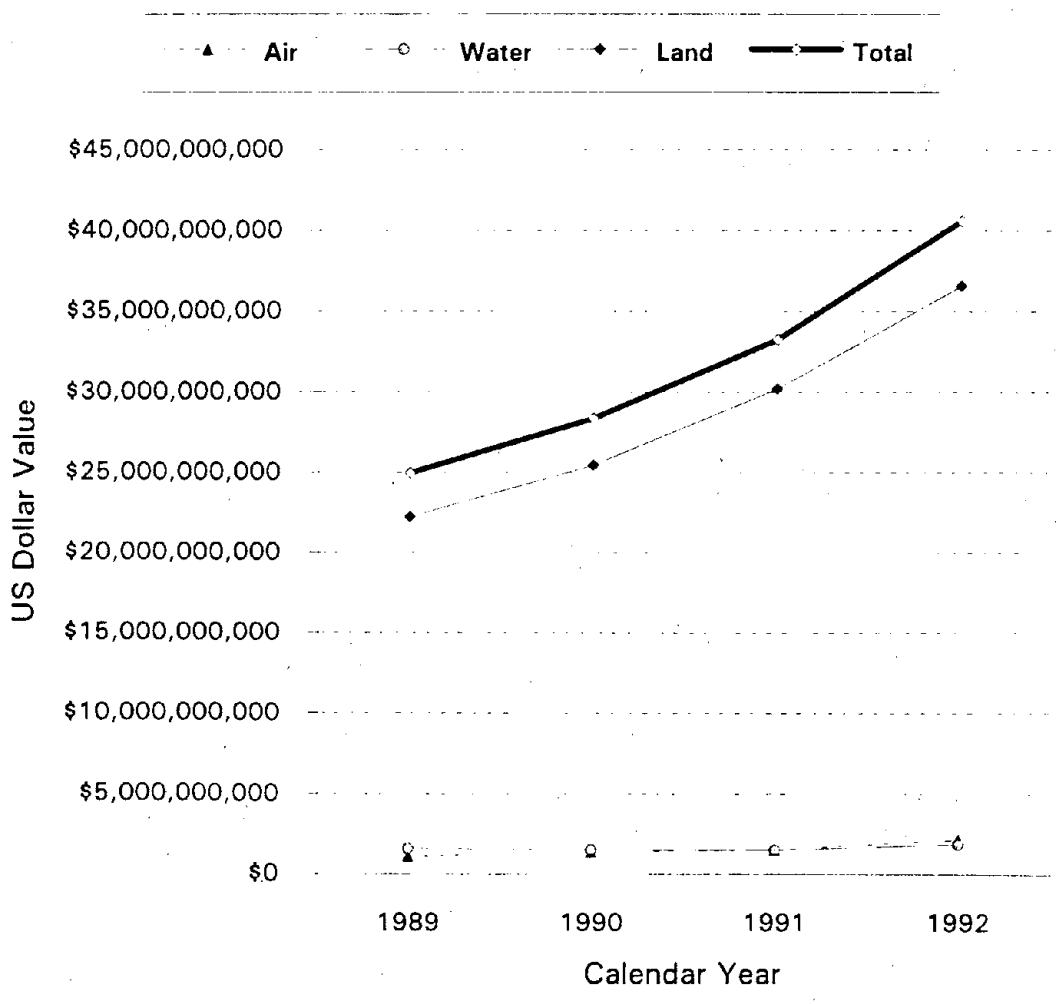


TABLE 3-3. US Imports from Mexico by Mode

YEAR	Air	Water	Land	Total
1989	$248,164,964	$4,670,648,853	$22,267,443,714	$27,186,257,531
1990	$572,150,816	$5,763,776,018	$23,836,366,257	$30,172,293,091
1991	$659,527,734	$5,260,029,592	$25,209,999,708	$31,129,557,034
1992	$805,965,119	$5,321,834,563	$29,056,349,387	$35,184,149,069

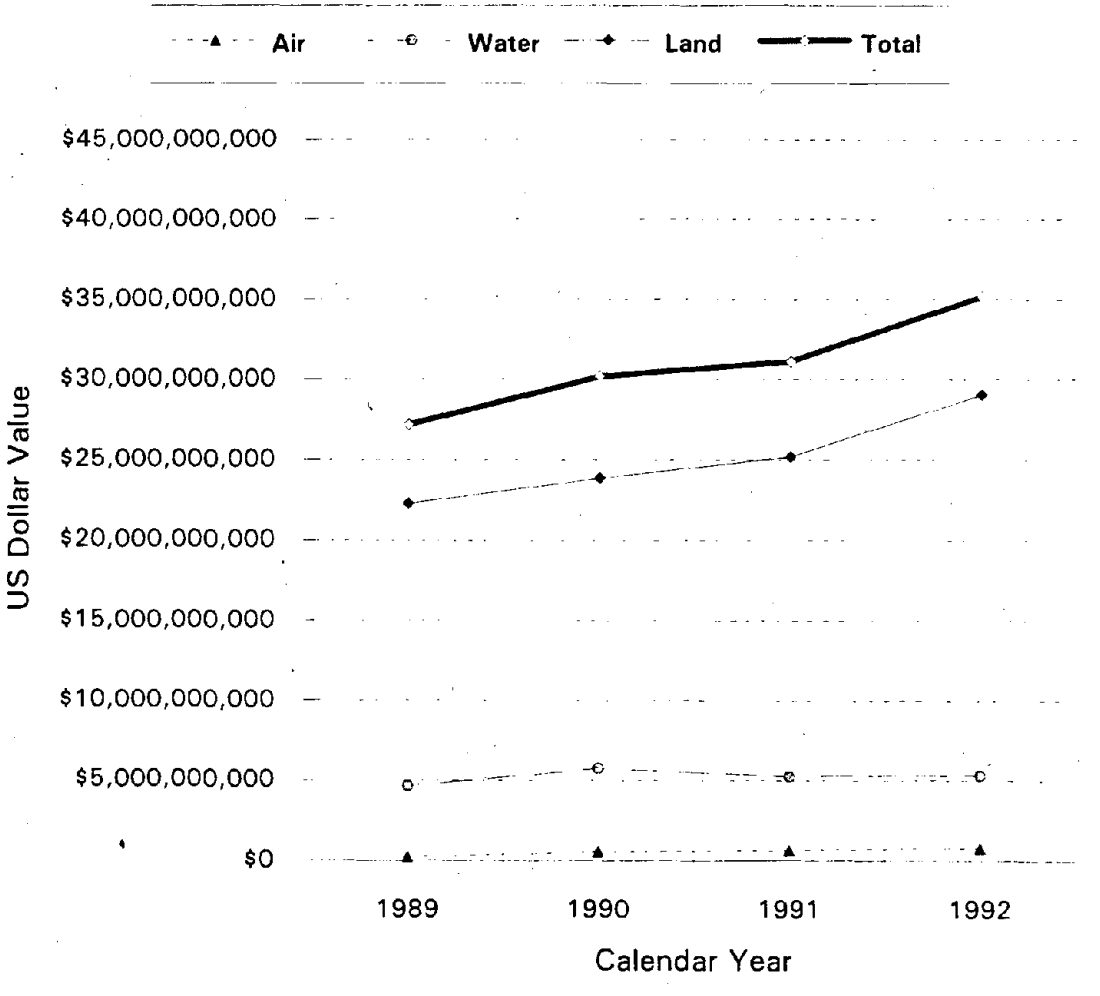


TABLE 3-4.
U.S. EXPORTS TO MEXICO BY COMMODITY

Commodity Class	1989		1990		1991		1992	
	Mil of $	%	Mil of $	%	Mil of $	%	Mil of $	%
Animals/Products	822	3	625	2	1055	3	1219	3
Vegetables/Products	1863	7	1836	6	1824	5	2421	6
Extractive	109	0	113	0	145	0	115	0
Petroleum	722	3	827	3	908	3	1239	3
Chemicals/Plastics	2938	12	3169	11	3641	11	4459	11
Metals/Products	1732	7	1985	7	2521	8	2967	7
Machnry/Appl/Veh	11419	46	13627	48	15709	47	17127	47
Miscellaneous	5363	21	6194	22	7474	22	9050	22
Total	24969	100	28375	100	33276	100	40597	100

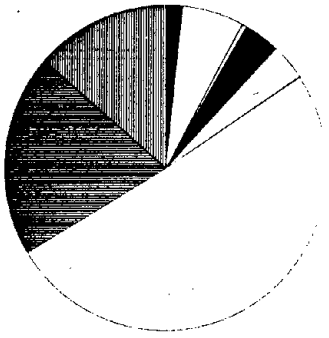
TABLE 3-5.
U.S. IMPORTS FROM MEXICO BY COMMODITY

Commodity Class	1989		1990		1991		1992	
	Mil of $	%	Mil of $	%	Mil of $	%	Mil of $	%
Animals/Products	718	3	744	2	711	2	643	2
Vegetables/Products	2042	8	2265	8	2201	7	2113	6
Extractive	412	2	426	1	346	1	267	1
Petroleum	4299	16	5288	18	4672	15	4732	13
Chemicals/Plastics	874	3	952	3	1037	3	1196	3
Metals/Products	1234	5	1281	4	1164	4	1325	4
Machnry/Appl/Veh	12296	45	13826	46	15040	48	17881	51
Miscellaneous	5310	20	5391	18	5957	19	7027	20
Total	27186	100	30172	100	31130	100	35184	100

TABLE 3-6. Composition of Total Trade in 1992

Commodity Class	Total Imports	Total Exports
Animals/Products	$643,440,436	$1,219,268,348
Vegetables	$2,112,923,011	$2,420,673,931
Extractive	$266,819,948	$115,187,768
Chemicals/Plastics	$1,195,667,449	$4,459,370,180
Metals/Products	$1,325,037,036	$2,966,565,470
Machnry/Appl/Vehicles	$17,881,337,404	$19,127,488,955
Miscellaneous	$7,027,265,268	$9,049,634,898
Petroleum	$4,731,658,517	$1,239,287,887
Totals	**$35,184,149,069**	**$40,597,477,437**

Composition of the Total Imports in 1992



Composition of the Total Exports in 1992

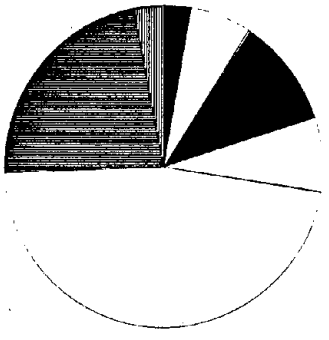
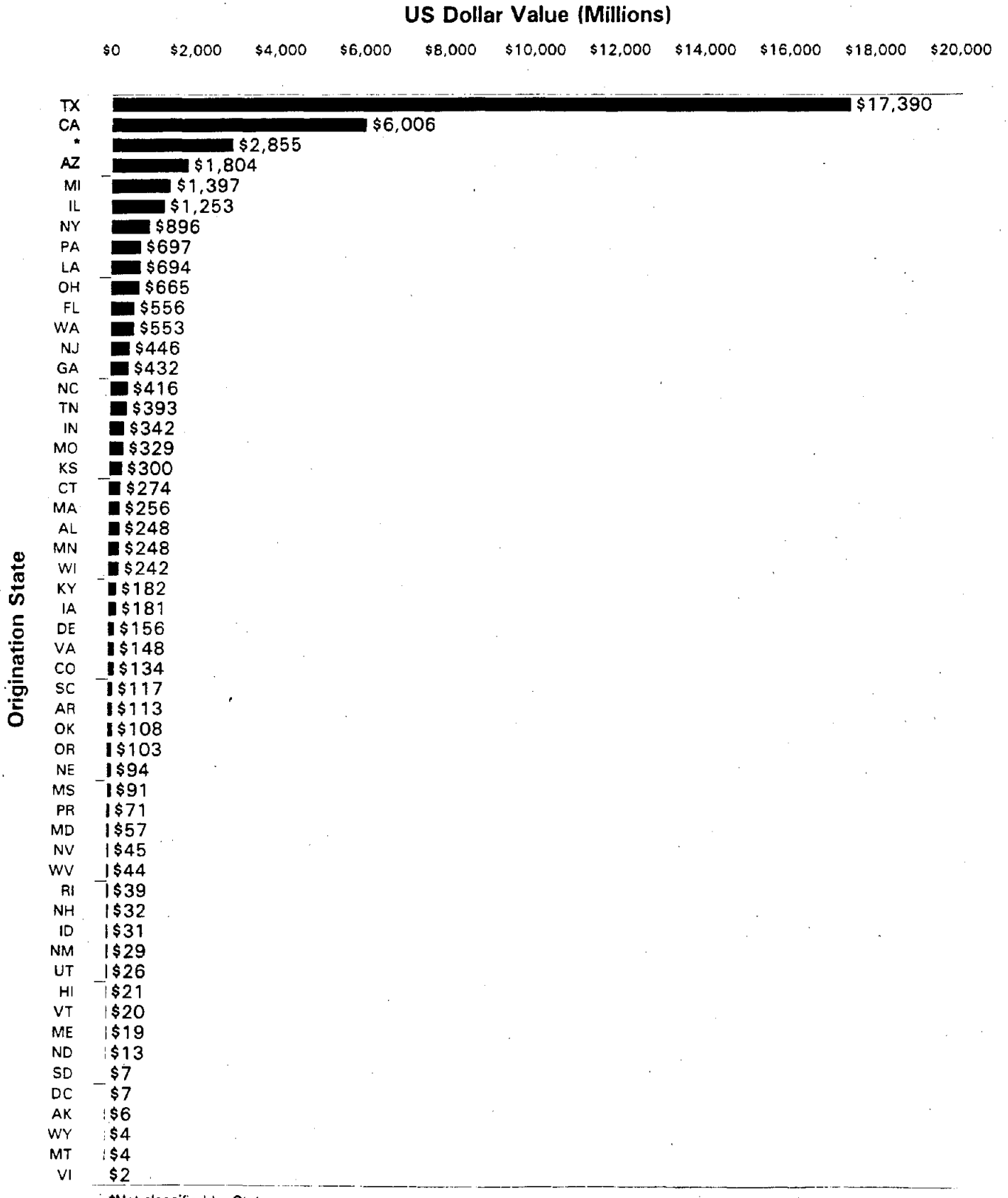


TABLE 3-7. U.S. EXPORTS TO MEXICO BY STATE



*Not classified by State

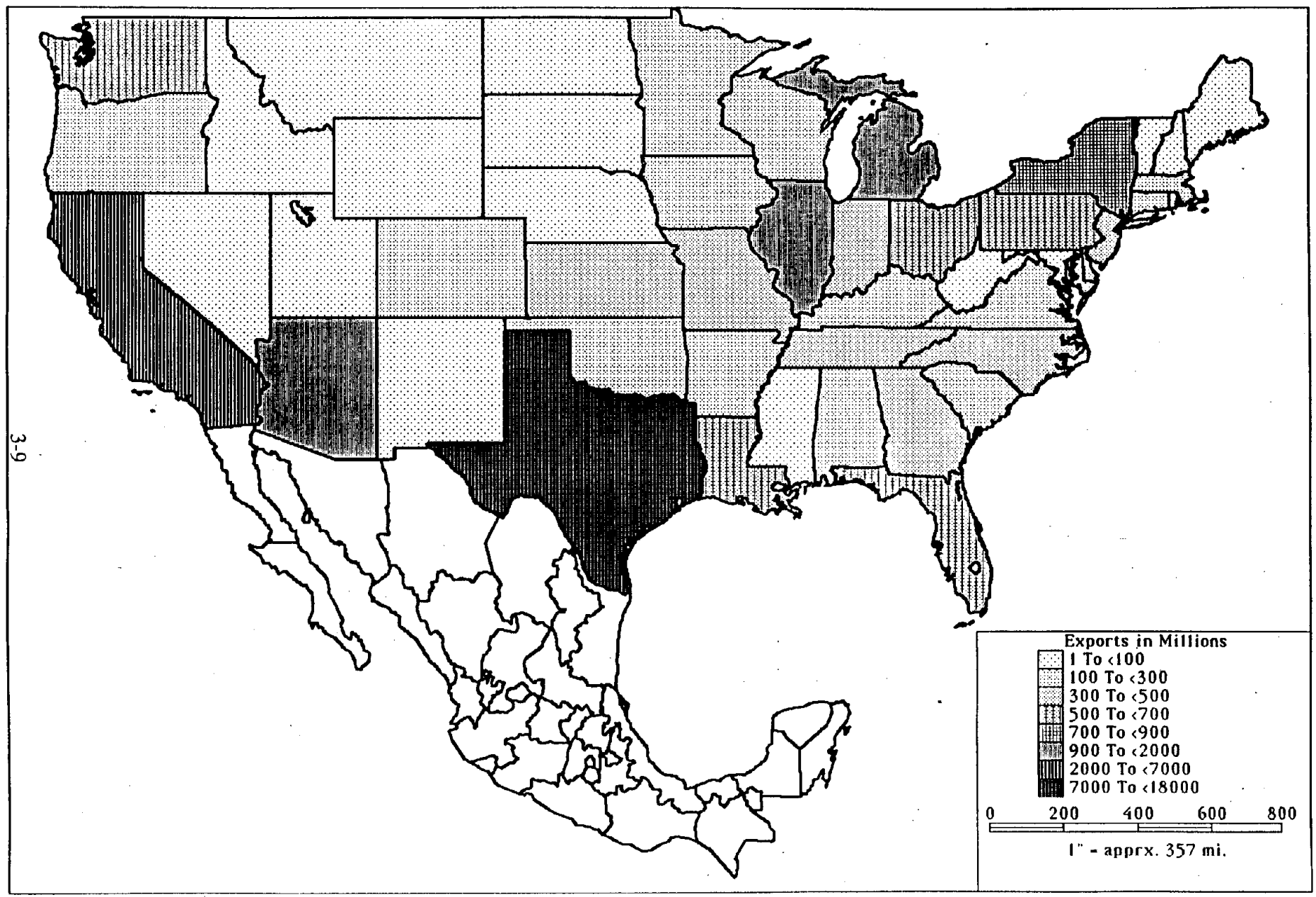

Total U.S. Exports to Mexico by State
Exports in Millions
1 To <100
100 To <300
300 To <500
500 To <700
700 To <900
900 To <2000
2000 To <7000
7000 To <18000
0
200
400
600
800
1" = apprx. 357 mi.

FIGURE 3-1.

Nonetheless, the pattern of export origins is believed to be representative at the macro level, although port of exit states are likely to be overly emphasized.

Comparable geographic information is given for imports in Table 3-8 and Figure 3-2 and the interpretation is equivalent. The destination states of imports from Mexico do not favor the use of water modes. Either shipments are going to states on the border or inland, for which transshipping from water to land is not cost effective.

3.3 EASTERN TRADE FLOW PATTERNS

Eastern trade flows with Mexico differ in several important ways from the pattern of national trade with Mexico. At the national level, both exports and imports grew over the 4-year reporting period. For the Eastern U.S., exports to Mexico also grew during this period, but a slightly lower rate, 14.0 percent per year as opposed to 17.6 percent. However, for the Eastern U.S., waterborne movements to Mexico fell at an annual average rate of 6.2 percent. Whereas total U.S. imports rose at an annual rate of 8.9 percent, Eastern imports increased by only 0.2 percent per year, reflecting two years of decline in the level of waterborne movements and one year decline in the level of land movements. These trends are shown in Tables 3-9 and 3-10. The net result of these shifts is that the percent of U.S. exports from the East dropped from 43 percent of the national total to 33 percent; imports to the East fell from 26 percent of the national total to 23 percent.

A review of Tables 3-11 and 3-12 will provide some context for these differences. Recall that for the nation as a whole, the higher valued, manufactured goods accounted for much of the overall growth. In the East, the level of exports or imports of manufactured goods remained more constant over the study period. Thus, the growth in inbound and outbound shipments is taking place in the West, primarily from and to Texas, which alone accounts for approximately 3/4 of the Western increases.[3]

On the other hand, the composition of the Eastern exports and imports are generally consistent with those of the nation as a whole. The distribution of 1992 exports and imports is shown in Table 3-13. These pie charts are quit similar to those in Table 3-6, although with the smaller percentages attributed to agricultural and extractive products.

The geographic distribution of Eastern states exporting to Mexico is highly concentrated in the East North Central and Middle Atlantic States, which in total account for 62.4 percent of the Eastern exports to Mexico. Imports are slightly more concentrated with 69.9 percent of the import going to these same states. This pattern of trade flow can be seen in Table 3-14 and Figure 3-3, for exports; and Table 3-15 and Figure 3-4, for imports.

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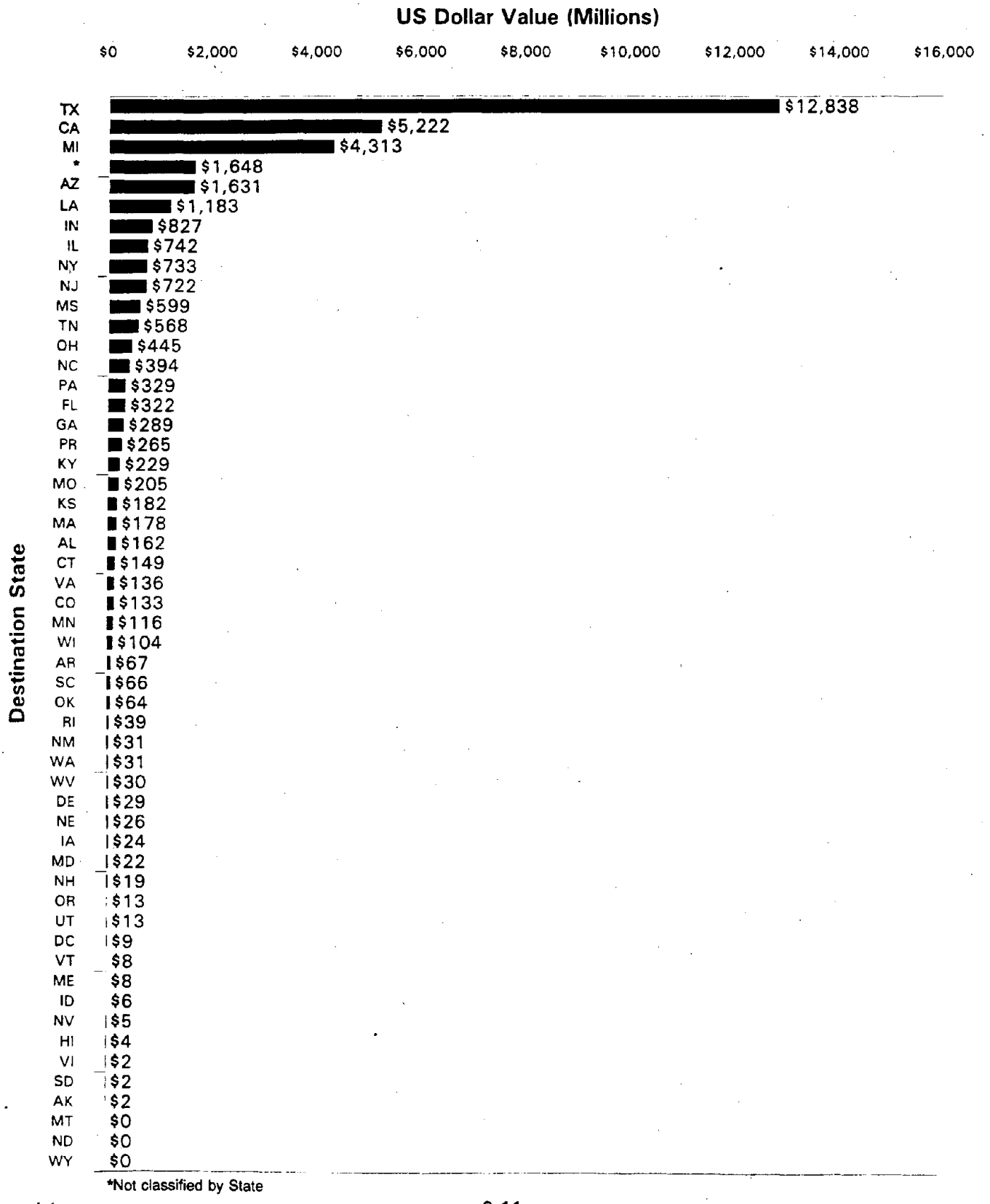
[3]Reporting problems no doubt overstate the absolute volume of trade originating from or destined to Texas. However, the relative position of Texas in the trade statistics is probably broadly correct.

TABLE 3-8. 1992 U.S. IMPORTS FROM MEXICO BY STATE



*Not classified by State

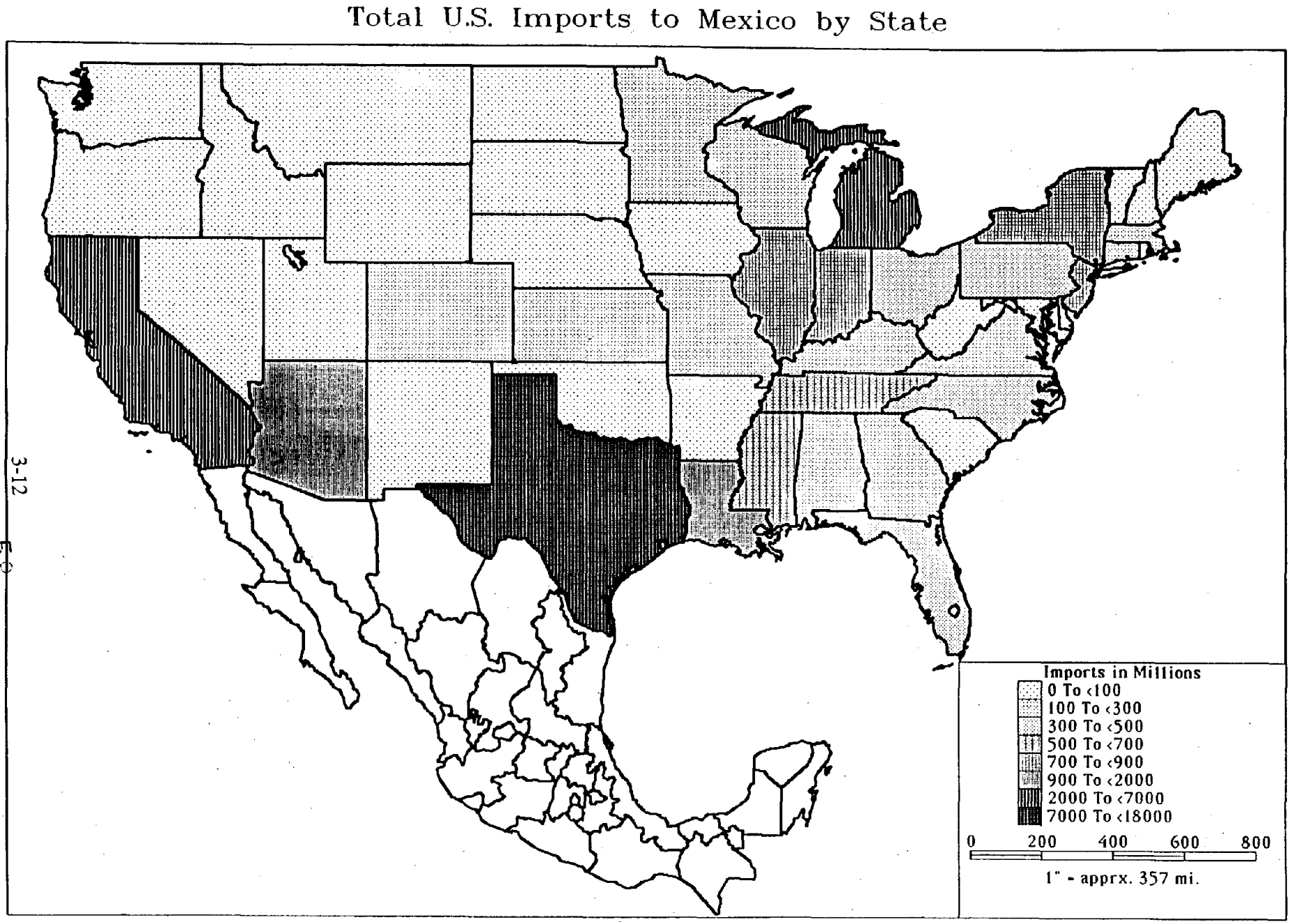

Total U.S. Imports to Mexico by State
Imports in Millions
0 To <100
100 To <300
300 To <500
500 To <700
700 To <900
900 To <2000
2000 To <7000
7000 To <18000
0 200 400 600 800
1" - apprx. 357 mi.

FIGURE 3-2.

TABLE 3-9. Total Eastern Exports to Mexico by Mode

YEAR	Air	Water	Land	Total
1989	$561,555,759	$198,951,508	$5,658,585,937	$6,419,093,204
1990	$642,851,025	$165,669,041	$6,219,342,915	$7,027,862,981
1991	$664,182,505	$161,698,121	$7,531,063,263	$8,356,943,889
1992	$931,076,945	$163,599,244	$8,405,682,745	$9,500,358,934

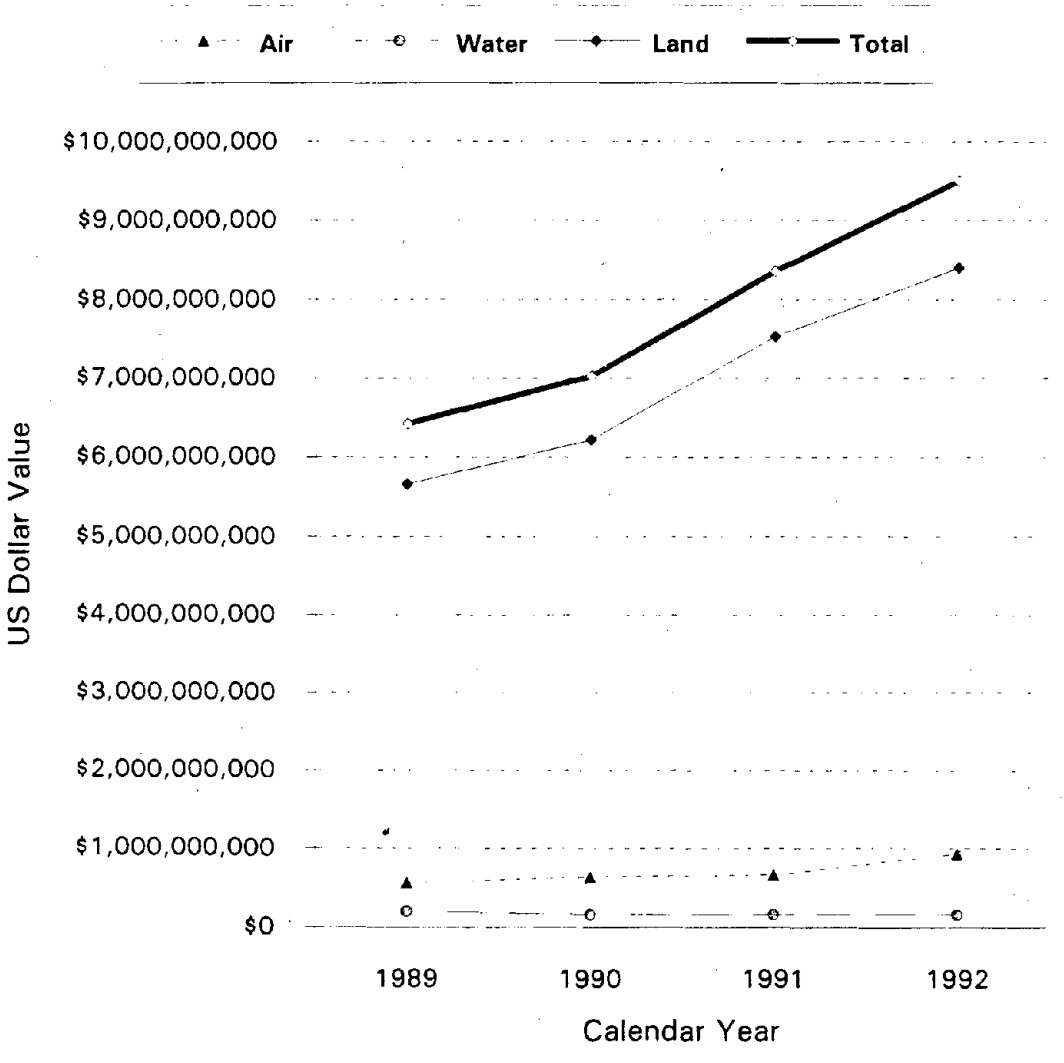


TABLE 3-10. Total Eastern Imports from Mexico by Mode

YEAR	Air	Water	Land	Total
1989	$132,199,890	$1,943,716,323	$9,596,826,516	$11,672,742,729
1990	$308,715,196	$2,209,113,775	$10,433,867,570	$12,951,696,541
1991	$275,045,149	$2,048,131,841	$10,578,265,313	$12,901,442,303
1992	$301,411,233	$1,777,335,695	$9,657,605,531	$11,736,352,459

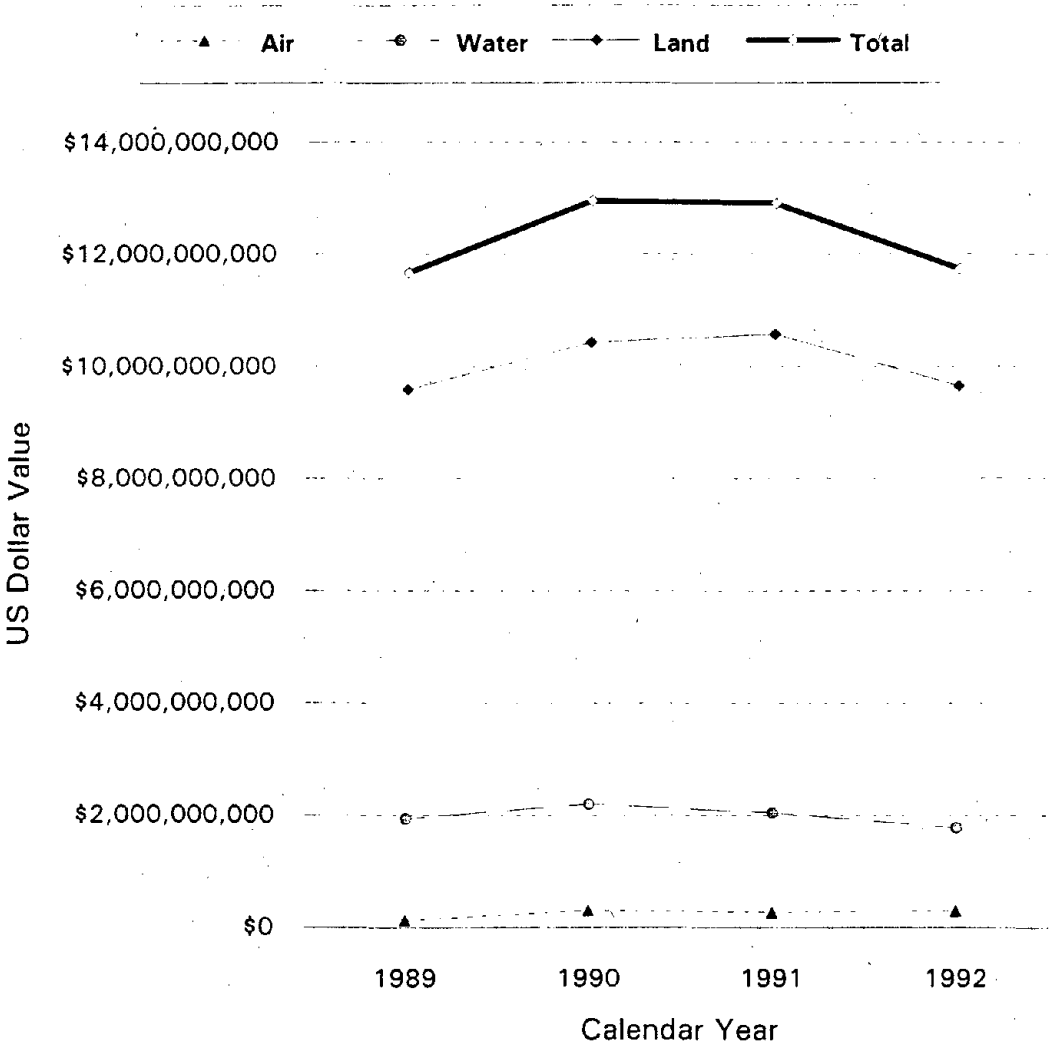


TABLE 3-11. COMPOSITION OF EASTERN U.S. EXPORTS TO MEXICO

Commodity Class	1989		1990		1991		1992	
	Mil of $	%	Mil of $	%	Mil of $	%	Mil of $	%
Animals/Products	78	1	81	1	108	1	146	2
Vegetables/Products	145	2	159	2	179	2	237	2
Extractive	58	1	51	1	77	1	59	1
Petroleum	71	1	63	1	92	1	72	1
Chemicals/Plastics	1070	17	1128	16	1369	16	1603	17
Metals/Products	556	9	637	9	833	10	926	10
Machnry/Appl/Veh	3073	48	3540	50	4144	50	4471	47
Miscellaneous	1399	22	1380	20	1556	19	1986	21
Total	6419	100	7028	100	8357	100	9500	100

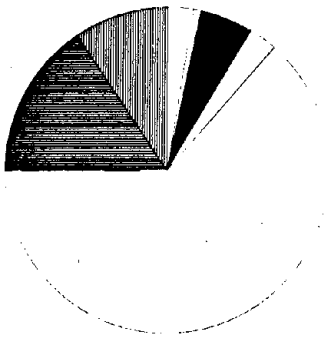
TABLE 3-12. COMPOSITION OF EASTERN U.S. IMPORTS FROM MEXICO

Commodity Class	1989		1990		1991		1992	
	Mil of $	%	Mil of $	%	Mil of $	%	Mil of $	%
Animals/Products	32	0	28	0	28	0	24	0
Vegetables/Products	568	5	516	4	478	4	293	2
Extractive	207	2	219	2	163	1	99	1
Petroleum	1614	14	1844	14	1492	12	1095	9
Chemicals/Plastics	409	4	450	3	511	4	608	5
Metals/Products	422	4	421	3	393	3	337	3
Machnry/Appl/Veh	6432	55	7545	58	7839	61	7457	64
Miscellaneous	1989	17	1930	15	1997	15	1823	16
Total	11673	100	12952	100	12901	100	11736	100

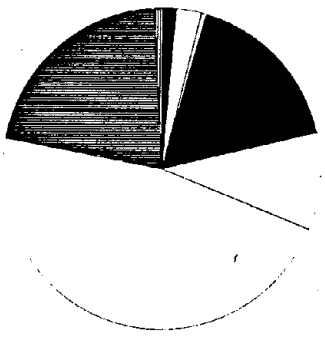
TABLE 3-13. Composition of 1992 Eastern US-Mexico Trade

Commodity Class	Total Imports	Total Exports
Animals/Products	$23,893,189	$146,251,127
Vegetables	$292,637,996	$236,711,563
Extractive	$99,472,657	$58,559,356
Chemicals/Plastics	$608,349,440	$1,602,744,596
Metals/Products	$337,043,957	$926,159,167
Machnry/Appl/Vehicles	$7,456,875,614	$4,471,456,435
Miscellaneous	$1,822,732,298	$1,986,193,963
Petroleum	$1,095,347,308	$72,282,727
Totals	**$11,736,352,459**	**$9,500,358,934**

Composition of 1992 Eastern US Imports

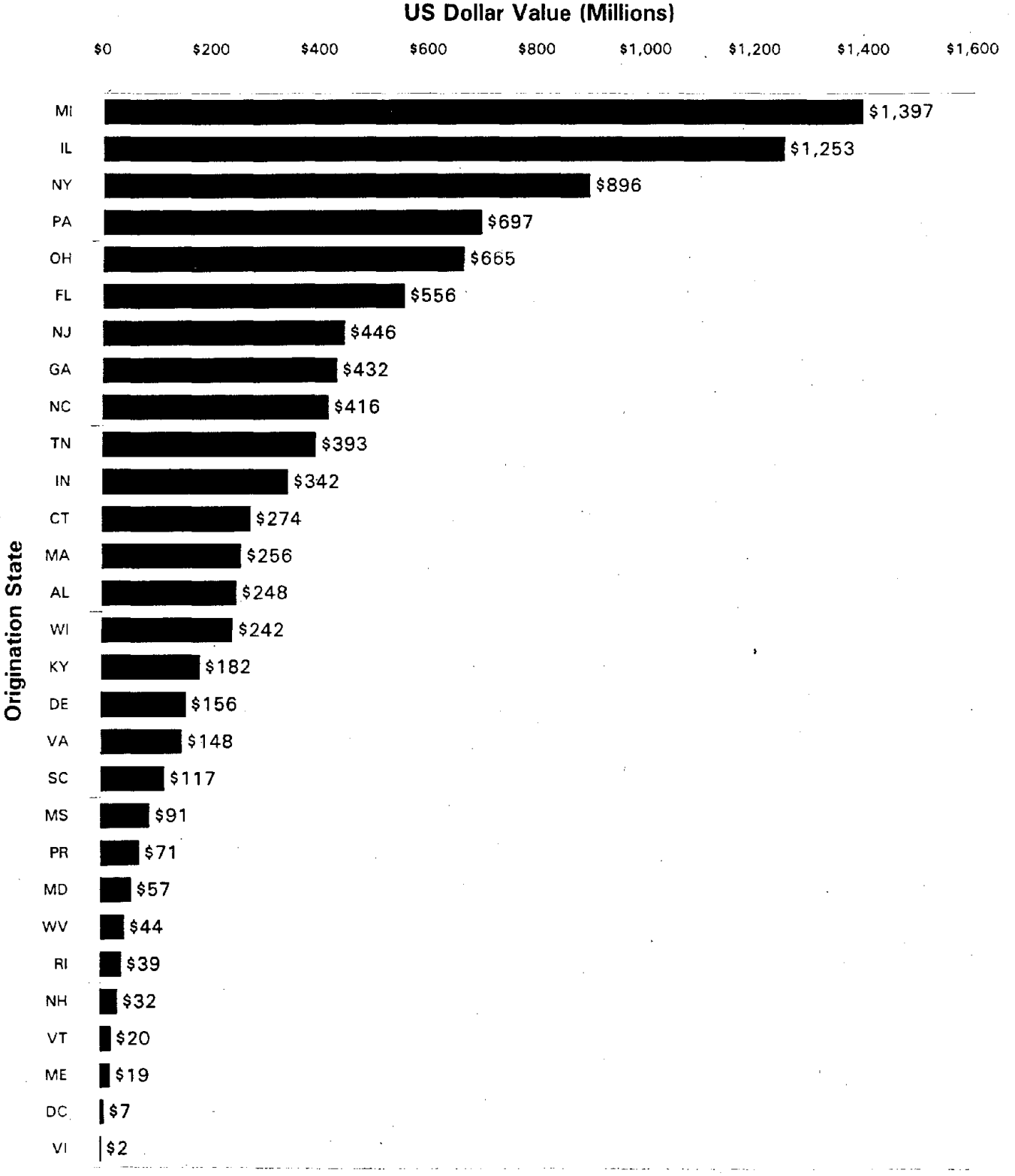


Composition of 1992 Eastern US Exports



Animals/Products
Vegetables
Extractive
Chemicals/Plastics
Metals/Products
Machnry/Appl/Vehicles
Miscellaneous
Petroleum

TABLE 3-14. 1992 EASTERN U.S. EXPORTS TO MEXICO BY STATE



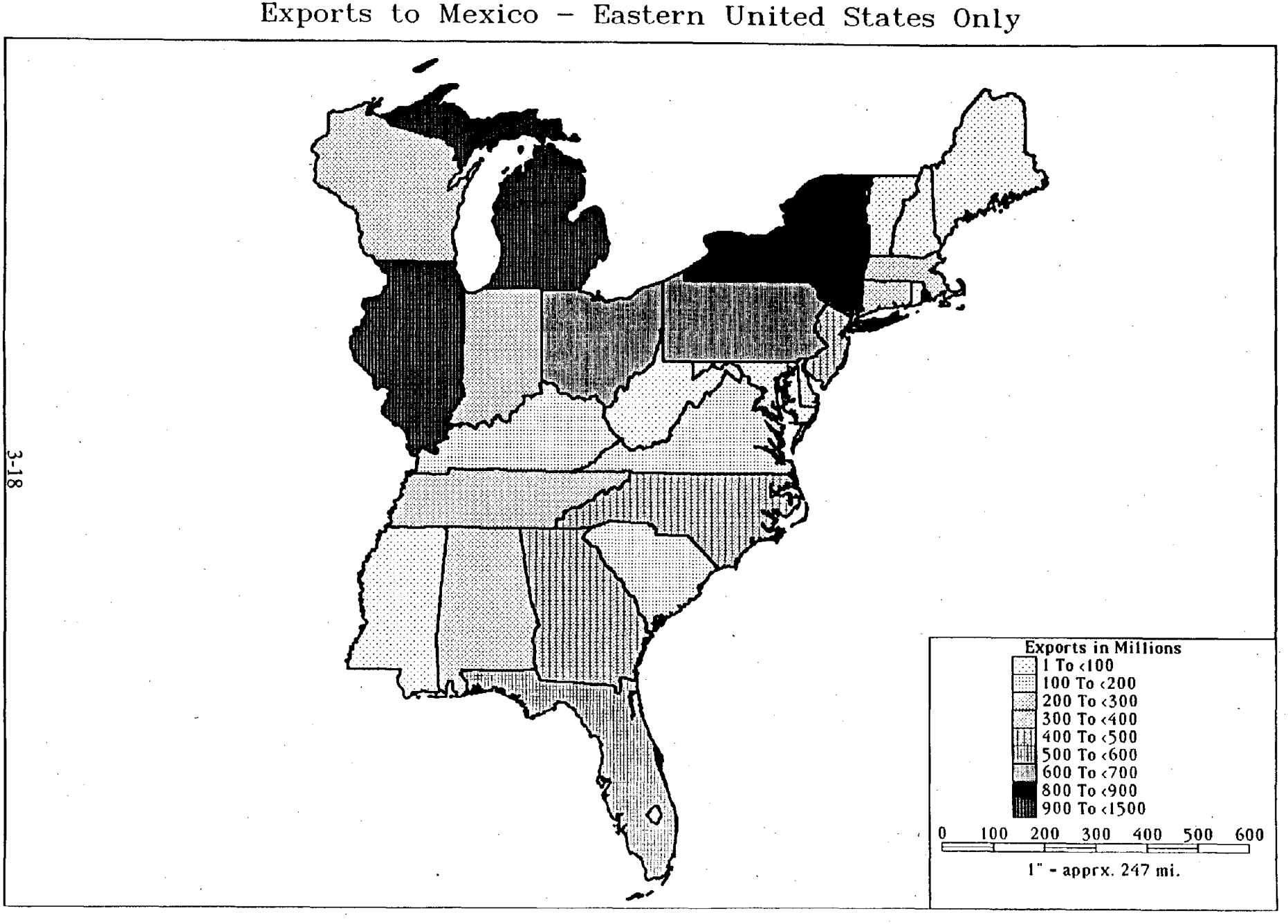
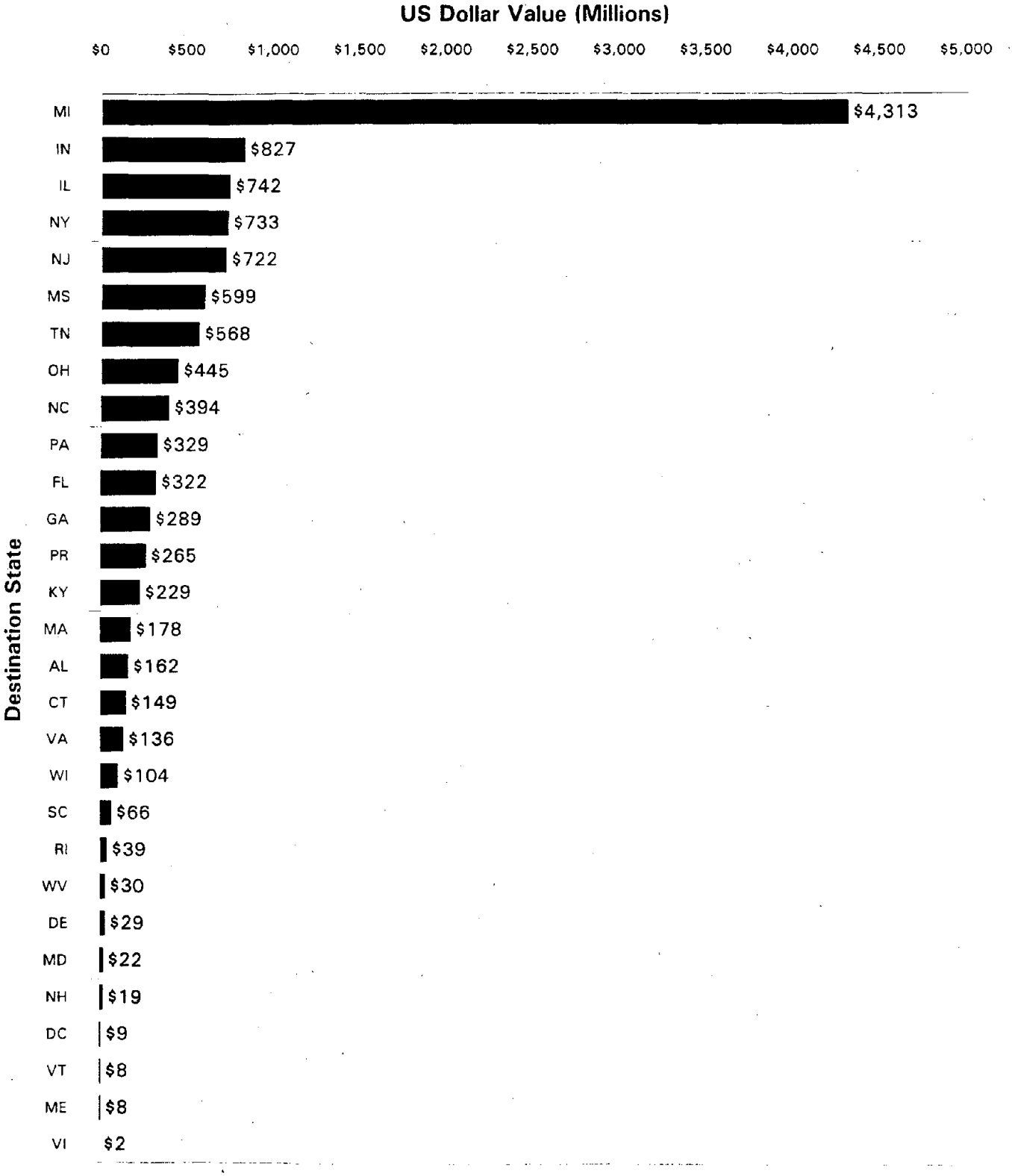

Exports to Mexico – Eastern United States Only
Exports in Millions
1 To <100
100 To <200
200 To <300
300 To <400
400 To <500
500 To <600
600 To <700
800 To <900
900 To <1500
0 100 200 300 400 500 600
1" - apprx. 247 mi.

FIGURE 3-3.

TABLE 3-15. 1992 EASTERN U.S. IMPORTS FROM MEXICO BY STATE



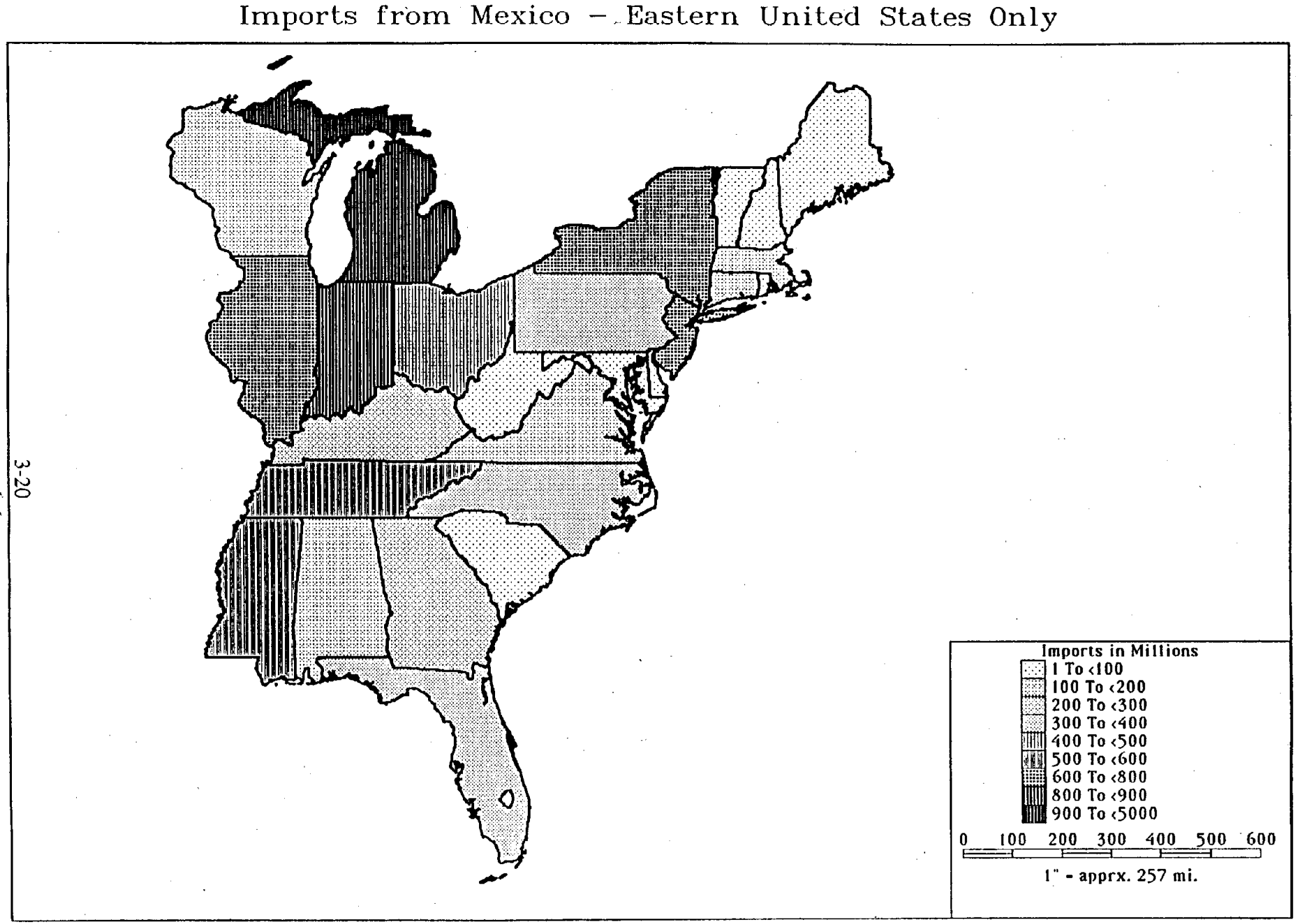

Imports from Mexico – Eastern United States Only
Imports in Millions
1 To <100
100 To <200
200 To <300
300 To <400
400 To <500
500 To <600
600 To <800
800 To <900
900 To <5000
0 100 200 300 400 500 600
1" = apprx. 257 mi.

FIGURE 3-4.

3.4 AGGREGATE WATERBORNE TRADE WITH MEXICO

This section contains an analysis of current waterborne trading patterns between the U.S. and Mexico.[4] The general references to the waterborne commodities above have placed the water mode in context. Over the study period, waterborne flows have grown less rapidly than those of other modes, or in some cases they have actually declined. This has been partially accounted for by the fact that the commodities most subject to traditional water moves have not grown as rapidly as higher valued goods and that the states most actively involved in trade with Mexico do not have ready access to traditional, cost-effective water transportation. This section contains a more detailed analysis of the current waterborne trading patterns between the U.S. and Mexico and provides a basis for evaluating the adequacy of the existing port infrastructure to accommodate trade between the U.S. and Mexico.

The differences in the composition of commodities between waterborne movements and trade in total is clear from an examination of Table 3-16. Waterborne movements are heavily dominated by agricultural products, chemical movements and petroleum shipments. This is quite consistent with the classification of current activity levels at the U.S. ports discussed in Chapter 1.

The commodities carried most by water have not experienced the rapid increases of commodities carried by motor carrier or rail. In addition, the increases in waterborne movements that have taken place have differed by segments of the system. In terms of exports to Mexico, the value of waterborne movements has increased over the study period by 5.0 percent per year, on average. However, most of the traffic is from East Coast and Gulf ports,[5] which have experienced an annual growth rate of 7.7 percent in the value of shipments (and 7.0 percent in terms of weight.) West Coast ports, on the other hand, declined rather consistently over the period at an average rate of 8.9 percent (a 13.4 percent decline in tonnage carried.) Other ports' traffic, although quite small, grew at 25.6 percent (65.3 percent in tonnage) per year. This can be seen in Table 3-17.

Imports have a more complicated story. As can been seen in Table 3-18, imports in total grew at an average rate of 4.4 percent. This, however, obscures the fact than between 1989 and 1990, trade increased by more than 23 percent and has since fallen from the level of 1990.

As with exports, the trends differ among the port segments. East Coast and Gulf ports have increased on average 2.9 percent in terms of the value of shipments and 4.6 percent in terms

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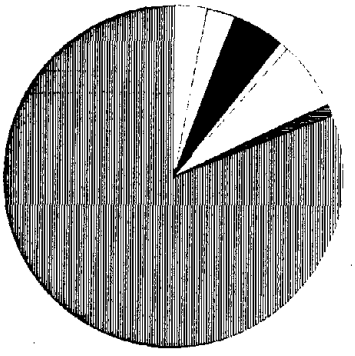
[4]The analysis was performed using the Foreign Trade Data from the Bureau of the Census. U.S. Census maintains a related waterborne database but for consistency with other modes this was not used. The Journal of Commerce maintains a waterborne data base having greater accuracy for foreign ports.

[5]East Coast and Gulf ports are those Atlantic and Gulf ports that range from Eastport, Maine to Brownsville, Texas. West Coast ports include all California, Oregon, and Washington ports. Other ports include all other U.S. ports, i.e., in Hawaii and Alaska ports; inland, Great Lakes and Seaway ports; and Puerto Rico and Territorial ports.

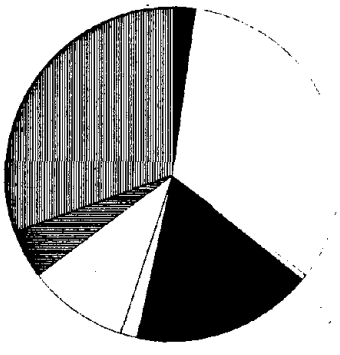
TABLE 3-16. Composition of Waterborne Trade in 1992

Commodity Class	Water Imports	Water Exports
Animals/Products	$5,482,379	$43,458,508
Vegetables	$163,450,280	$617,514,470
Extractive	$144,439,838	$11,774,432
Chemicals/Plastics	$269,296,221	$327,600,639
Metals/Products	$52,935,111	$31,702,171
Machnry/Appl/Vehicles	$338,774,641	$183,582,250
Miscellaneous	$50,337,314	$85,178,376
Petroleum	$4,297,118,779	$569,834,875
Totals	$5,321,834,563	$1,870,645,721

Composition of Waterborne Imports in 1992



Composition of Waterborne Exports in 1992



Animals/Products Vegetables Extractive Chemicals/Plastics

Metals/Products Machnry/Appl/Vehicles Miscellaneous Petroleum

TABLE 3-17. Trend in Waterborne Exports to Mexico by Region

YEAR	East/Gulf Ports	West Ports	Other Ports	Total Ports
1989	$1,244,561,605	$344,698,862	$27,569,438	$1,616,829,905
1990	$1,187,801,771	$314,092,408	$25,513,418	$1,527,407,597
1991	$1,211,804,196	$268,331,996	$29,259,490	$1,509,395,682
1992	$1,554,745,732	$261,224,469	$54,675,520	$1,870,645,721

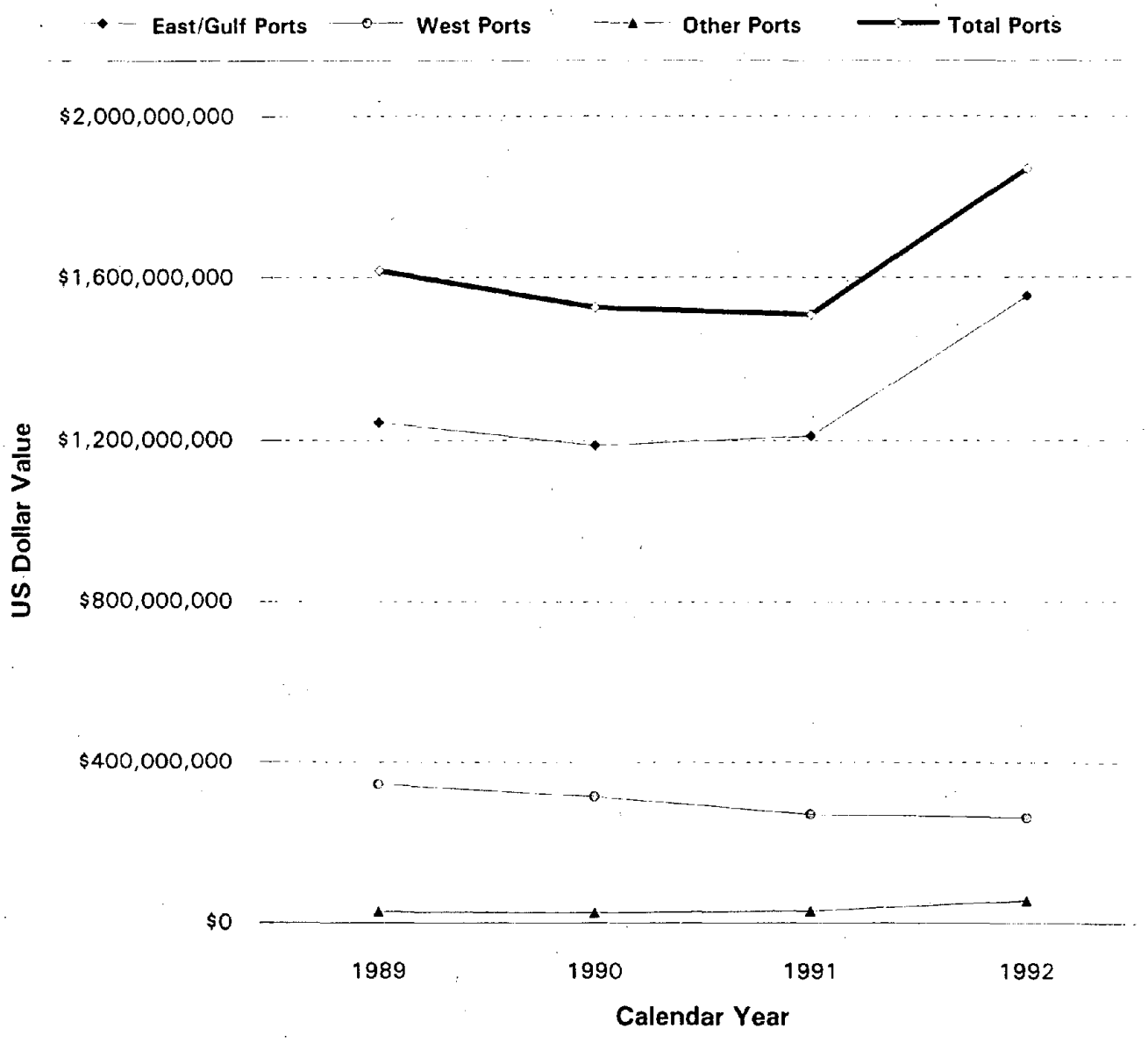
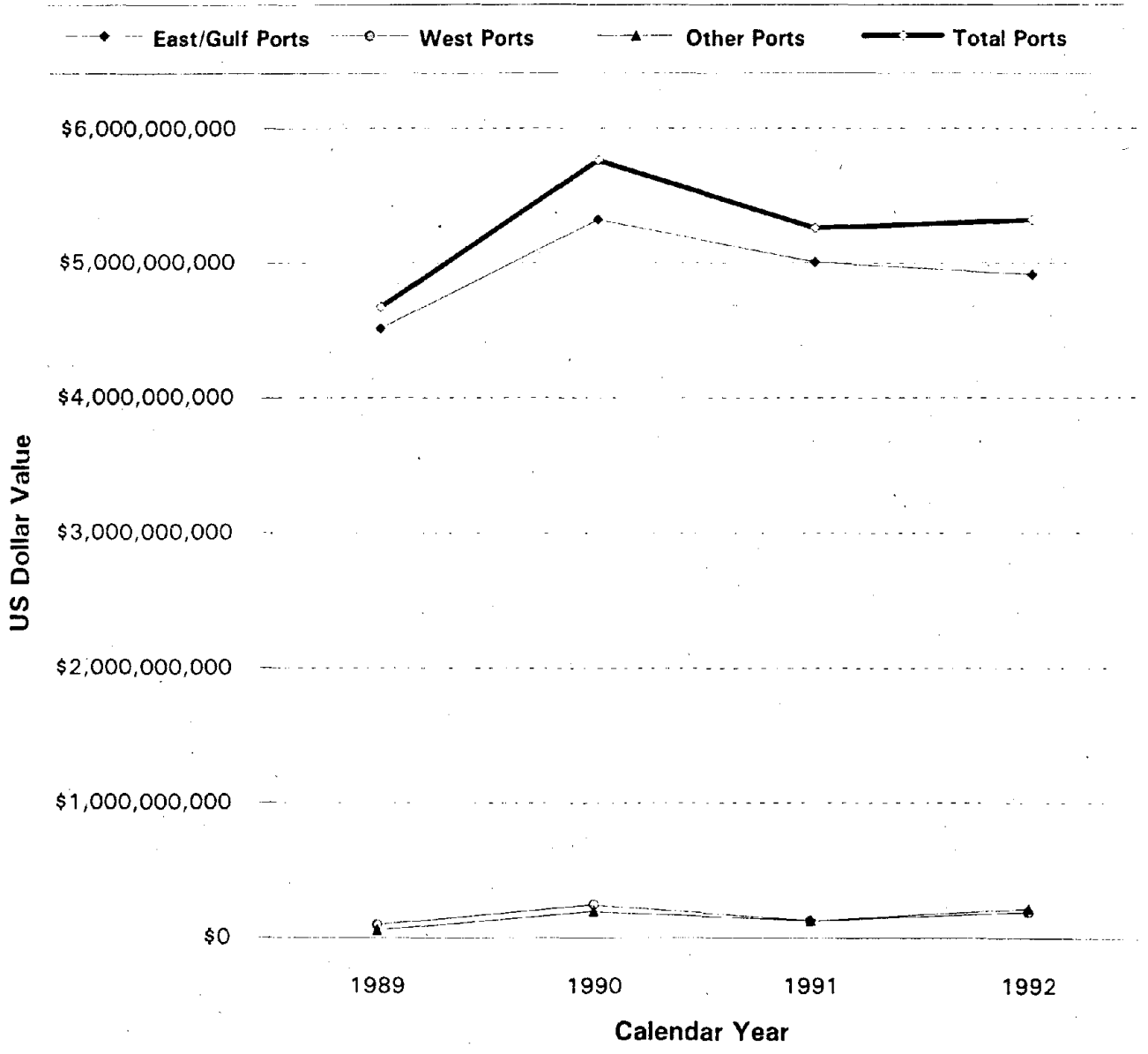


TABLE 3-18. Trend in Waterborne Imports from Mexico by Region

YEAR	East/Gulf Ports	West Ports	Other Ports	Total Ports
1989	$4,510,624,580	$100,088,220	$59,936,053	$4,670,648,853
1990	$5,323,703,969	$244,855,548	$195,216,501	$5,763,776,018
1991	$5,004,960,989	$127,574,212	$127,494,391	$5,260,029,592
1992	$4,914,944,920	$190,436,829	$216,452,814	$5,321,834,563



of tonnage. However, the value of commodities shipped from East Coast and Gulf ports has fallen in the last two years. In spite of this, the tonnage shipped through East Coast and Gulf ports has increased each year of the study period. This indicates a shift to lower valued goods.

Imports through West Coast ports, on the other hand, experienced an average increase in the value of 23.9 percent per year, while tonnage rose only 1.7 percent on average. This difference may be a result of price level increases and a shift on the West Coast to higher valued commodities. Other ports have an annual increase of 53.4 percent in the value of shipments and 59.8 percent in the tonnage of shipments.

3.5 EAST COAST AND GULF PORT TRADE WITH MEXICO

Descriptions and analyses of the waterborne trade between U.S. East Coast and Gulf ports and Mexican ports are presented in this section. Chapters 1 and 2 contain detailed information on specific East Coast and Gulf ports in terms of capacity and activity levels. This section defines ports in terms of Customs' districts or combinations of Customs' districts.[6]

Total exports to Mexico from East Coast ports are relatively small. The majority of the eastern trade with Mexico is out of Gulf ports, primarily New Orleans and Houston. The level of exports by Customs' district can be seen in Tables 3-19, which contains data on the value of exports, and Table 3-20, which contains data on the weight of exports. Value and weight measures yield similar pictures of the pattern of exports. However, there are several points for which differences between the two measures gives added insight into the flows. In terms of the dollar value of exports, Houston and New Orleans account for 81 percent of the flows from East Coast and Gulf ports. Of this amount 57 percent is from Houston and 43 percent from New Orleans. In terms of the tonnage shipped to Mexico, Houston and New Orleans account for 88 percent of the flows, but Houston's share of this is only 49 percent and New Orleans' share is 51 percent. The explanation for the shift lies in the fact that Houston's exports are of slightly higher value than the average East Coast and Gulf port export, while exports through New Orleans are of lower than average value. The picture for Miami exports is comparable. In terms of value of exports, Miami is ranked third among the districts, but in terms of tonnage shipped, Miami is sixth. This is also attributable to the fact that exports through Miami are of significantly higher value than the average East Coast and Gulf port export.

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[6]A broader classification of ports is used in this section. At the most detailed level, ports are defined at the Customs' district level. However an inspection of the volumes of trade transiting port districts led to aggregating the East Coast ports still further. Thus the Portland, Boston, Providence, and Bridgeport districts have been consolidated into a class called Northeast ports; New York, Philadelphia, Baltimore, and Washington are classified as Mid-Atlantic; Norfolk, Wilmington, Charleston, and Savannah as Southeast; Miami and Tampa as Florida; Mobile, New Orleans, and Beaumont-Port Arthur remain as three separate ports; and Galveston, Houston, and Laredo are combined as Houston.

TABLE 3-19. VALUE OF TOTAL EXPORTS TO MEXICO BY WATER, EAST COAST AND GULF, 1992

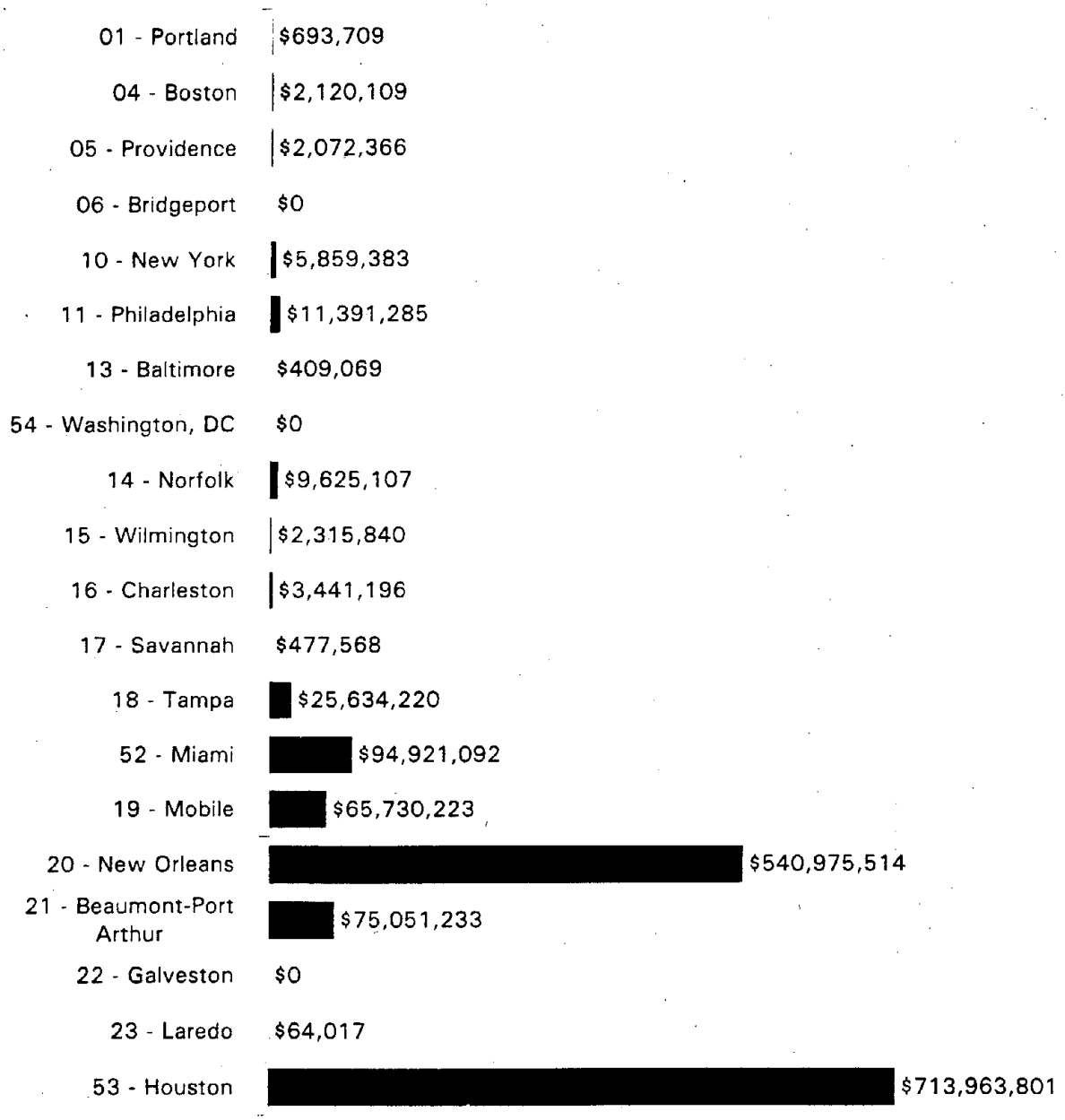
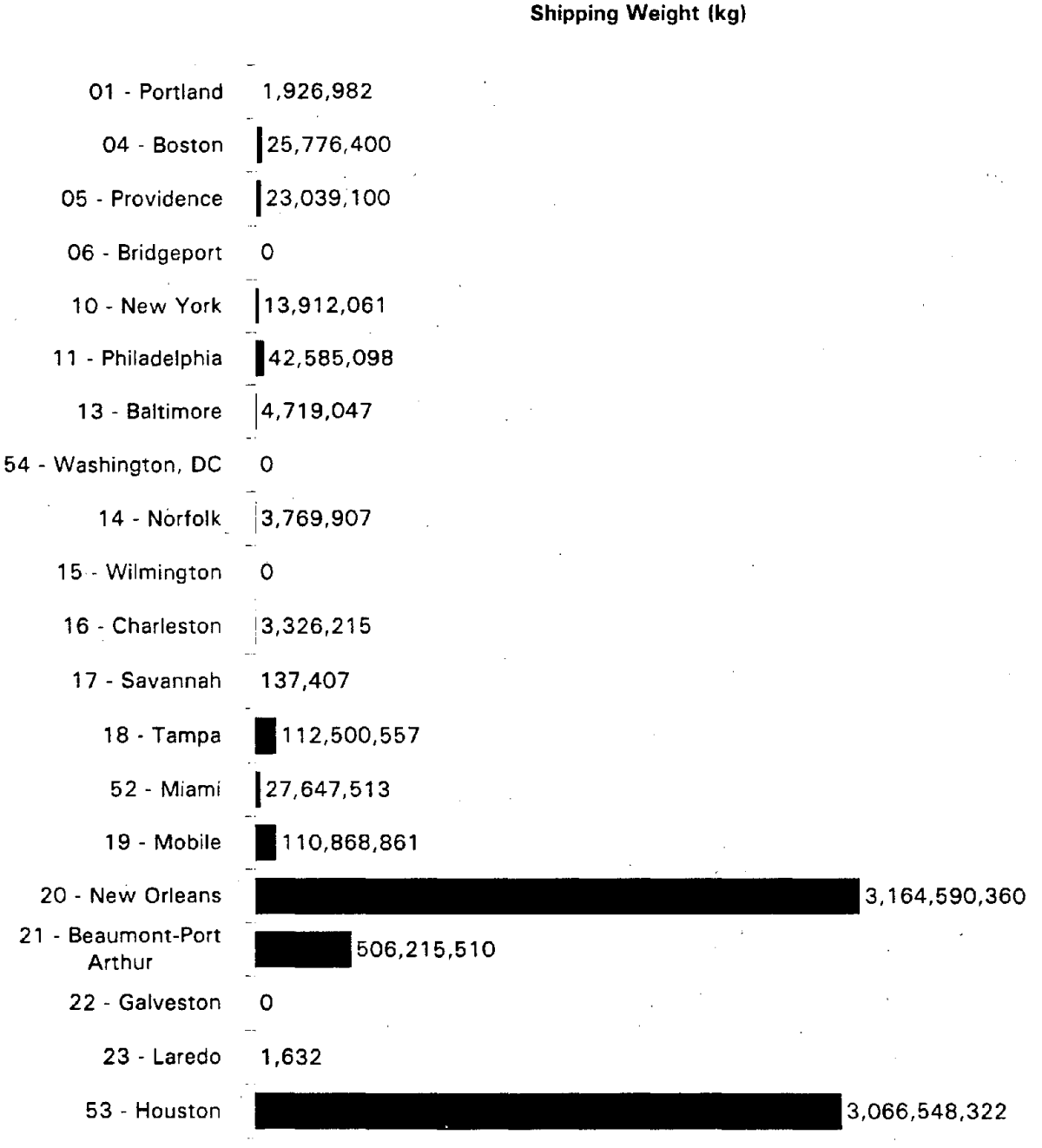


TABLE 3-20. WEIGHT OF TOTAL EXPORTS TO MEXICO BY WATER, EAST COAST AND GULF, 1992



Imports through East Coast and Gulf ports are less highly concentrated than exports. Nonetheless, Gulf ports remain the primary ports of entry. A comparison of the distribution of imports by value, shown in Table 3-21, and by tonnage, shown in Table 3-22, indicates a greater level on consistency between the two measures than was seen for exports. The major exception is for Miami, which again handles commodities having substantial higher value than the average.

Data sources are not currently adequate to give precise pictures of the true origin to destination flows of commodities using the nation's port system. Thus, in order to attempt to understand the pattern of trade flow between the U.S. and Mexico it is necessary to approach the topic by analyzing segments of the commodity flows. It is possible to look at the primary sea legs of waterborne and it is possible to examine the hinterland or marketshed for each of the ports. Both aspects of the commodity flows are discussed below.

Given the diversity of U.S.-Mexico trade, the number of conceivable port pairs is quite large. However, as discussed above, the actual trade is concentrated through a smaller number of ports. As a consequence, it is useful to consolidate the East Coast and Gulf ports as described in footnote 4. Mexican ports have been consolidated in a similar fashion.[7] Even after consolidation, the number of port pairs is large but the concentration observed in the U.S. port activity is reflected in similar concentrations of sea routes.

Sea routes that account for at least 80 percent of the commodity flows are shown in Figures 3-5 through 3-8.[8] Figure 3-5 shows the primary flows of exported petroleum products is almost entirely concentrated in the movement of product from the refineries of Texas to Tuxpan. Non-petroleum products exported from the U.S. are shipped out of most of the Gulf ports. These data are given in Figure 3-6. At this level of analysis, some differences among the Gulf ports are indicated. Houston serves the nearby Tamaulipas and Veracruz coasts, while Mobile concentrates on the Yucatan Peninsula. New Orleans and the Florida ports serve both the Mexican Gulf ports and those of the Yucatan.

U.S. imports of Mexican petroleum and products flow from the oil fields of the southern Veracruz-Campeche region to the refinery centers from Houston to Mobile (Pascagoula). This is shown in Figure 3-7. Non-petroleum imports, Figure 3-8, flow to population or transshipment centers on the Gulf and also to Atlantic Coast ports.

Of course the sea leg will represent only a portion of the total transportation. Unfortunately, the available data does not permit an analysis of Mexican origin or destinations, although for

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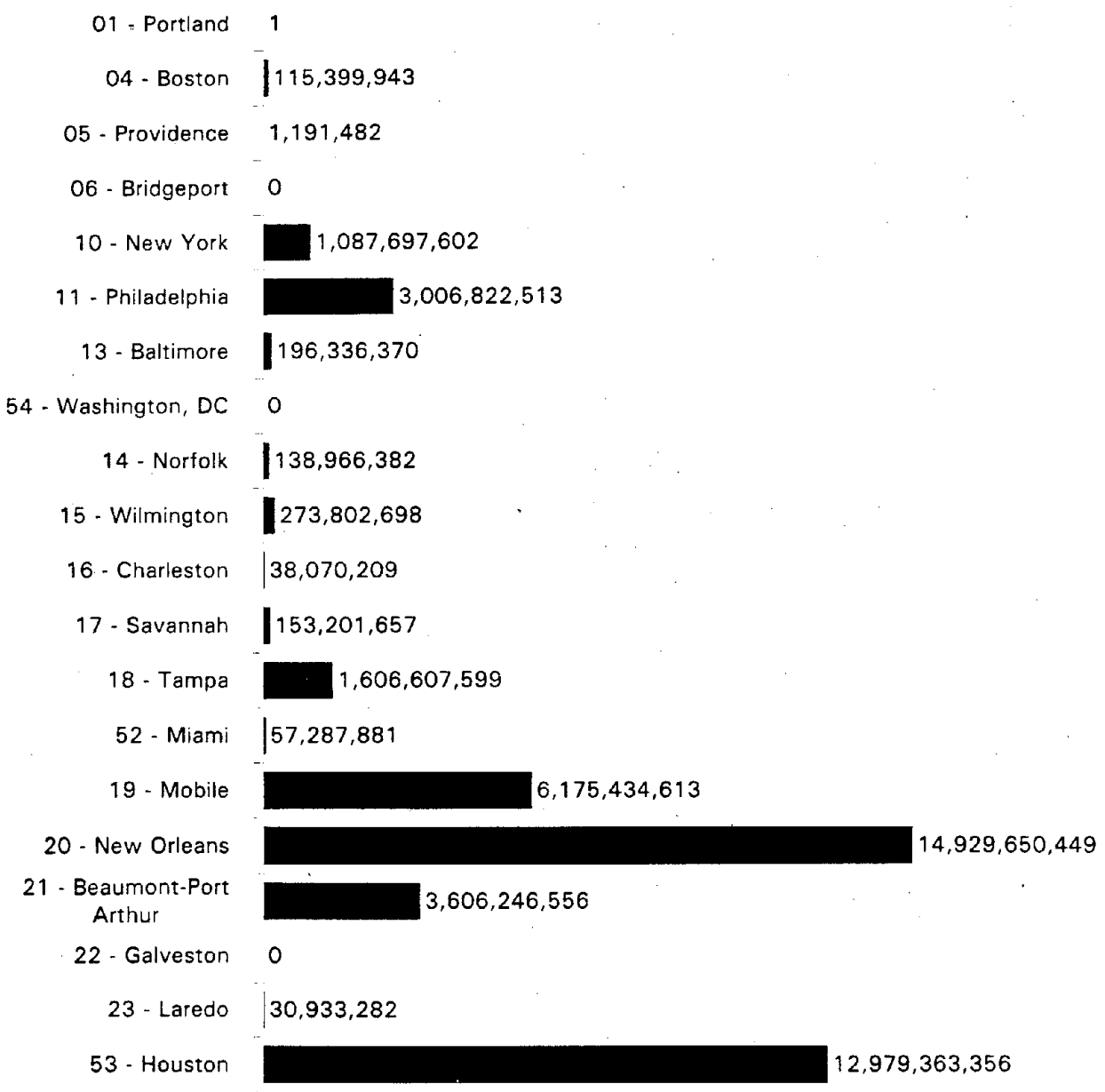
[7]For the purposes of analyzing the Gulf and Atlantic flows, the Mexican ports have been consolidated by states for Mexican Gulf and Caribbean states and into an aggregate West Coast category for Pacific ports. The exception to this is for the state of Veracruz, which has not only a long coast line but multiple port zones. Thus, the Mexican ports are as follows: Tampico/Altamira in Tamaulipas; Tuxpan, Veracruz and Coatzacoalcos in Veracruz; Dos Bocas in Tabasco; Campeche State for Campeche; Merida for Yucatan; Cozumel for Quintana Roo; and West Coast for all Pacific Coast ports.

[8]Port-to-port flows for each port pair reporting traffic in 1992 are given in the Reference Tables. Rank ordering of the volumes of commodity flows for petroleum and non-petroleum products also are given in Reference Tables.

TABLE 3-22. WEIGHT OF TOTAL IMPORTS FROM MEXICO BY WATER, EAST COAST AND GULF, 1992



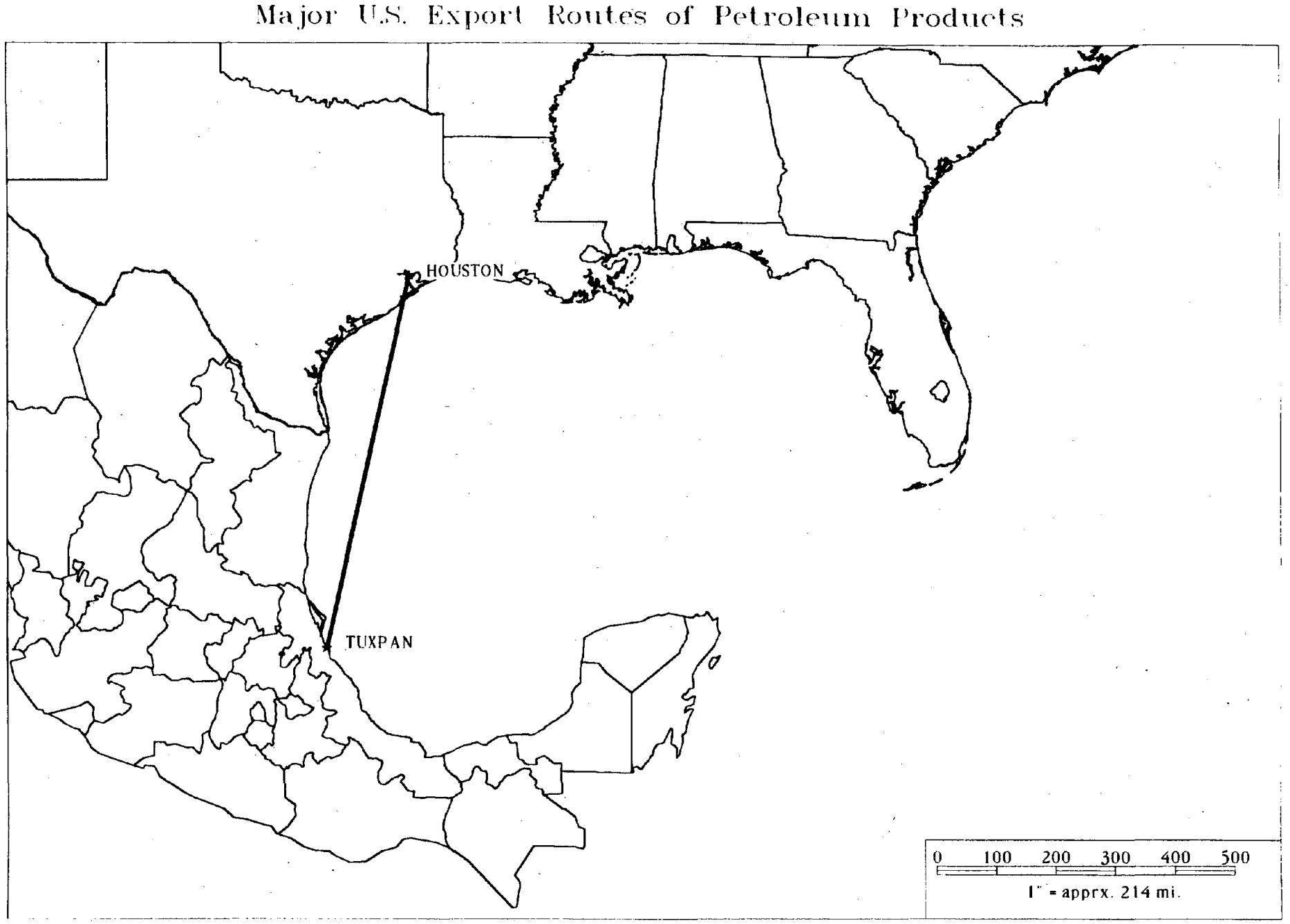

Major U.S. Export Routes of Petroleum Products
HOUSTON
TUXPAN
0 100 200 300 400 500
1" = apprx. 214 mi.

FIGURE 3-5.

Major U.S. Export Routes of Non-Petroleum Products

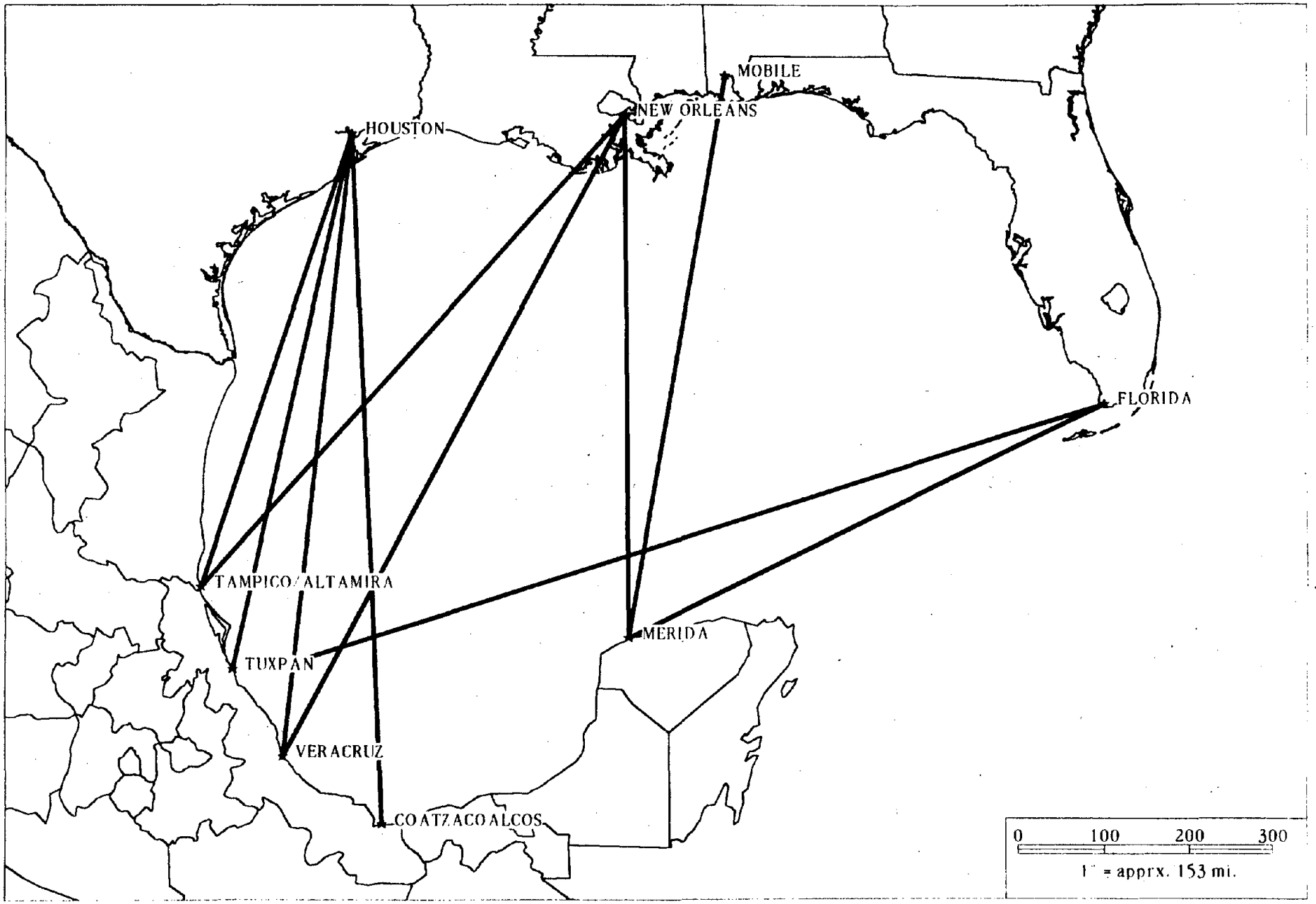


FIGURE 3-6.

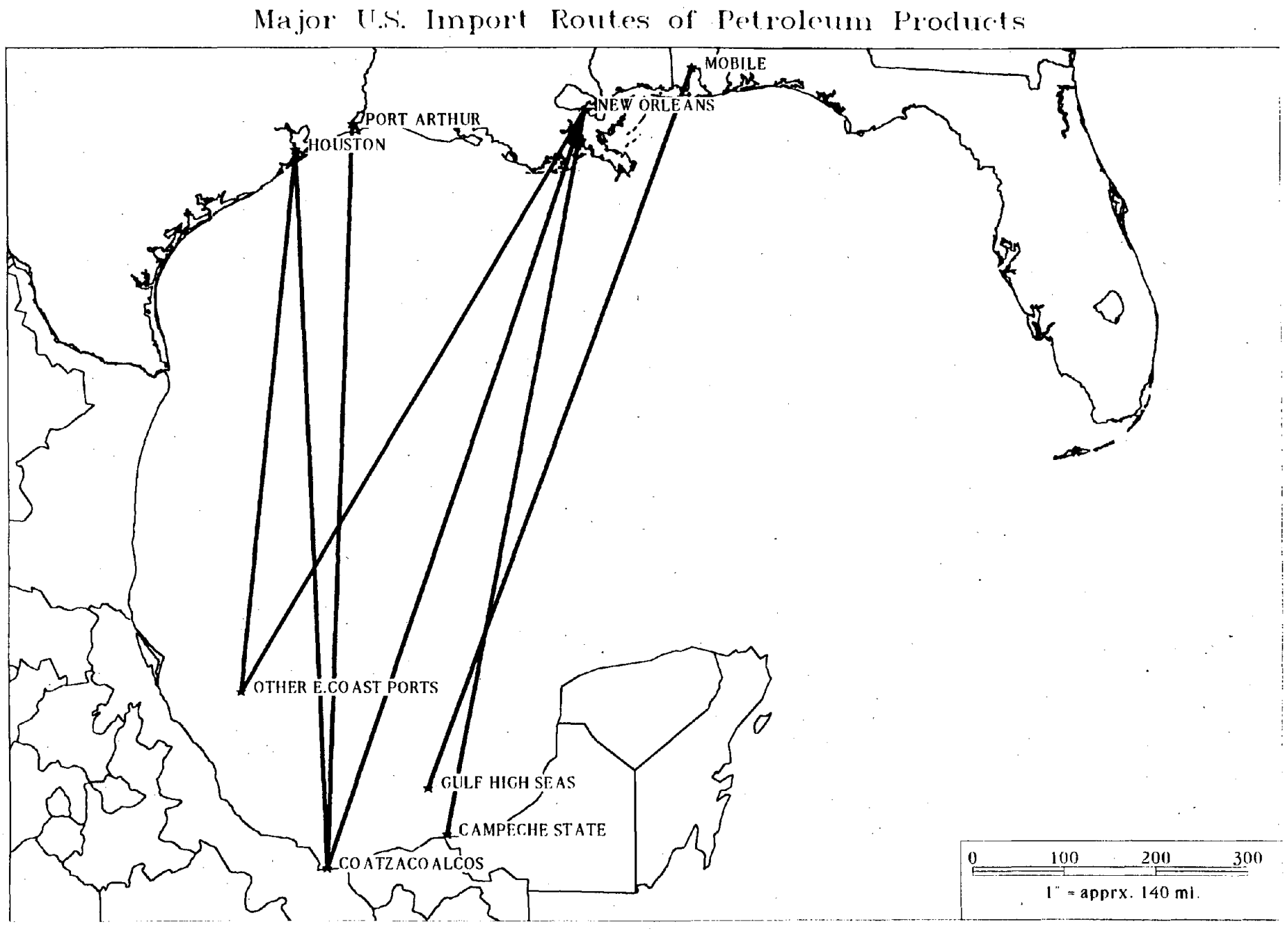

Major U.S. Import Routes of Petroleum Products
MOBILE
NEW ORLEANS
PORT ARTHUR
HOUSTON
OTHER E.COAST PORTS
GULF HIGH SEAS
CAMPECHE STATE
COATZACOALCOS
0
100
200
300
1" = apprx. 140 mi.

FIGURE 3-7.

Major U.S. Import Routes of Non-Petroleum Products

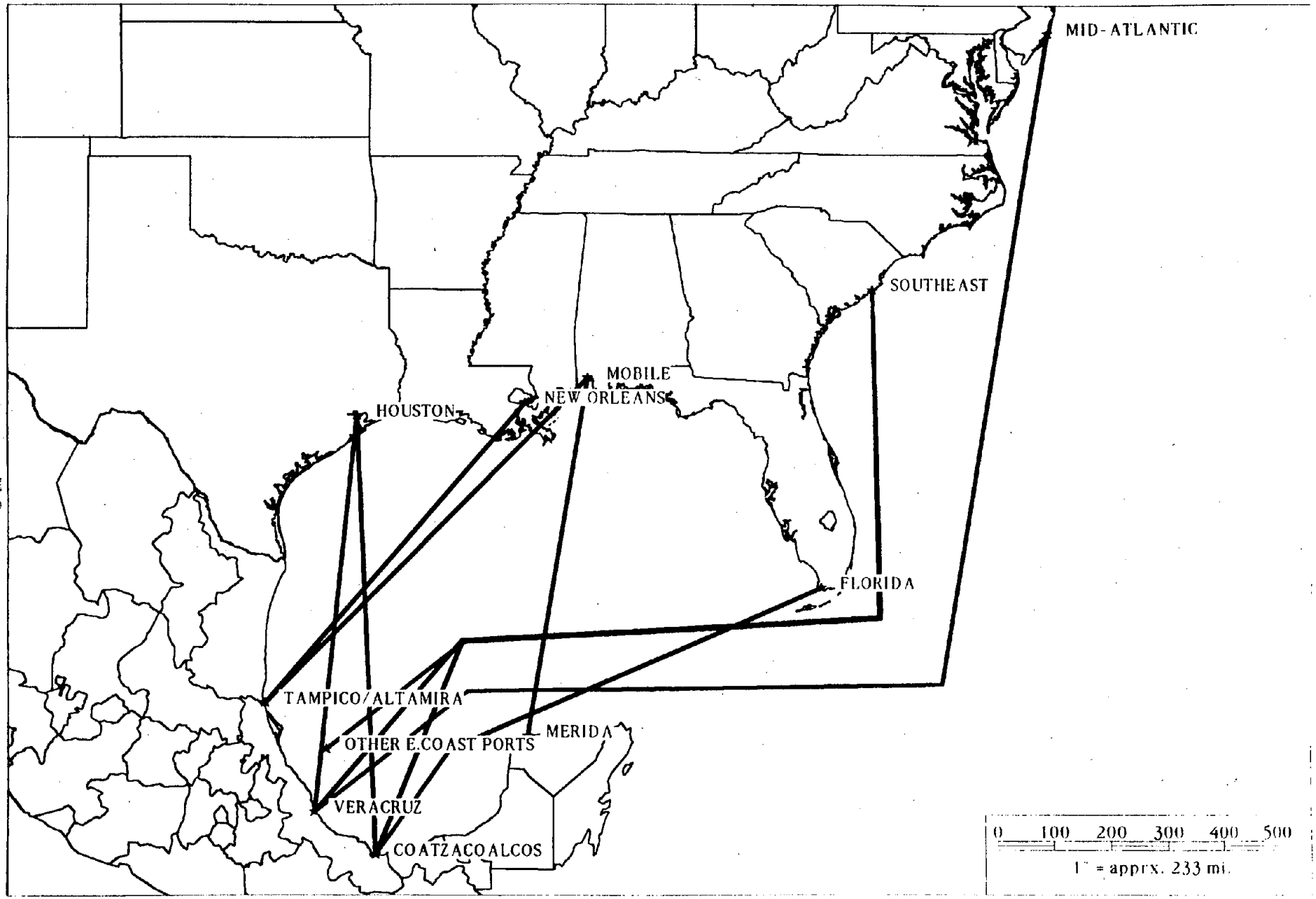


FIGURE 3-8.

many products the Mexican origin or destination can be inferred. In addition, the marginal nature of land access to Mexican ports implies that it would not be cost effective to move large amounts of commodity by land for transshipment by water. Consequently, Mexican origins and destinations are much more likely to be near the maritime port serving the trade. This is certainly true for petroleum exported from Mexico. Mexican imports of petroleum products, especially those through Tuxpan, are likely bound for the population and industrial center of Central Mexico.

There is somewhat better data on the U.S. origins and destinations, even with the caveats expressed earlier about the reporting problems.[9] The availability of this information permits an examination of the hinterlands for U.S. ports. Figures 3-9 through 3-24 show for each East Coast and Gulf port the states importing and exporting through a port.[10] Several relationships can be seen from these maps. The first and most obvious observation is that the hinterlands for maritime traffic do not extend very far from the port handling the traffic. On balance, for trade with Mexico, the states immediately about the port area originate or receive between 75 and 90 percent of the traffic transiting a port. Given the richness of highway and rail connections to Mexico, it is understandable that any freight that must travel a significant distance by land to reach a port could nearly as easily reach the Mexican border by land.

The second observation is that generally the freight not coming from or going to states contiguous to the port state is most likely coming from or going to the Midwest or Mid-Atlantic states. Thus, East Coast ports take some advantage of the existing east-west highway and rail systems to the Midwest, and Gulf ports use the existing north-south systems. The exceptions to these generalizations are:

- California, although never a major source of destination for trade through the East Coast and Gulf ports, is more highly represented as a source or destination state than other western states or even non-contiguous Southeastern states.

- Florida, although most exports or imports are for the state of Florida, has a much more dispersed marketshed than other port states, possibly as a result of dealing with commodities of much higher average value.

In terms of trade corridors, the waterborne trade with Mexico does not appear to have any inland corridors of large volume, at least based on the data available. To the extent that corridors are present, they run from the midwest to the East Coast ports and south to the Gulf ports. However, the volume of trade attributable to several of the Gulf port states can not be reasonably justified by the activities in those states. As a consequence, the north-south trade corridors must be understated in the data.

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[9]Because of the change in mode of commodities shifting to or from maritime vessel and because of the distribution systems associated with much of the bulk commodities, it is more likely that the origin or destination of a waterborne shipment is cited as the port state.

[10]The data used in these maps is in the Reference Tables.

An analysis of the U.S. market areas for Mexican ports provides some interesting results. Maps of the major U.S. states either exporting or importing through a given Mexican port are presented in Figures 3-25 through 3-45. For virtually any Mexican port selected, the trade will be dominated by Texas and Louisiana and, to a lesser extent, Florida. However, for U.S. exports, Merida and Veracruz receive shipments from a far wider geographic range of U.S. states. This probably reflects the diversity of commodities transiting these two ports.

With respect to Merida, the upper midwest is a significant source of trade, shipping agricultural products. Veracruz appears to receive a wider set of commodities, probably for transshipment to Central Mexico. U.S. imports show the same general pattern, i.e., Texas, Louisiana, and Florida are the dominate destination states except for Merida and Veracruz.

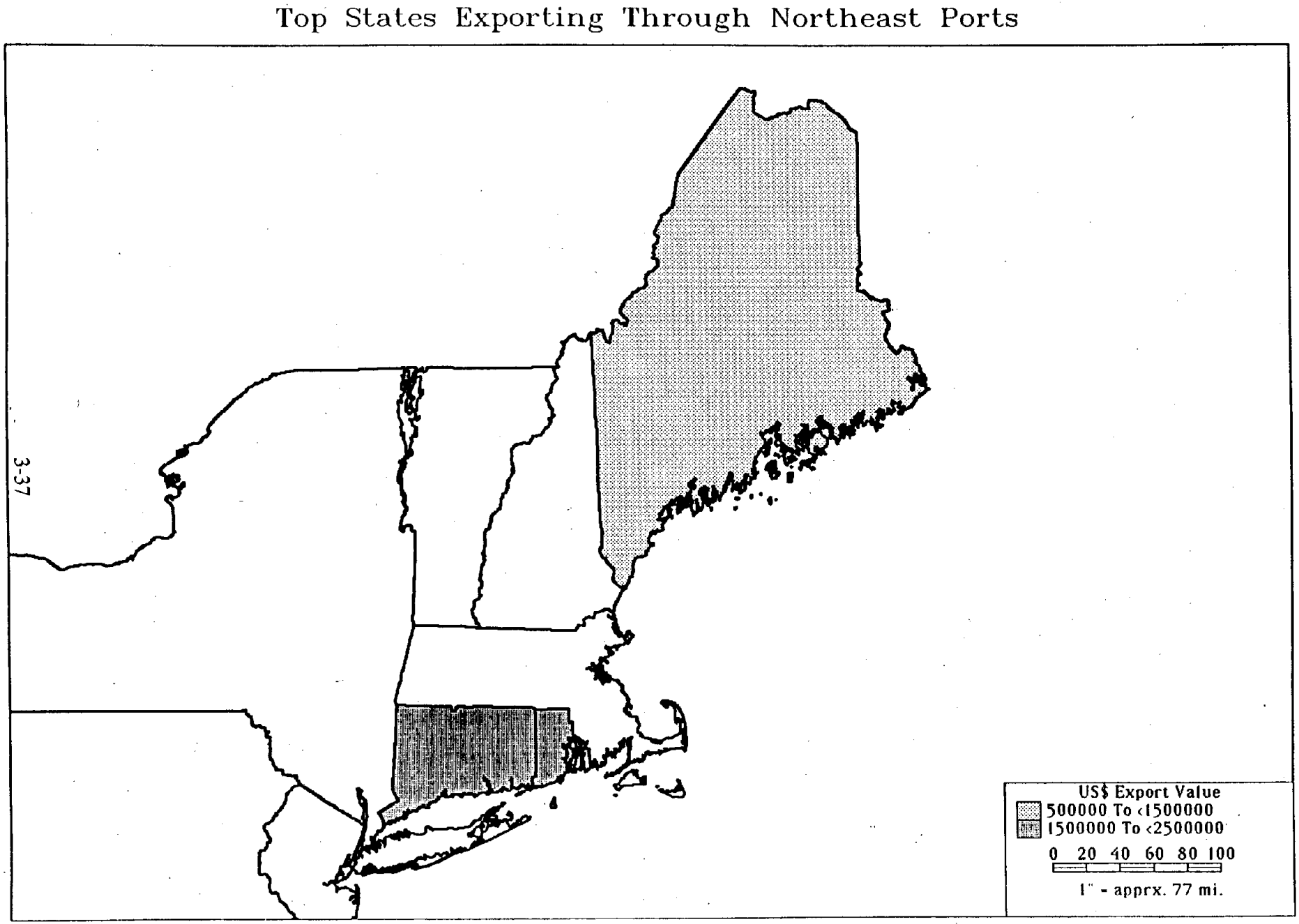

Top States Exporting Through Northeast Ports
US$ Export Value
500000 To <1500000
1500000 To <2500000
0 20 40 60 80 100
1" - apprx. 77 mi.

FIGURE 3-9.

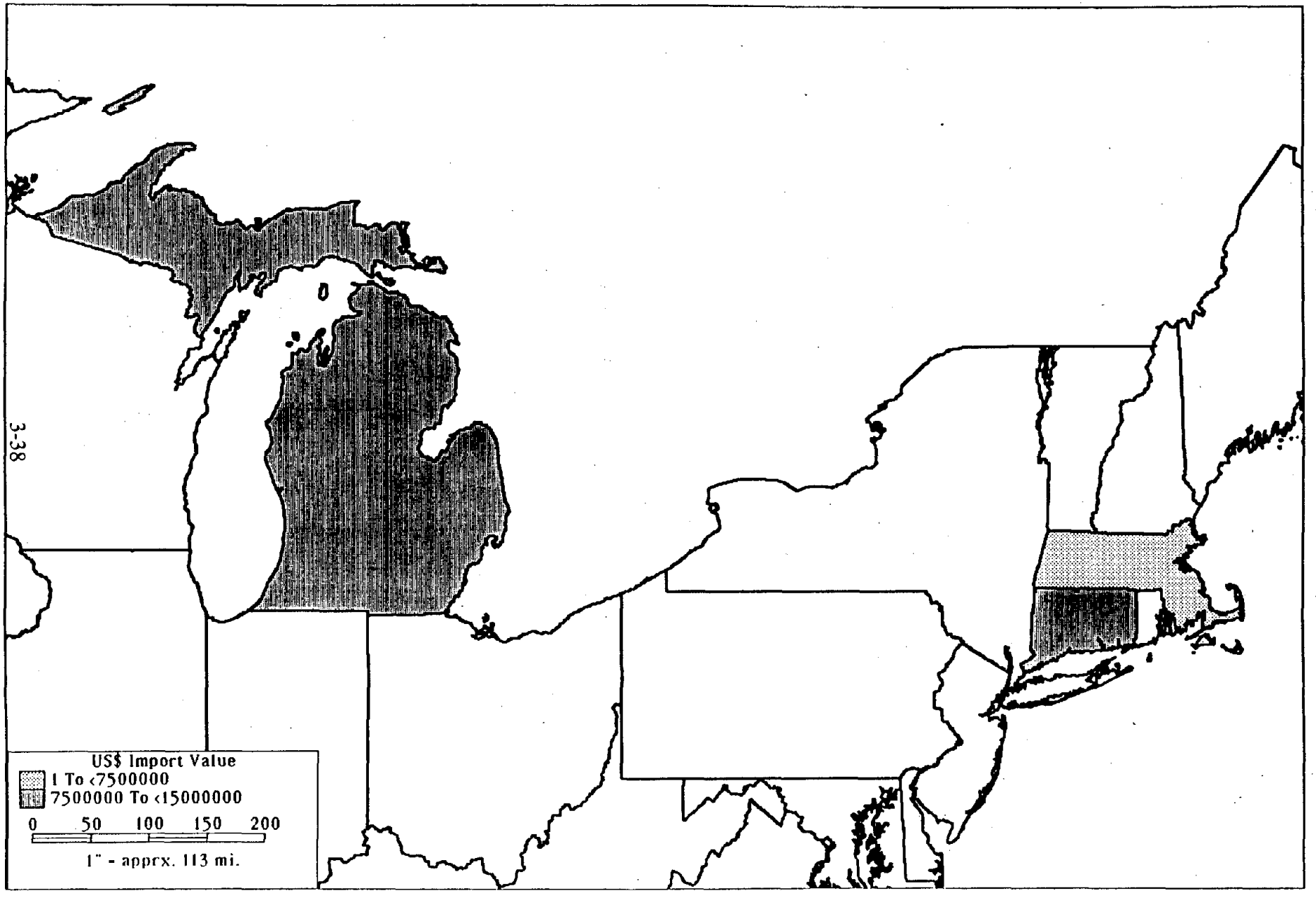

Top States Importing Through Northeast Ports
US$ Import Value
1 To <7500000
7500000 To <15000000
0 50 100 150 200
1" - apprx. 113 mi.

FIGURE 3-10.

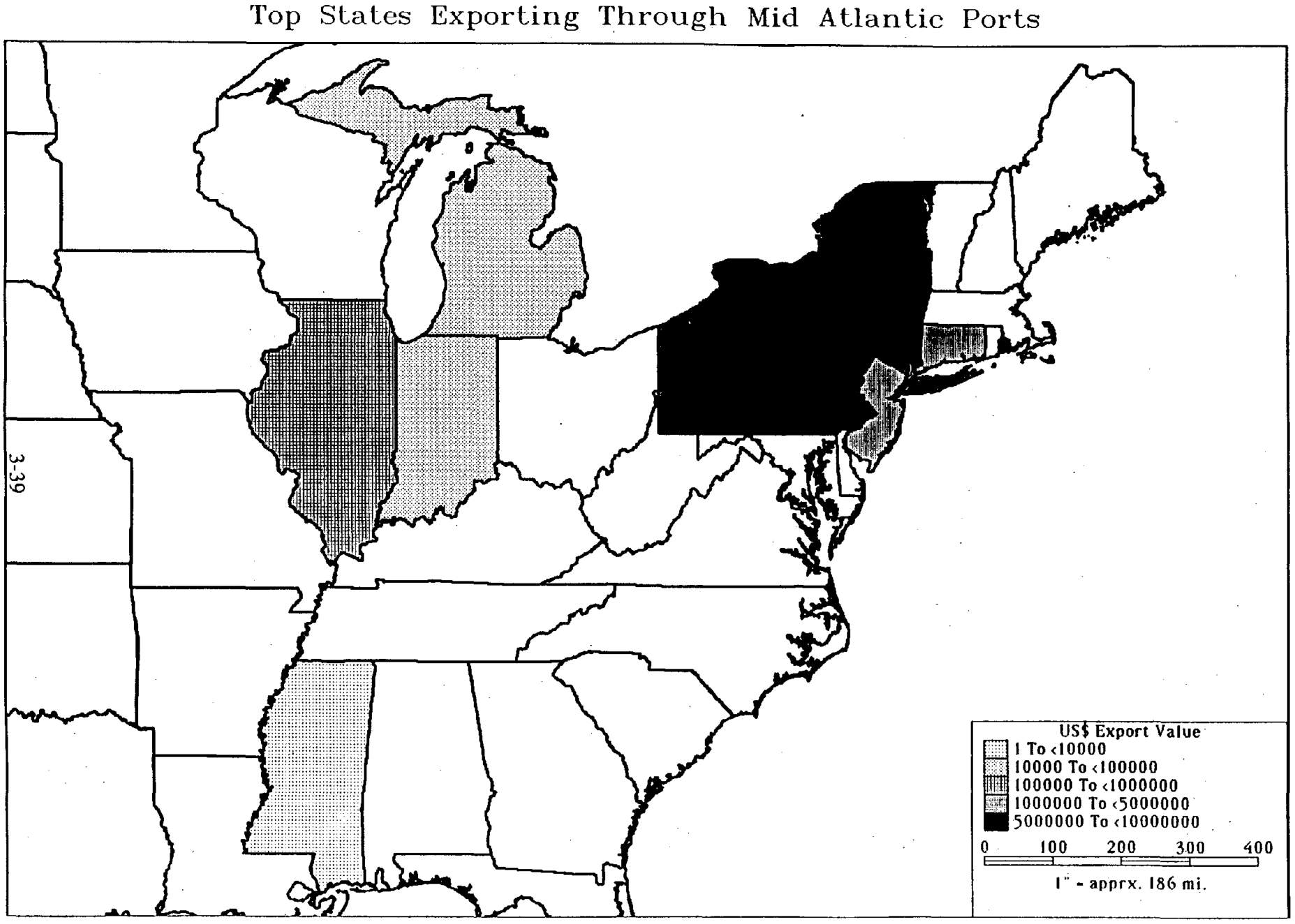

Top States Exporting Through Mid Atlantic Ports
US$ Export Value
1 To <10000
10000 To <100000
100000 To <1000000
1000000 To <5000000
5000000 To <10000000
0
100
200
300
400
1" = apprx. 186 mi.

FIGURE 3-11.

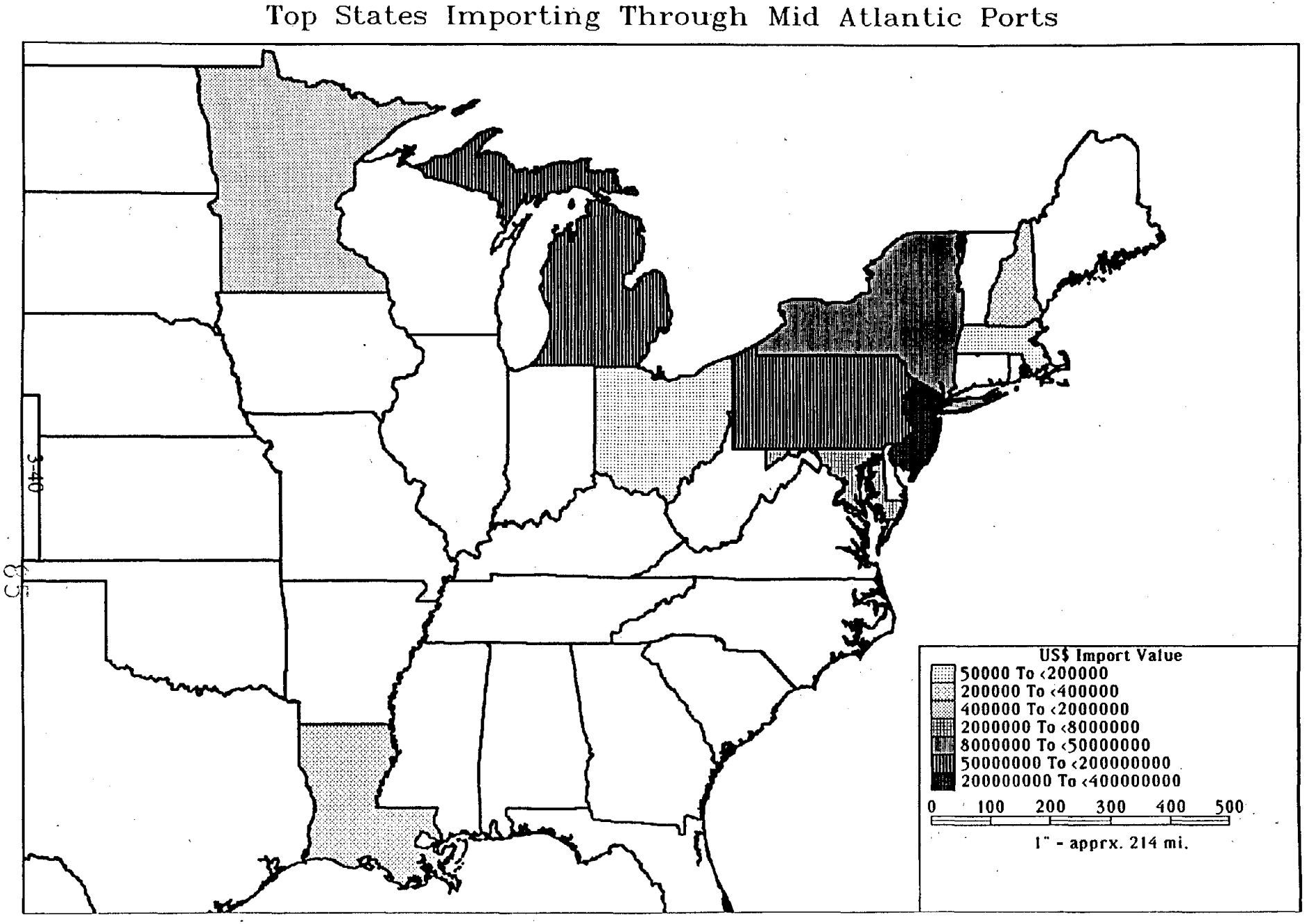

Top States Importing Through Mid Atlantic Ports
US$ Import Value
50000 To <200000
200000 To <400000
400000 To <2000000
2000000 To <8000000
8000000 To <50000000
50000000 To <200000000
200000000 To <400000000
0 100 200 300 400 500
1" - apprx. 214 mi.

FIGURE 3-12.

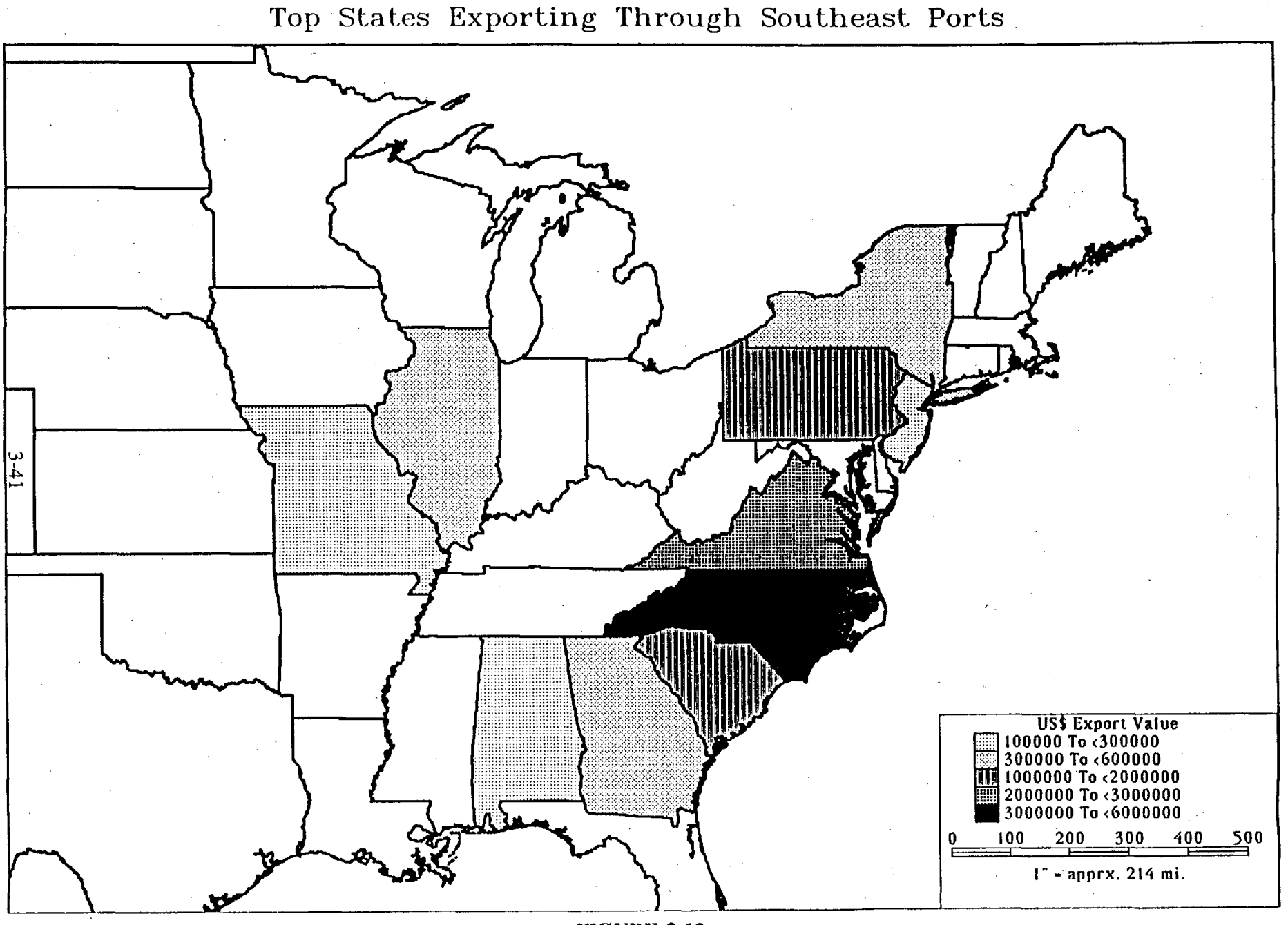

Top States Exporting Through Southeast Ports
US$ Export Value
100000 To <300000
300000 To <600000
1000000 To <2000000
2000000 To <3000000
3000000 To <6000000
0 100 200 300 400 500
1" - apprx. 214 mi.

FIGURE 3-13.

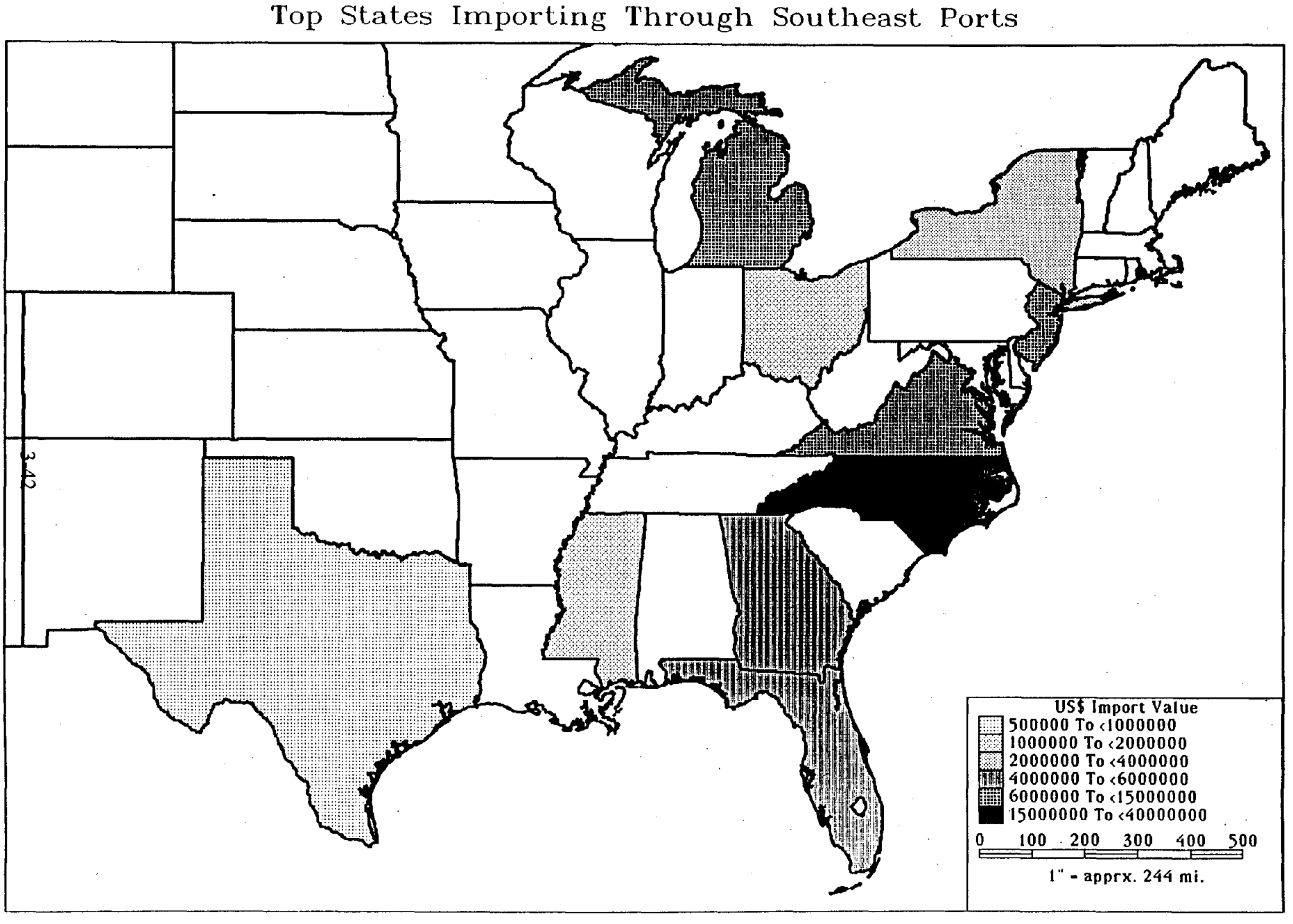

Top States Importing Through Southeast Ports
US$ Import Value
500000 To <1000000
1000000 To <2000000
2000000 To <4000000
4000000 To <6000000
6000000 To <15000000
15000000 To <40000000
0 100 200 300 400 500
1" = apprx. 244 mi.

FIGURE 3-14.

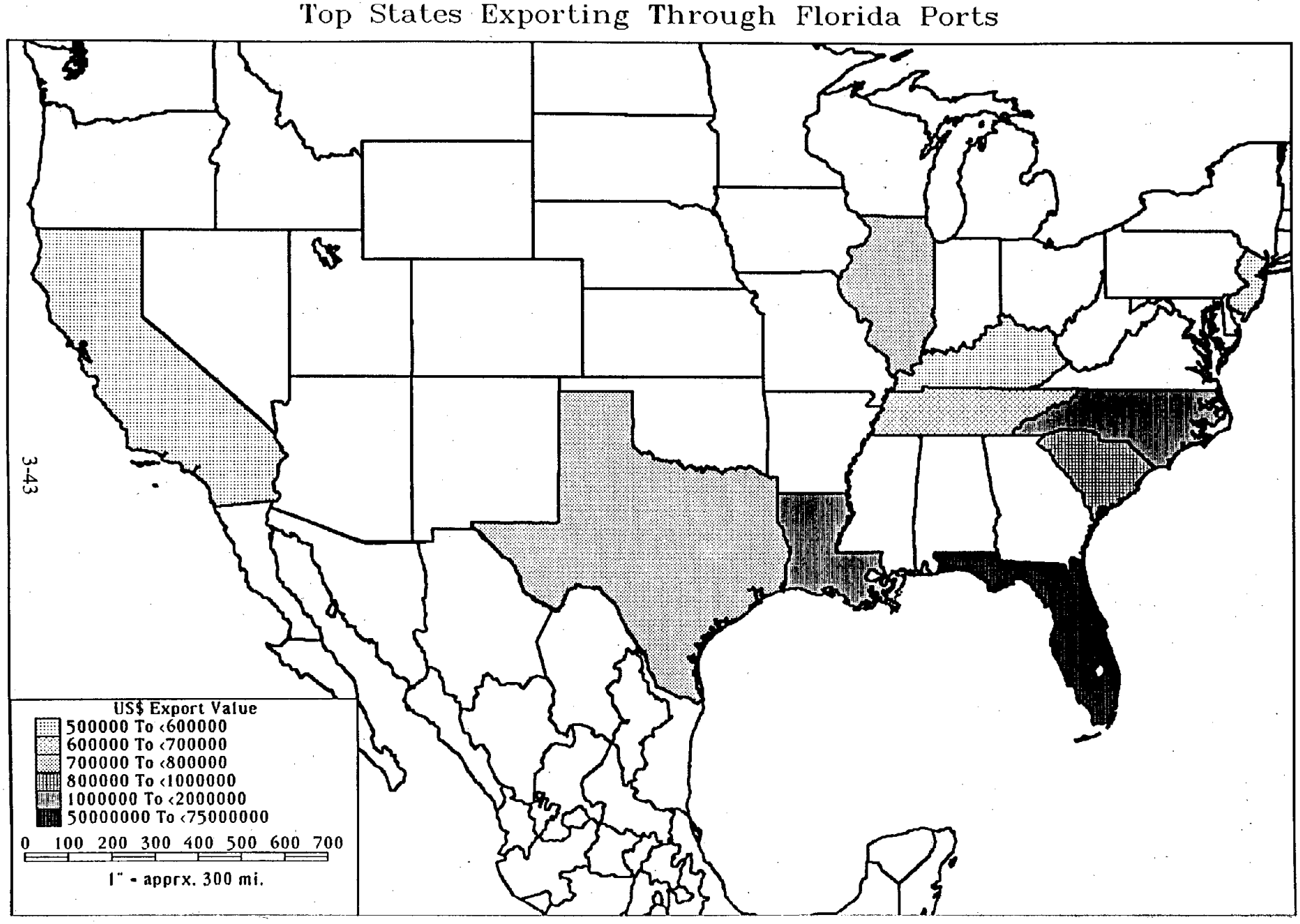

Top States Exporting Through Florida Ports
US$ Export Value
500000 To <600000
600000 To <700000
700000 To <800000
800000 To <1000000
1000000 To <2000000
50000000 To <75000000
0 100 200 300 400 500 600 700
1" = apprx. 300 mi.

FIGURE 3-15.

Top States Importing Through Florida Ports

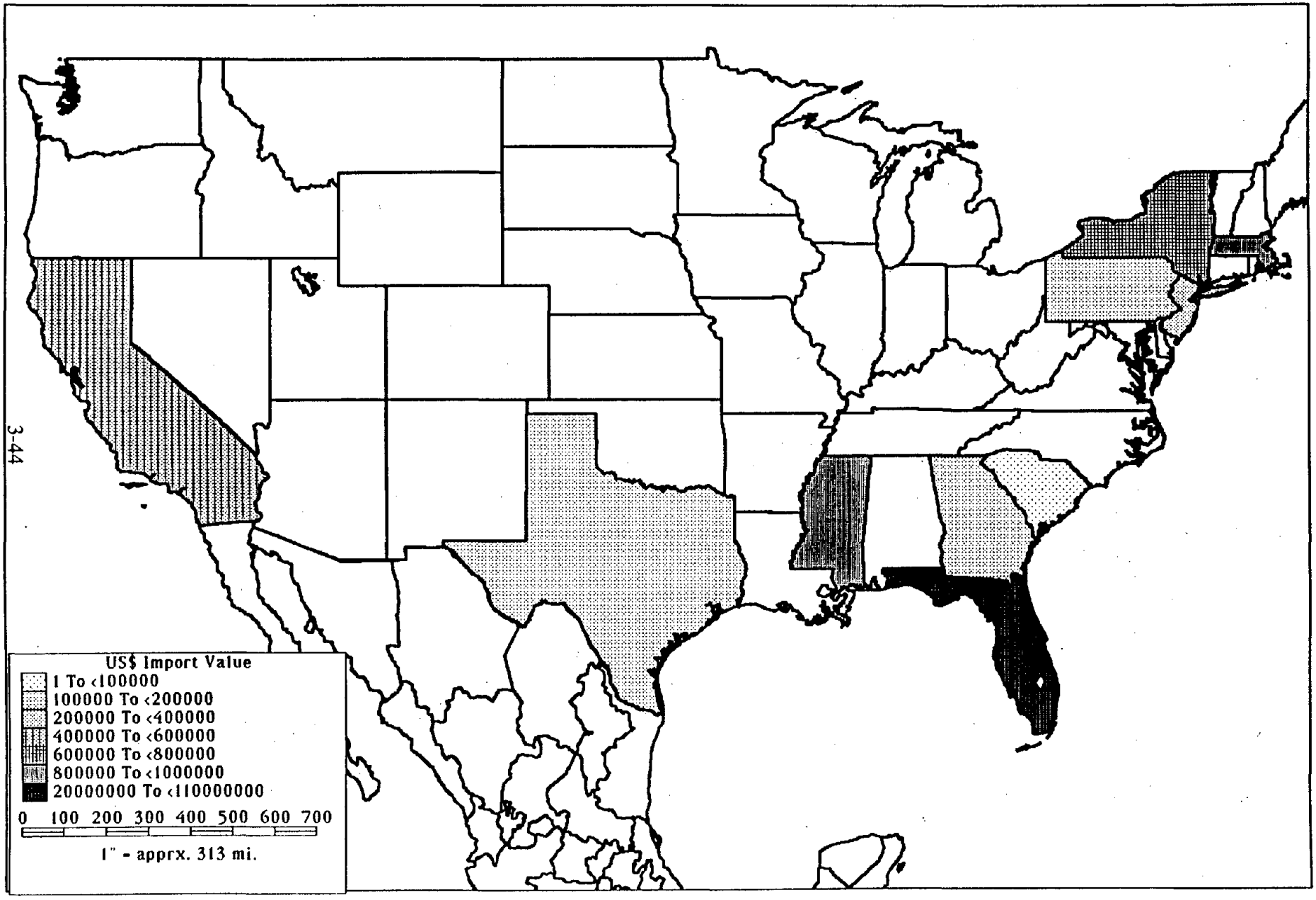


FIGURE 3-16.

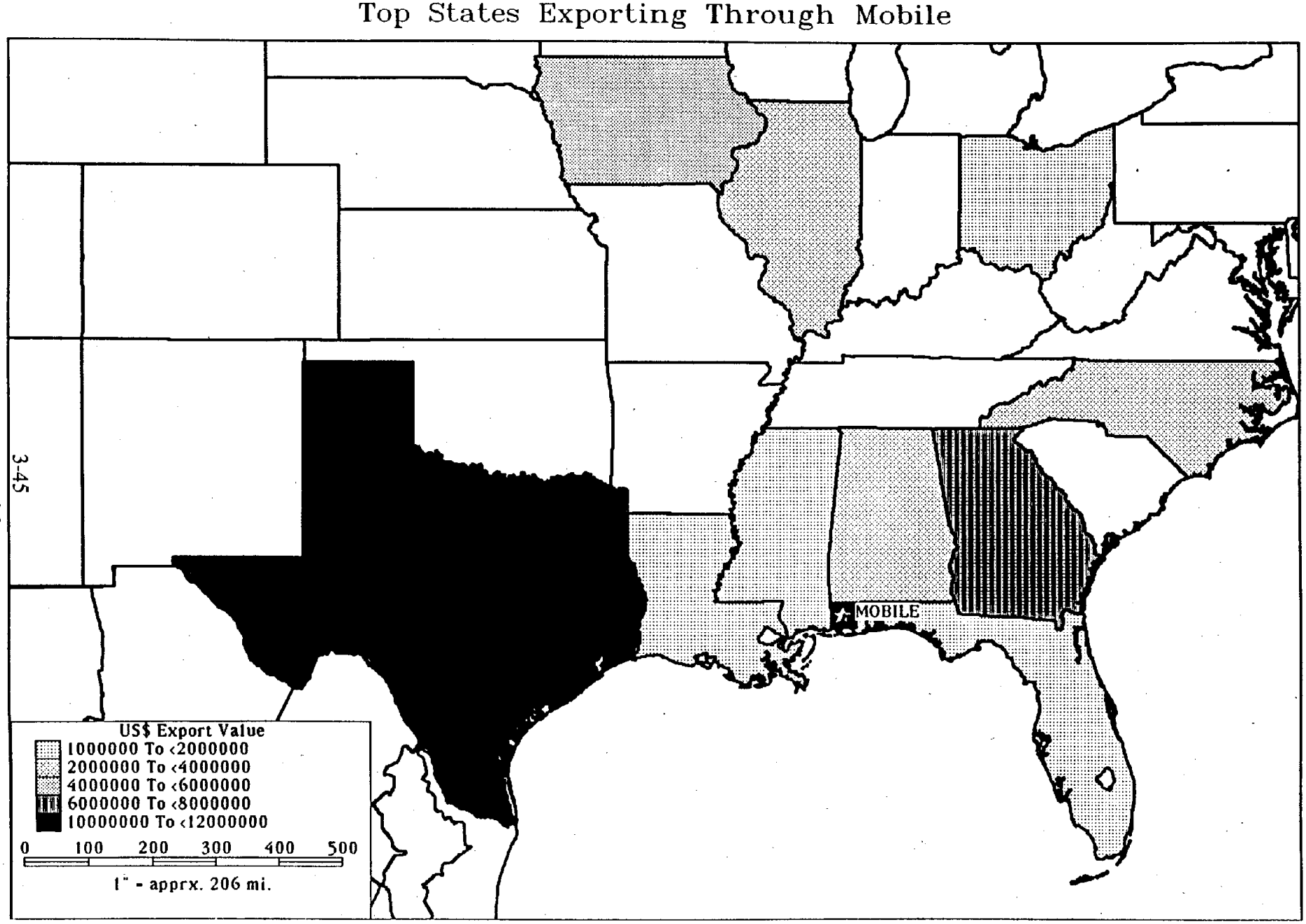

Top States Exporting Through Mobile
MOBILE
US$ Export Value
1000000 To <2000000
2000000 To <4000000
4000000 To <6000000
6000000 To <8000000
10000000 To <12000000
0 100 200 300 400 500
1" - apprx. 206 mi.

FIGURE 3-17.

Top States Importing Through Mobile

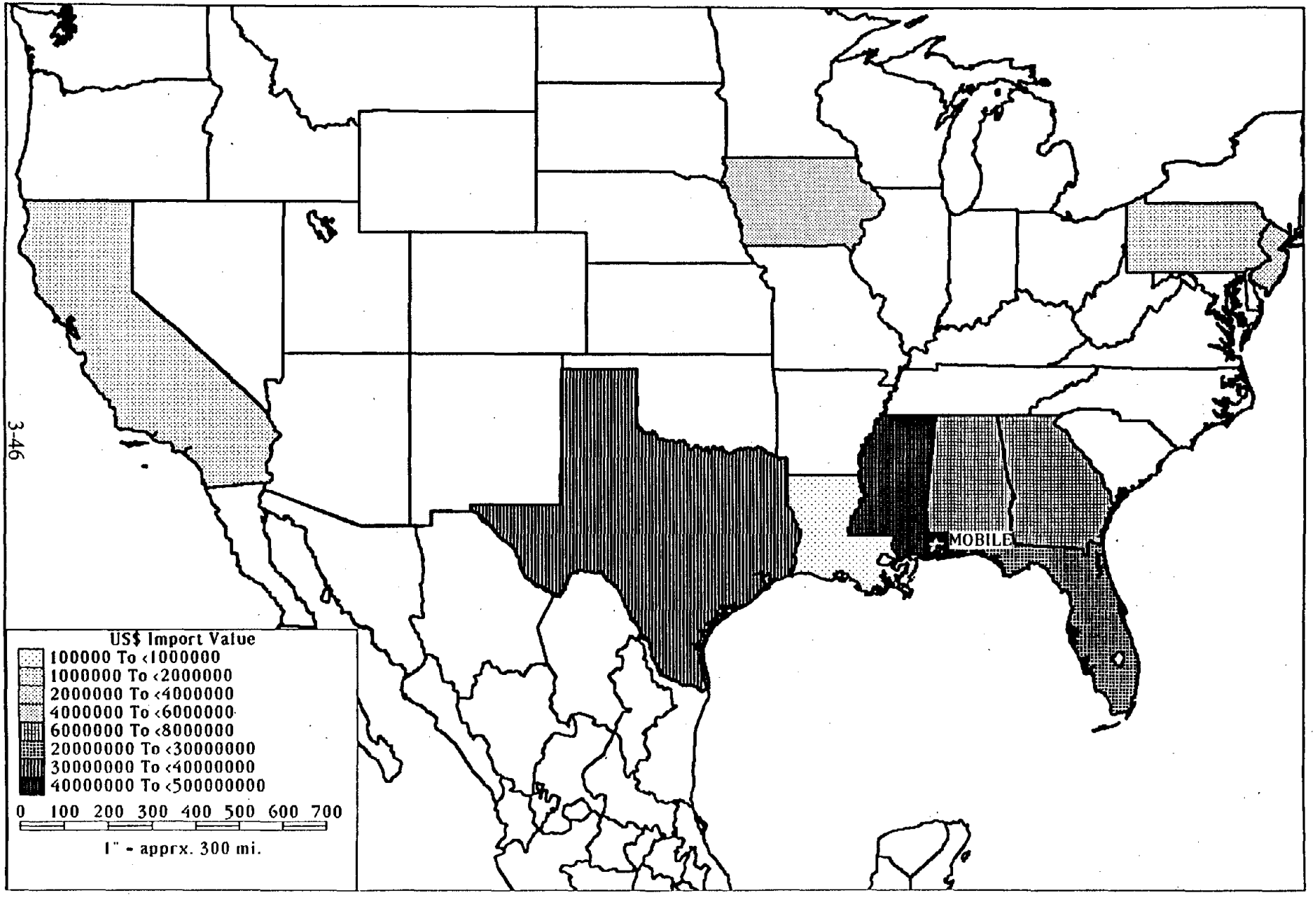


FIGURE 3-18.

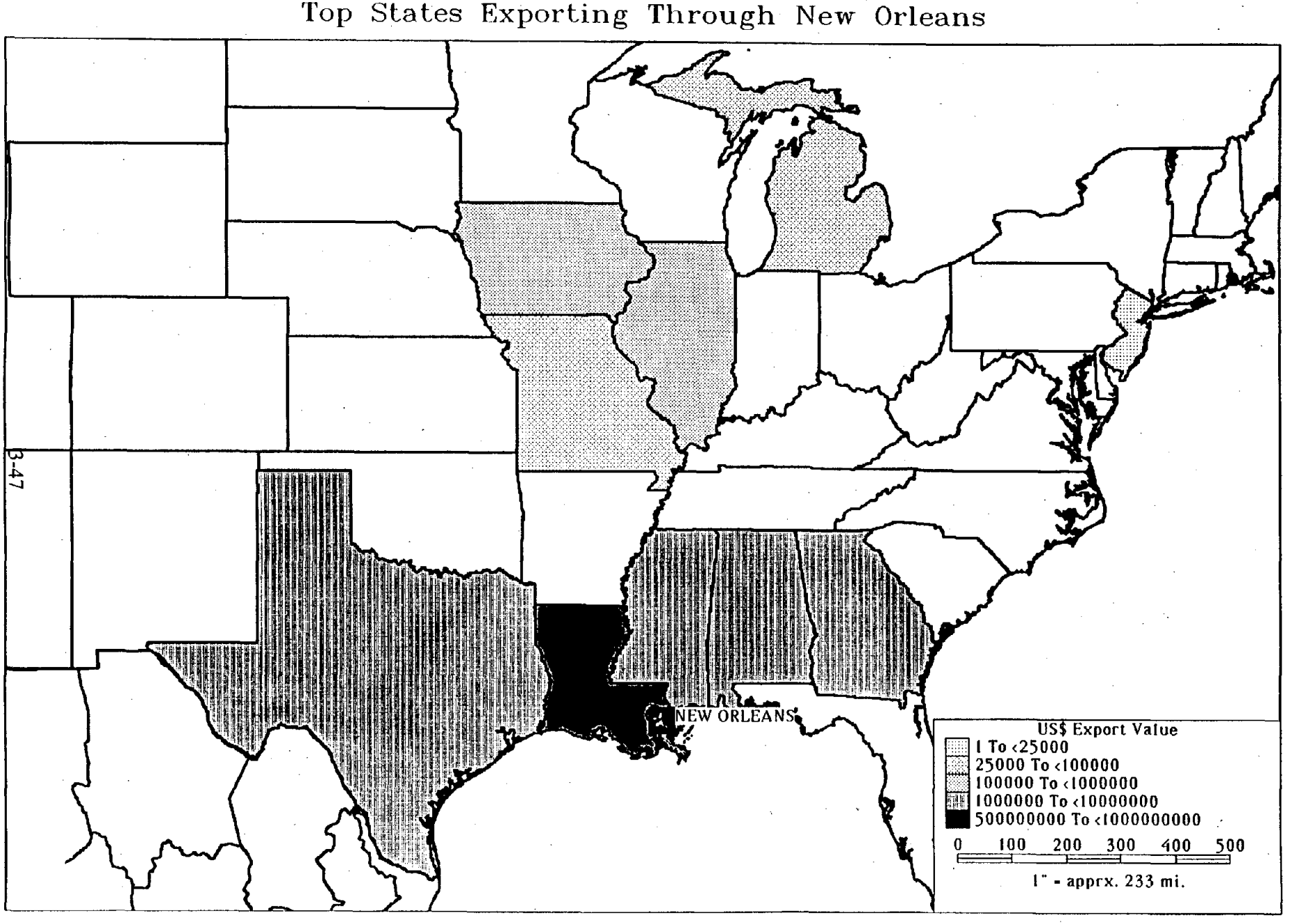


FIGURE 3-19.

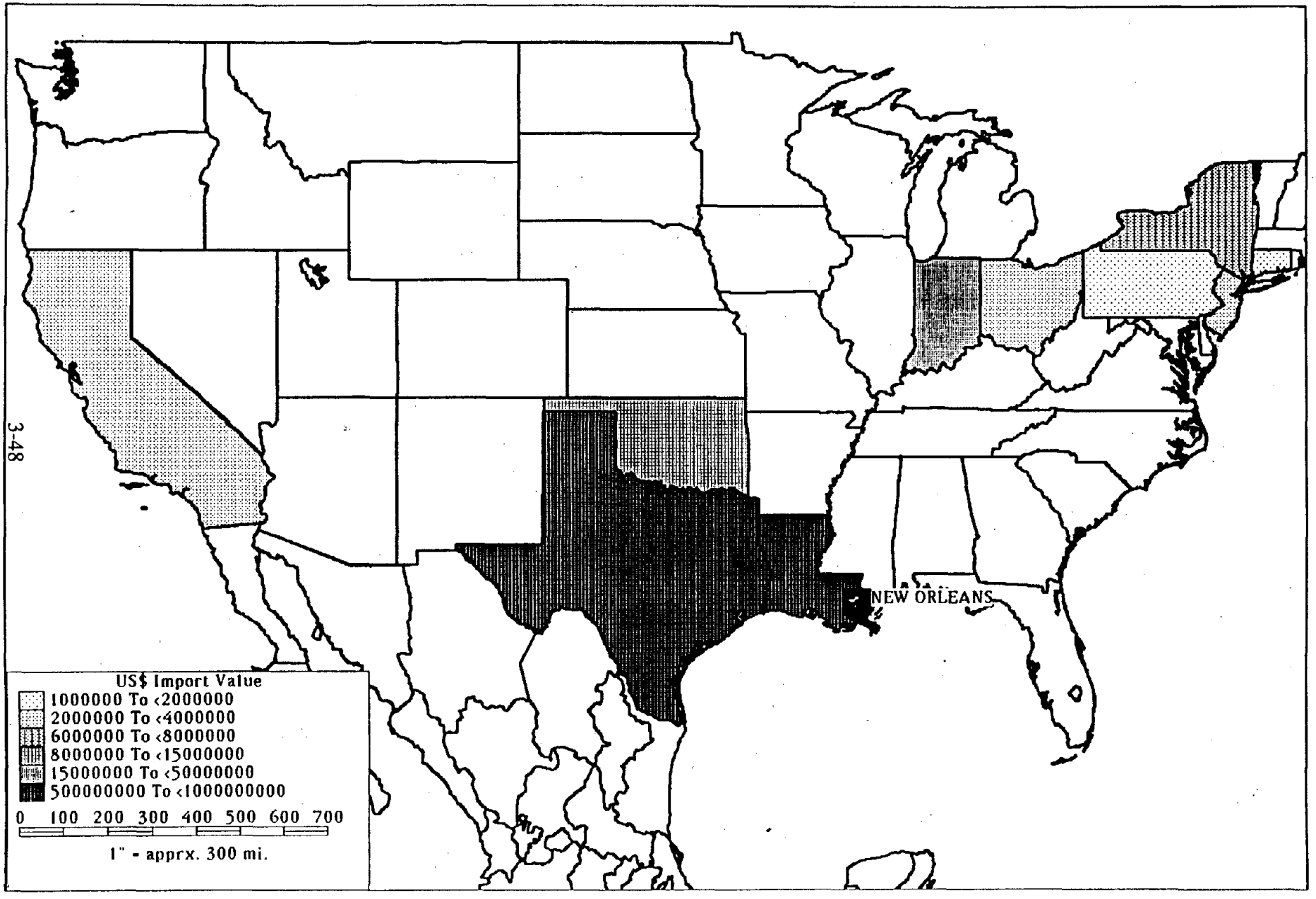

Top States Importing Through New Orleans
NEW ORLEANS
US$ Import Value
1000000 To <2000000
2000000 To <4000000
6000000 To <8000000
8000000 To <15000000
15000000 To <50000000
500000000 To <1000000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.

FIGURE 3-20.

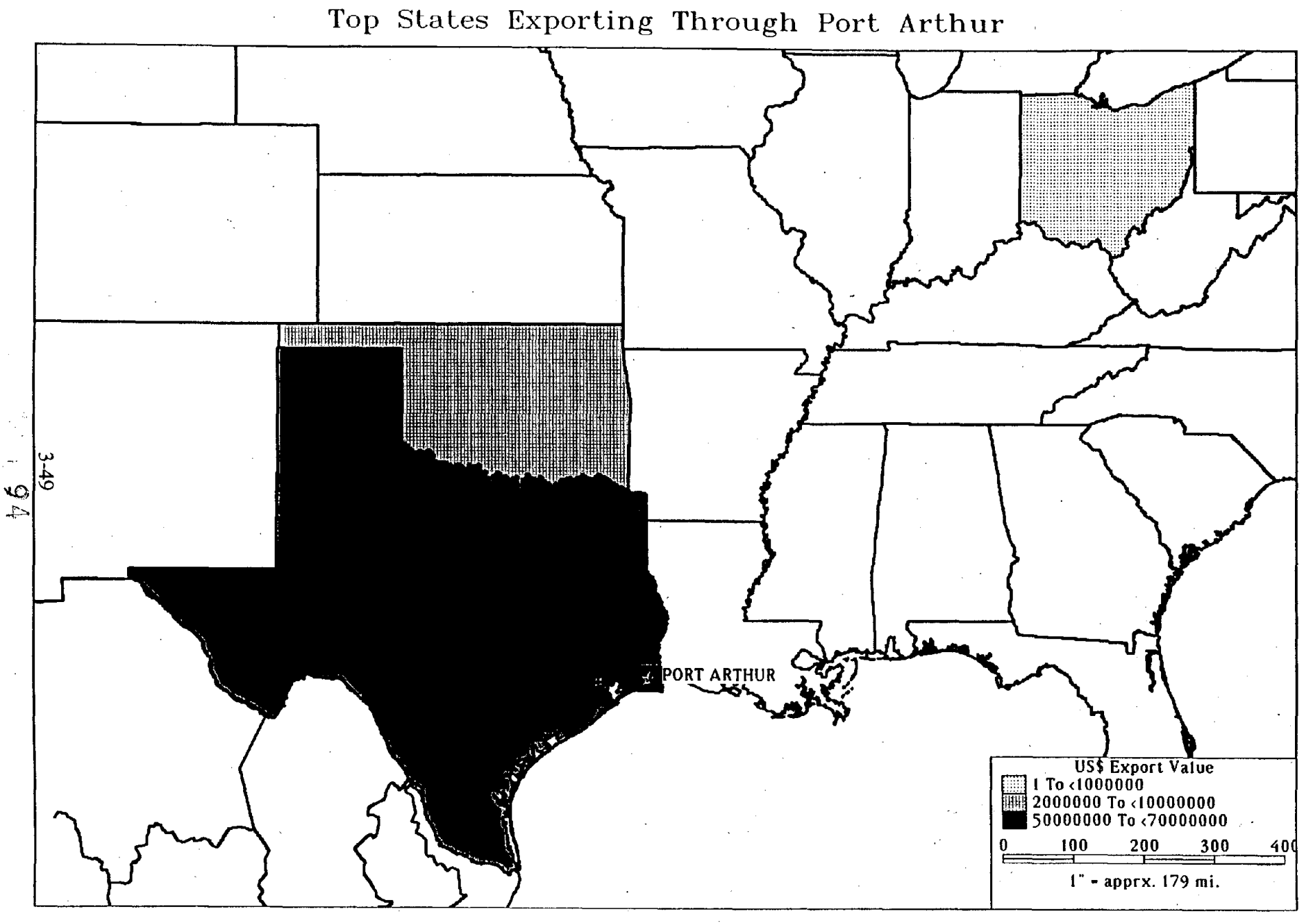

Top States Exporting Through Port Arthur
PORT ARTHUR
US$ Export Value
1 To <1000000
2000000 To <10000000
50000000 To <70000000
0
100
200
300
400
1" = apprx. 179 mi.

FIGURE 3-21.

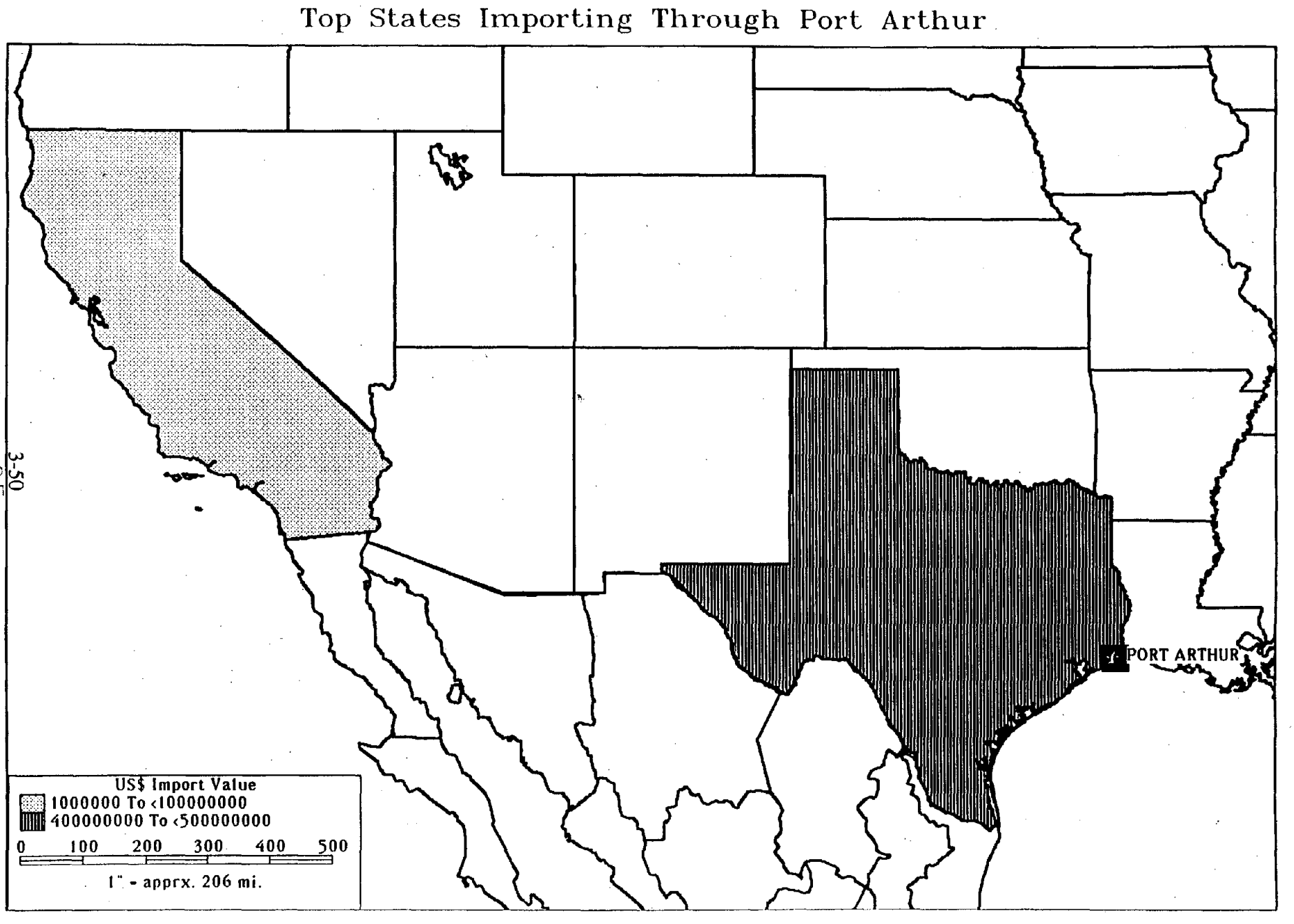

Top States Importing Through Port Arthur
PORT ARTHUR
US$ Import Value
1000000 To <100000000
400000000 To <500000000
0 100 200 300 400 500
1" - apprx. 206 mi.

FIGURE 3-22.

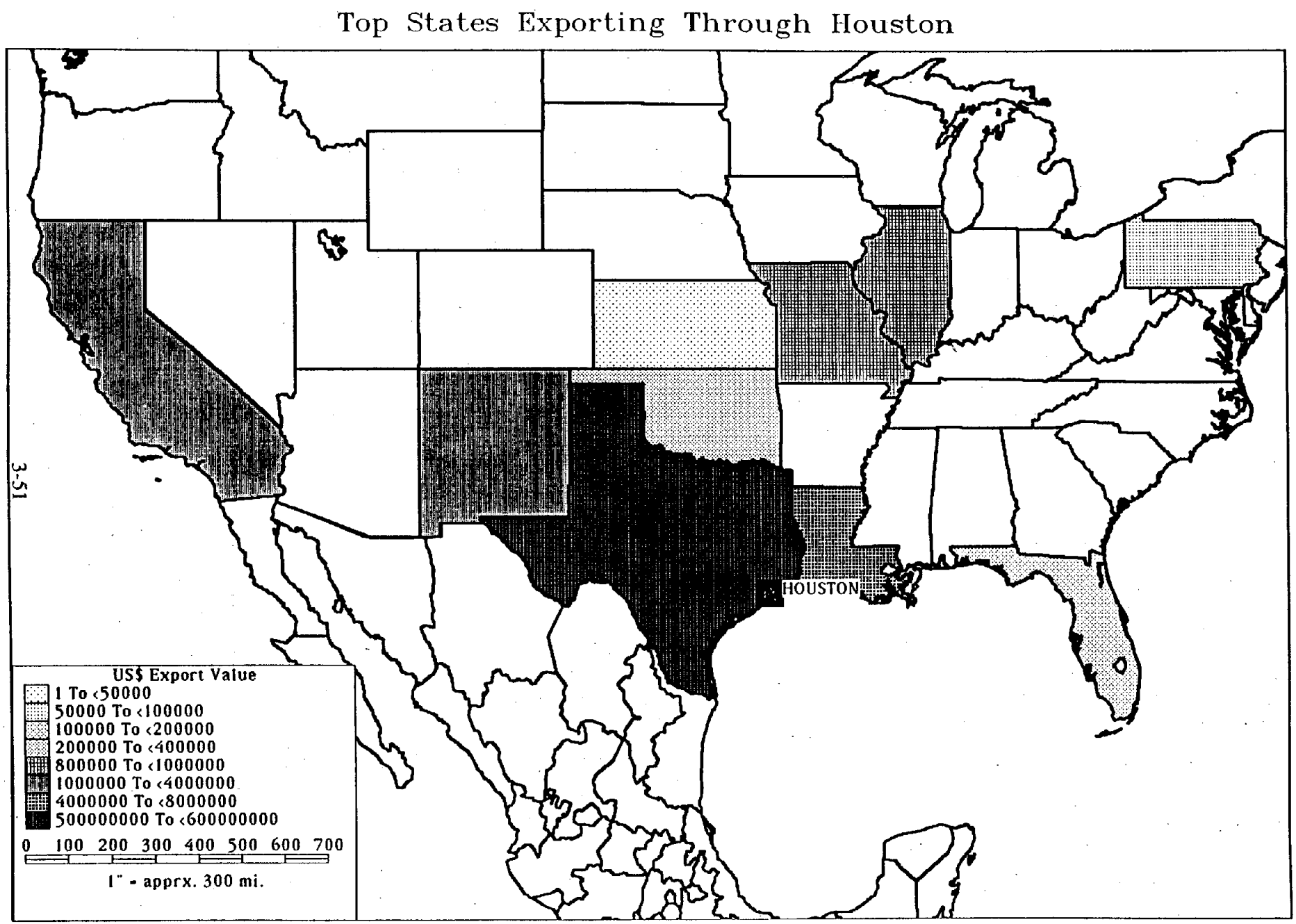

Top States Exporting Through Houston
HOUSTON
US$ Export Value
1 To <50000
50000 To <100000
100000 To <200000
200000 To <400000
800000 To <1000000
1000000 To <4000000
4000000 To <8000000
500000000 To <600000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.

FIGURE 3-23.

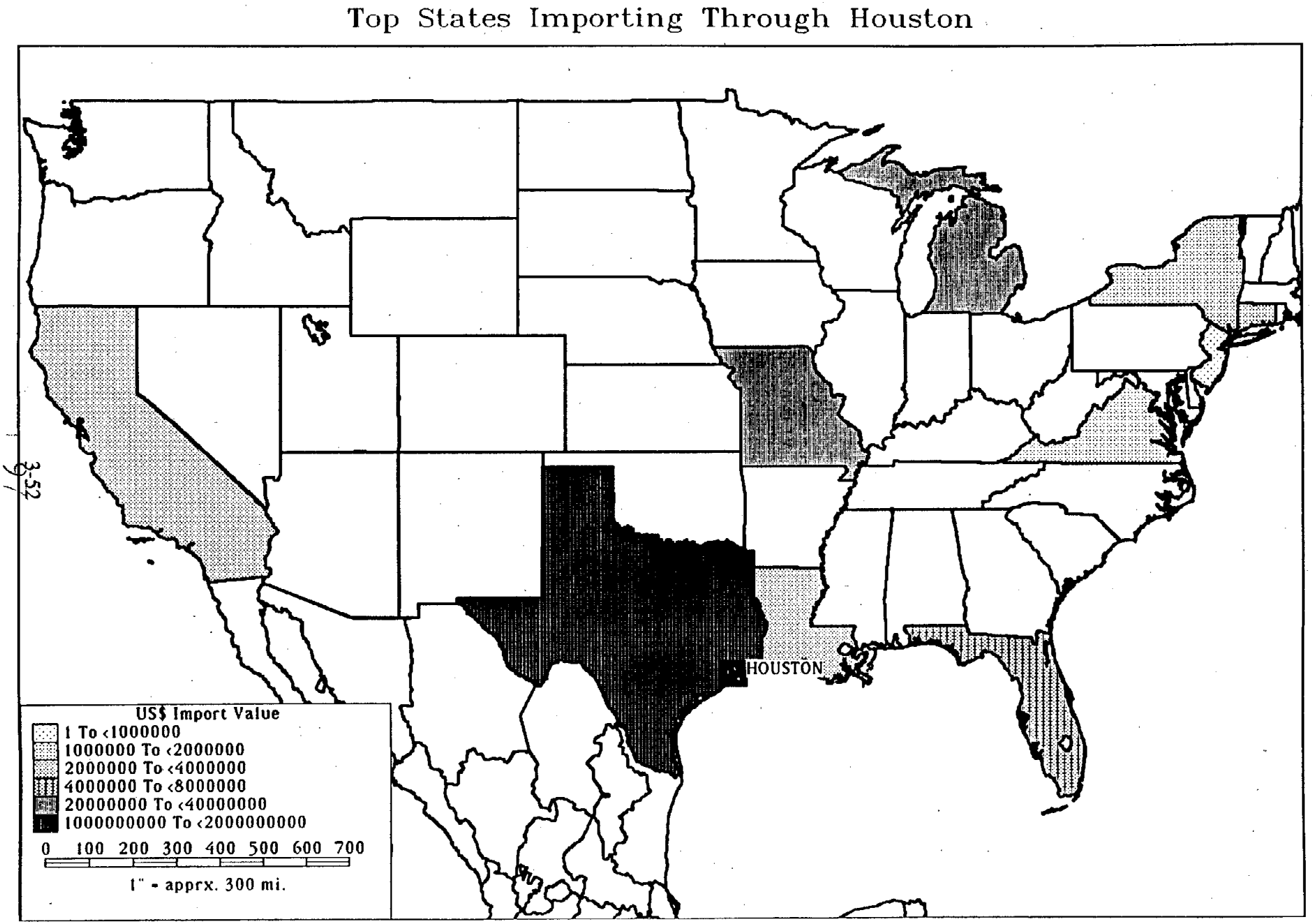

Top States Importing Through Houston
HOUSTON
US$ Import Value
1 To <1000000
1000000 To <2000000
2000000 To <4000000
4000000 To <8000000
20000000 To <40000000
1000000000 To <2000000000
0 100 200 300 400 500 600 700
1" = apprx. 300 mi.

FIGURE 3-24.

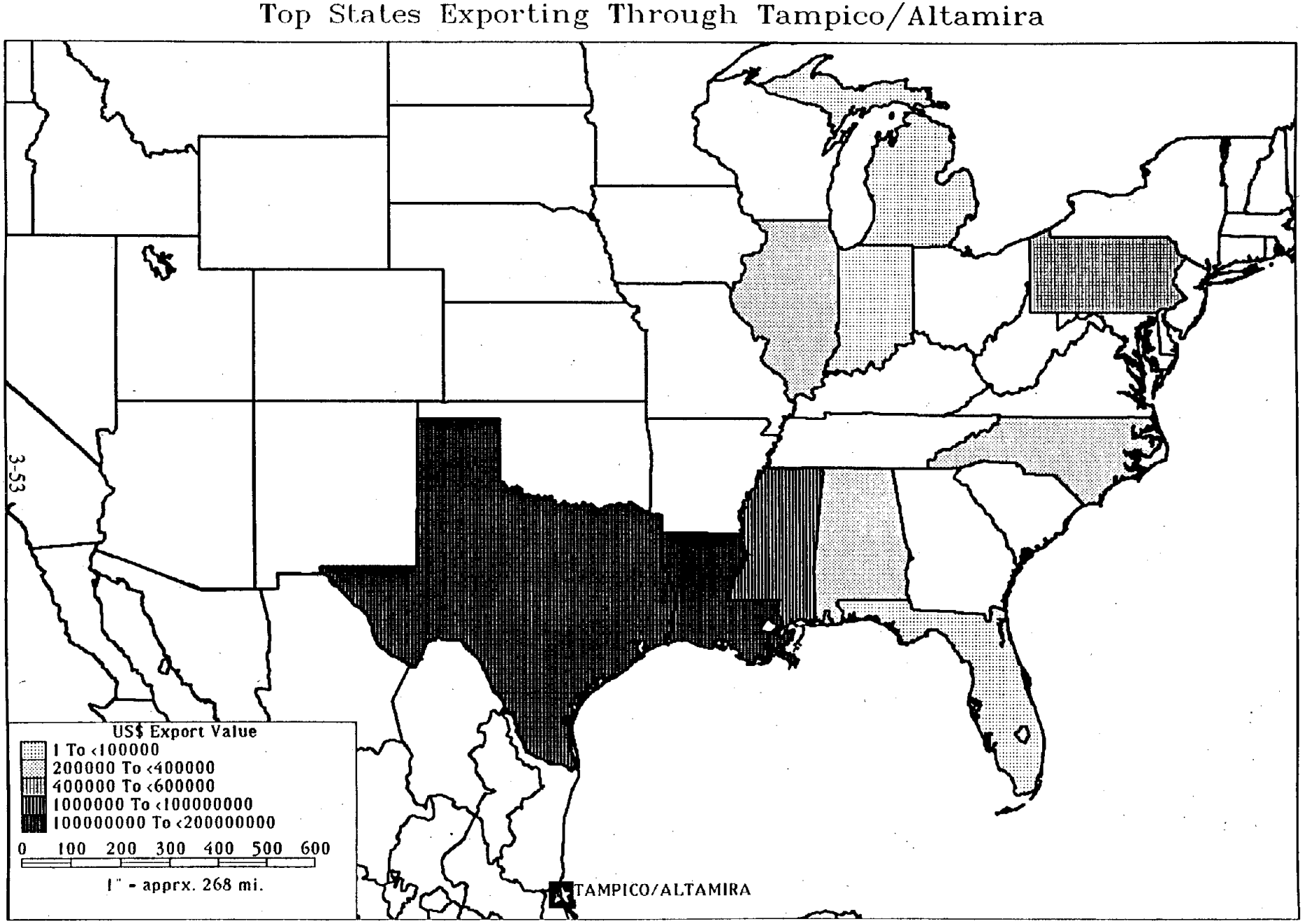

Top States Exporting Through Tampico/Altamira
US$ Export Value
1 To <100000
200000 To <400000
400000 To <600000
1000000 To <100000000
100000000 To <200000000
0 100 200 300 400 500 600
1" = apprx. 268 mi.
TAMPICO/ALTAMIRA

FIGURE 3-25.

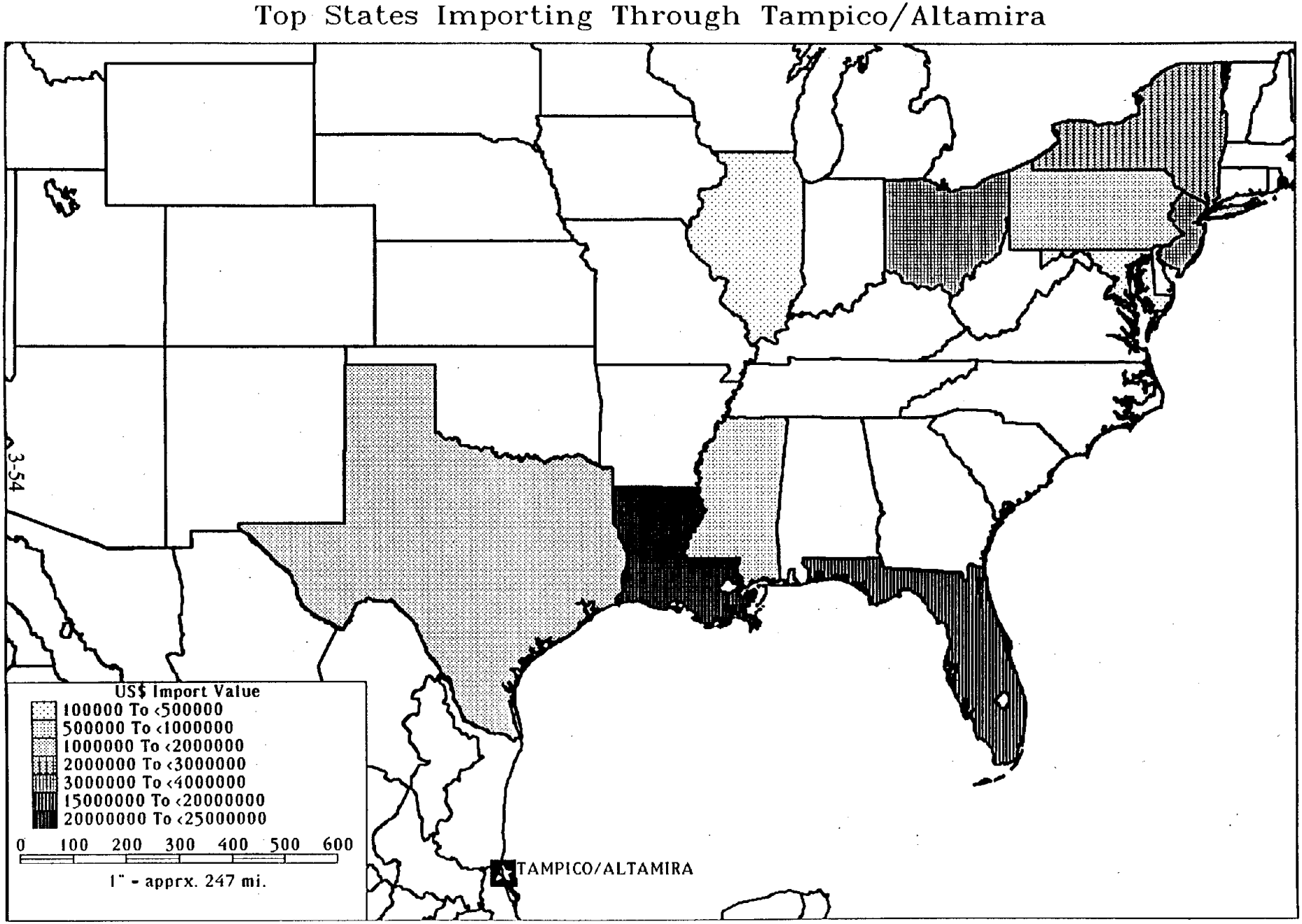

Top States Importing Through Tampico/Altamira
US$ Import Value
100000 To <500000
500000 To <1000000
1000000 To <2000000
2000000 To <3000000
3000000 To <4000000
15000000 To <20000000
20000000 To <25000000
0 100 200 300 400 500 600
1" = apprx. 247 mi.
TAMPICO/ALTAMIRA
3-54

FIGURE 3-26.

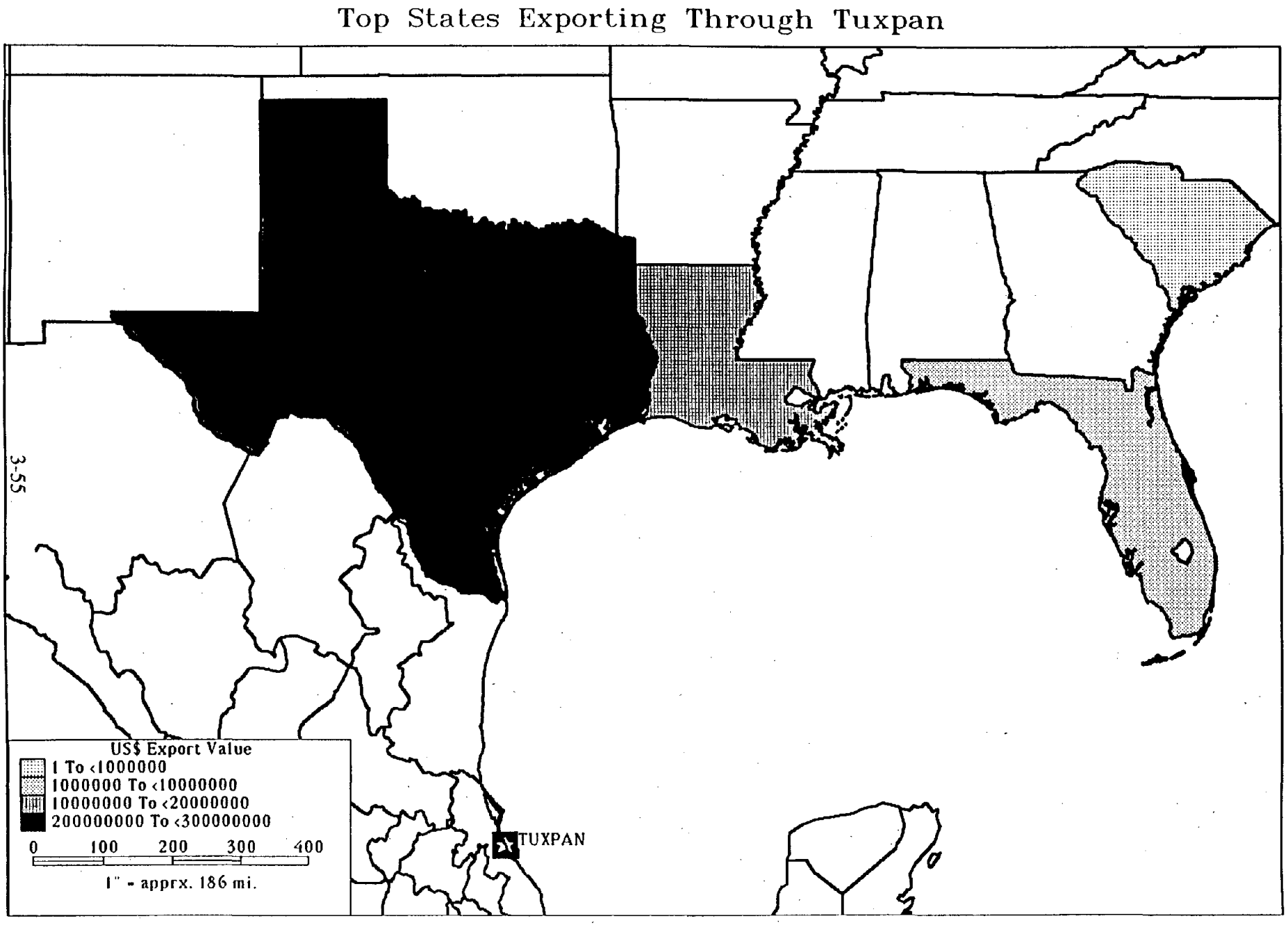

Top States Exporting Through Tuxpan
US$ Export Value
1 To <1000000
1000000 To <10000000
10000000 To <20000000
200000000 To <300000000
0 100 200 300 400
1" = apprx. 186 mi.
TUXPAN

FIGURE 3-27.

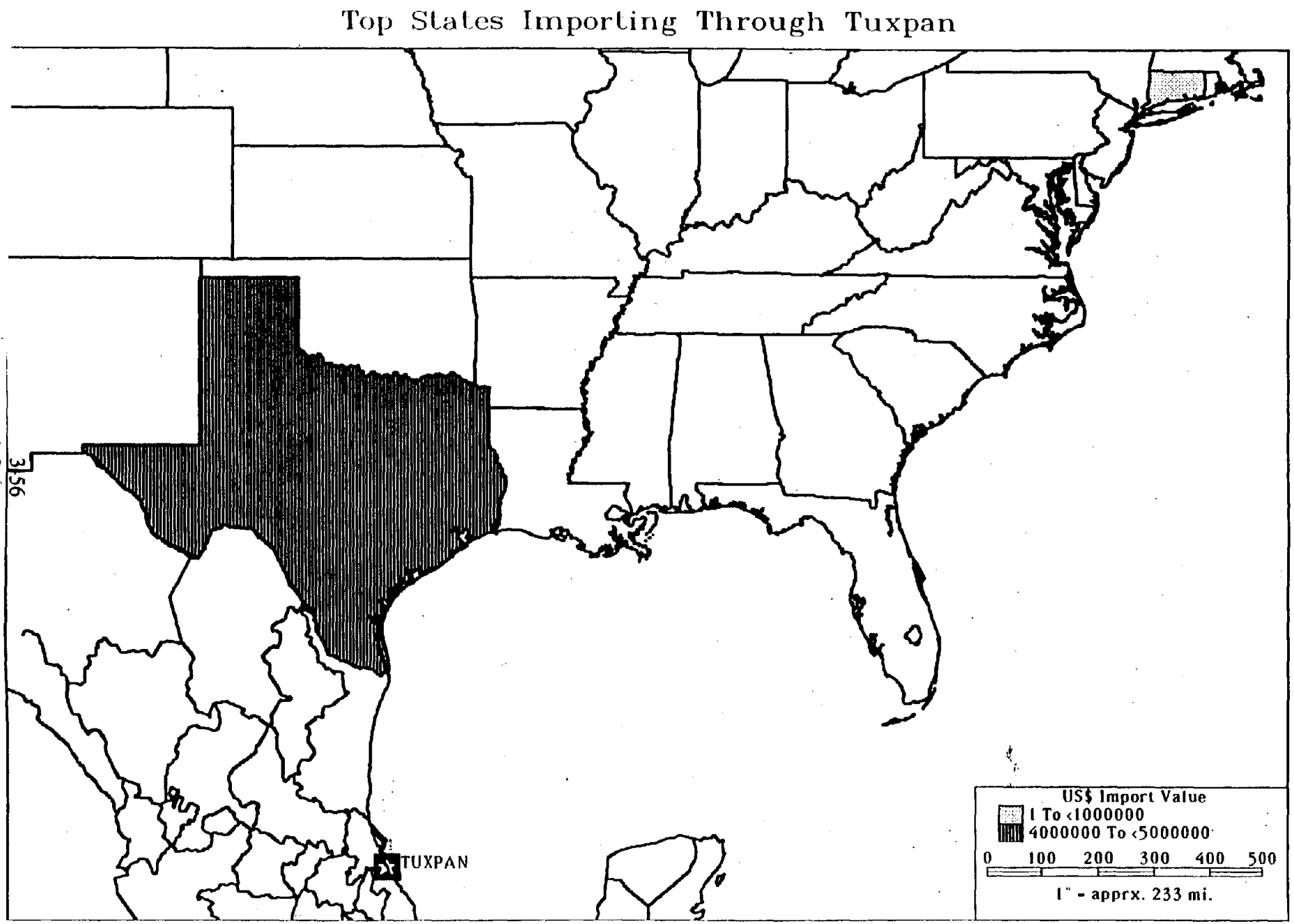

Top States Importing Through Tuxpan
TUXPAN
US$ Import Value
1 To <1000000
4000000 To <5000000
0 100 200 300 400 500
1" = apprx. 233 mi.

FIGURE 3-28.

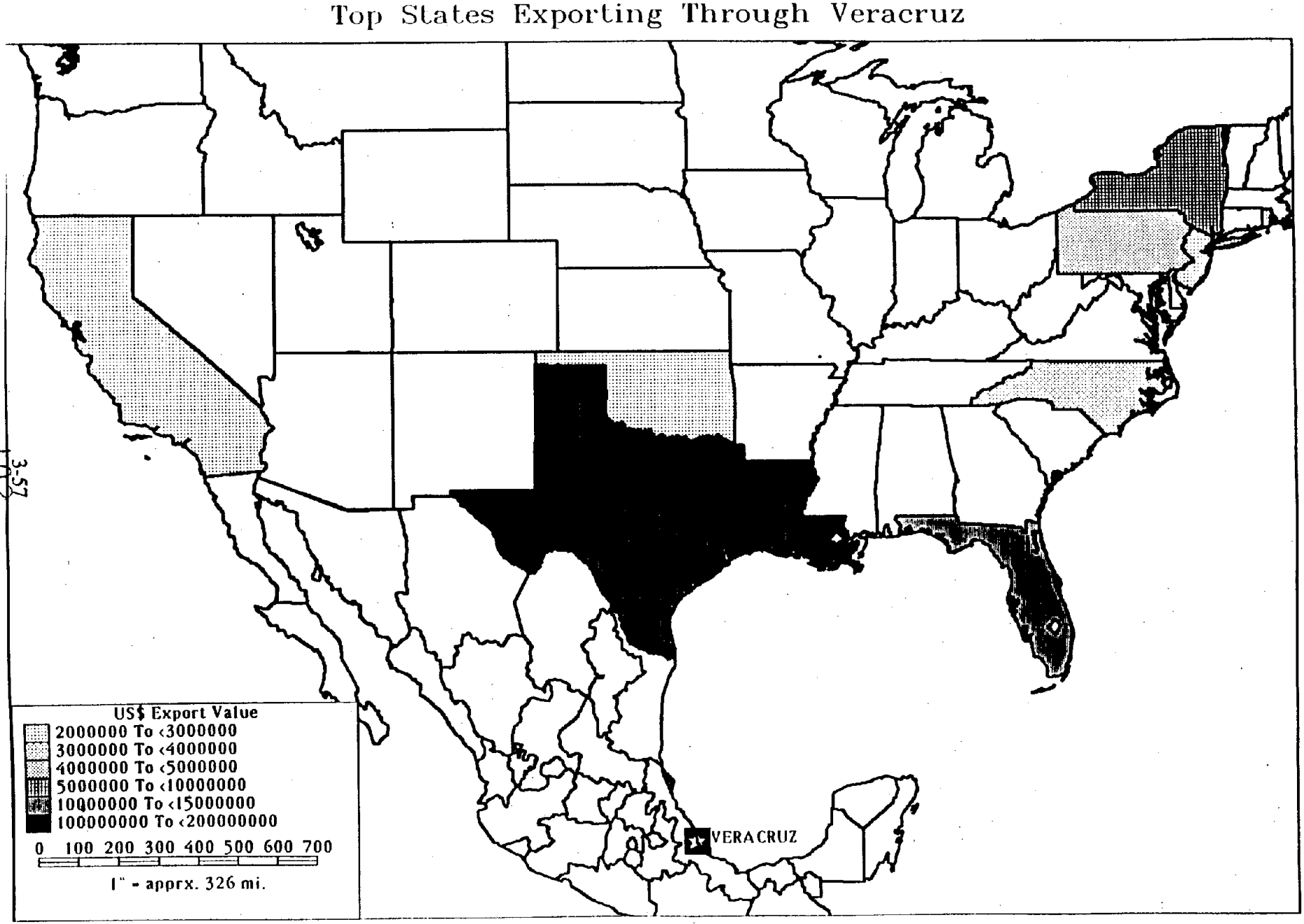

Top States Exporting Through Veracruz
US$ Export Value
2000000 To <3000000
3000000 To <4000000
4000000 To <5000000
5000000 To <10000000
10000000 To <15000000
100000000 To <200000000
0 100 200 300 400 500 600 700
1" - apprx. 326 mi.
VERACRUZ

FIGURE 3-29.

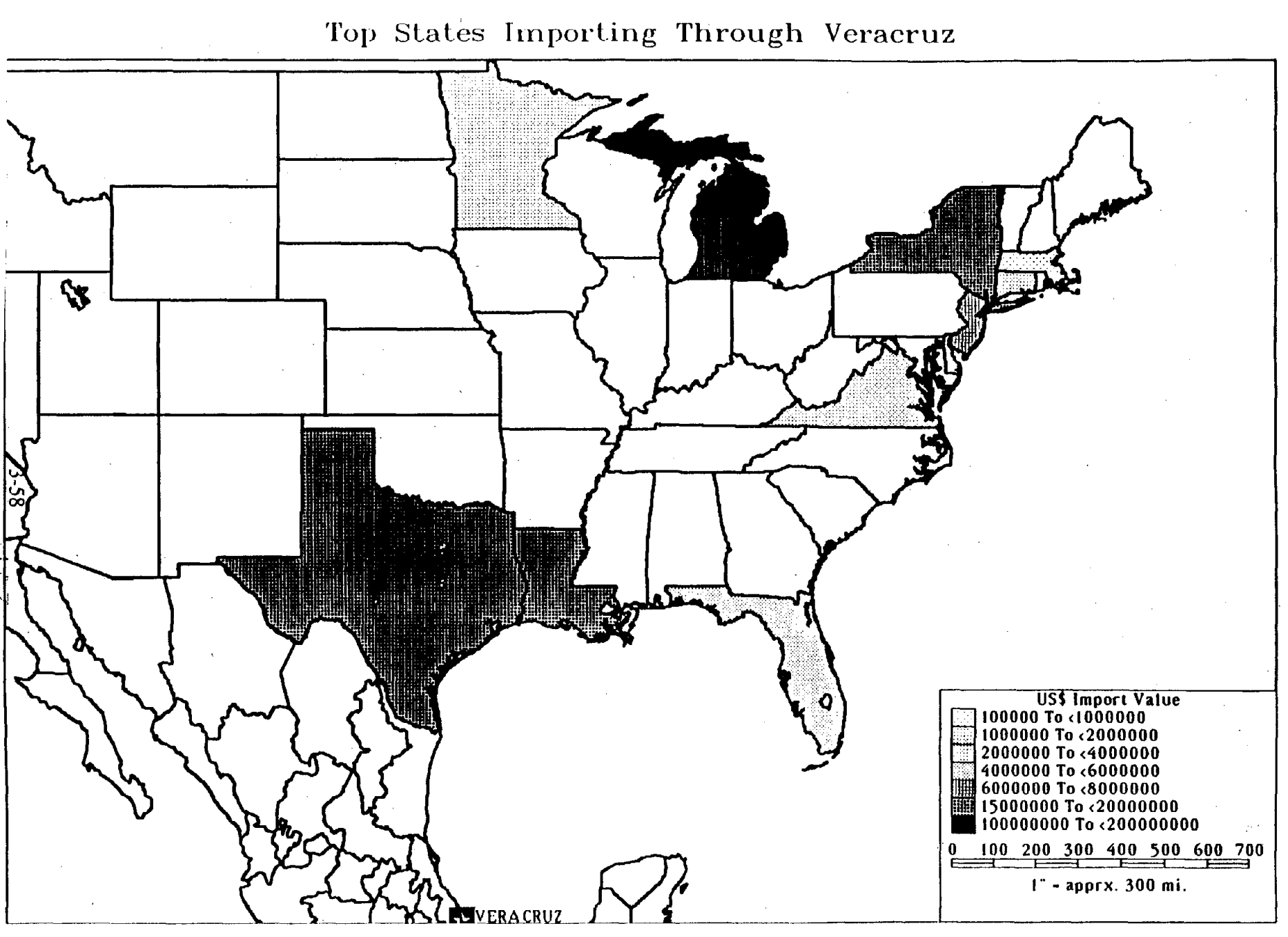
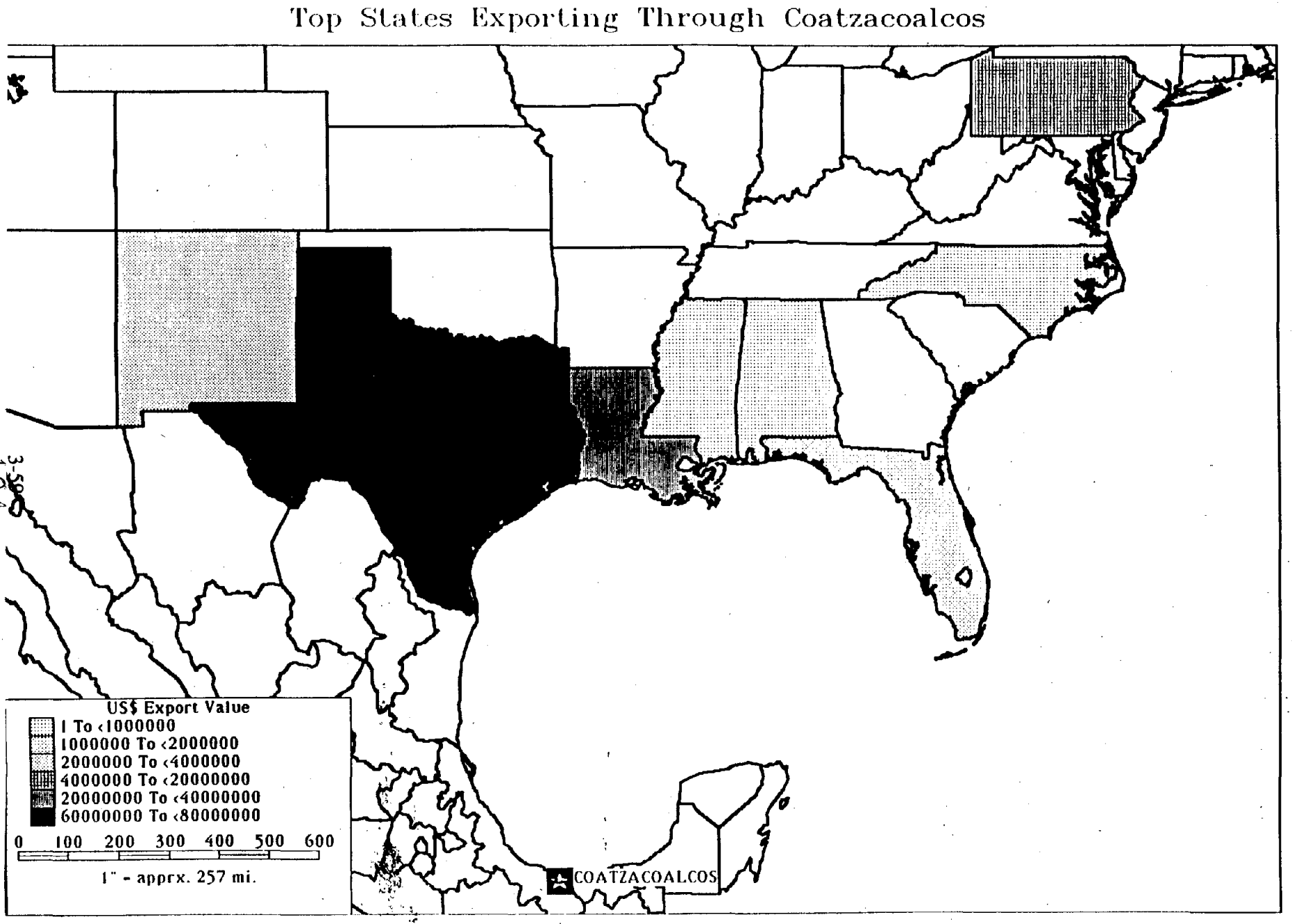

Top States Importing Through Veracruz
US$ Import Value
100000 To <1000000
1000000 To <2000000
2000000 To <4000000
4000000 To <6000000
6000000 To <8000000
15000000 To <20000000
100000000 To <200000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.
VERACRUZ

FIGURE 3-30.



3-50
104

FIGURE 3-31.

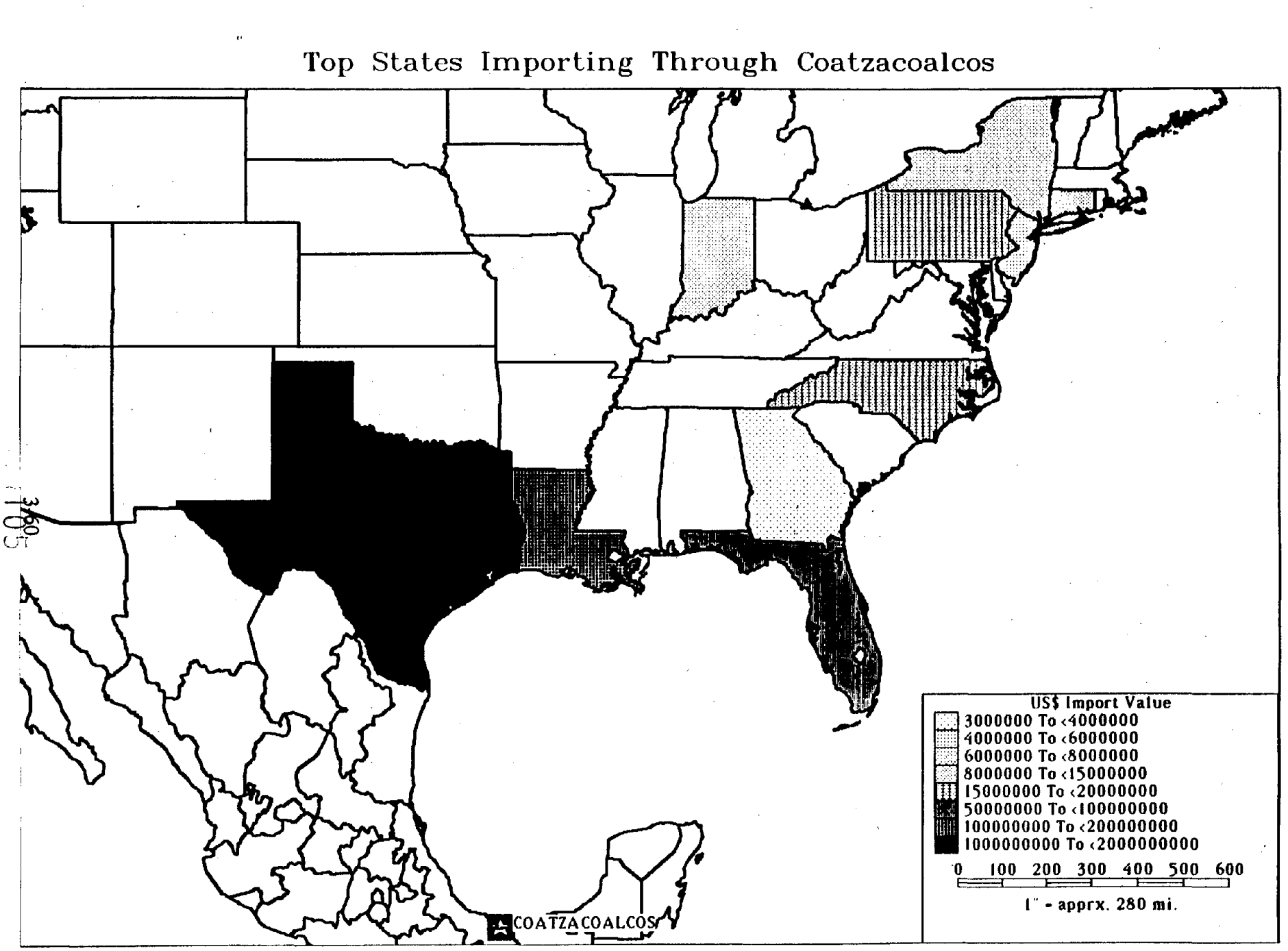

Top States Importing Through Coatzacoalcos
US$ Import Value
3000000 To <4000000
4000000 To <6000000
6000000 To <8000000
8000000 To <15000000
15000000 To <20000000
50000000 To <100000000
100000000 To <200000000
1000000000 To <2000000000
0 100 200 300 400 500 600
1" - apprx. 280 mi.
COATZACOALCOS

FIGURE 3-32.

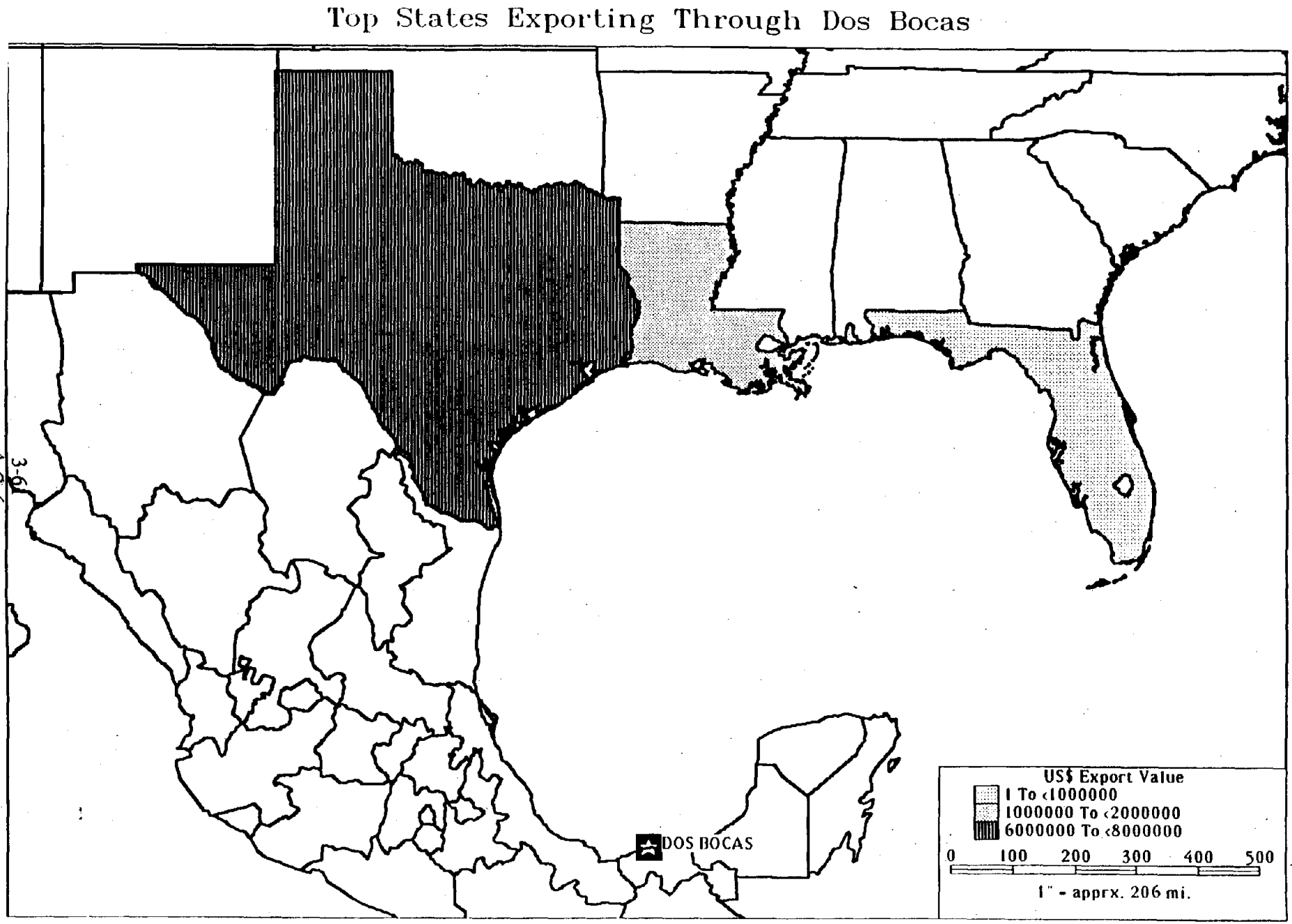

Top States Exporting Through Dos Bocas
DOS BOCAS
US$ Export Value
1 To <1000000
1000000 To <2000000
6000000 To <8000000
0 100 200 300 400 500
1" - apprx. 206 mi.

FIGURE 3-33.

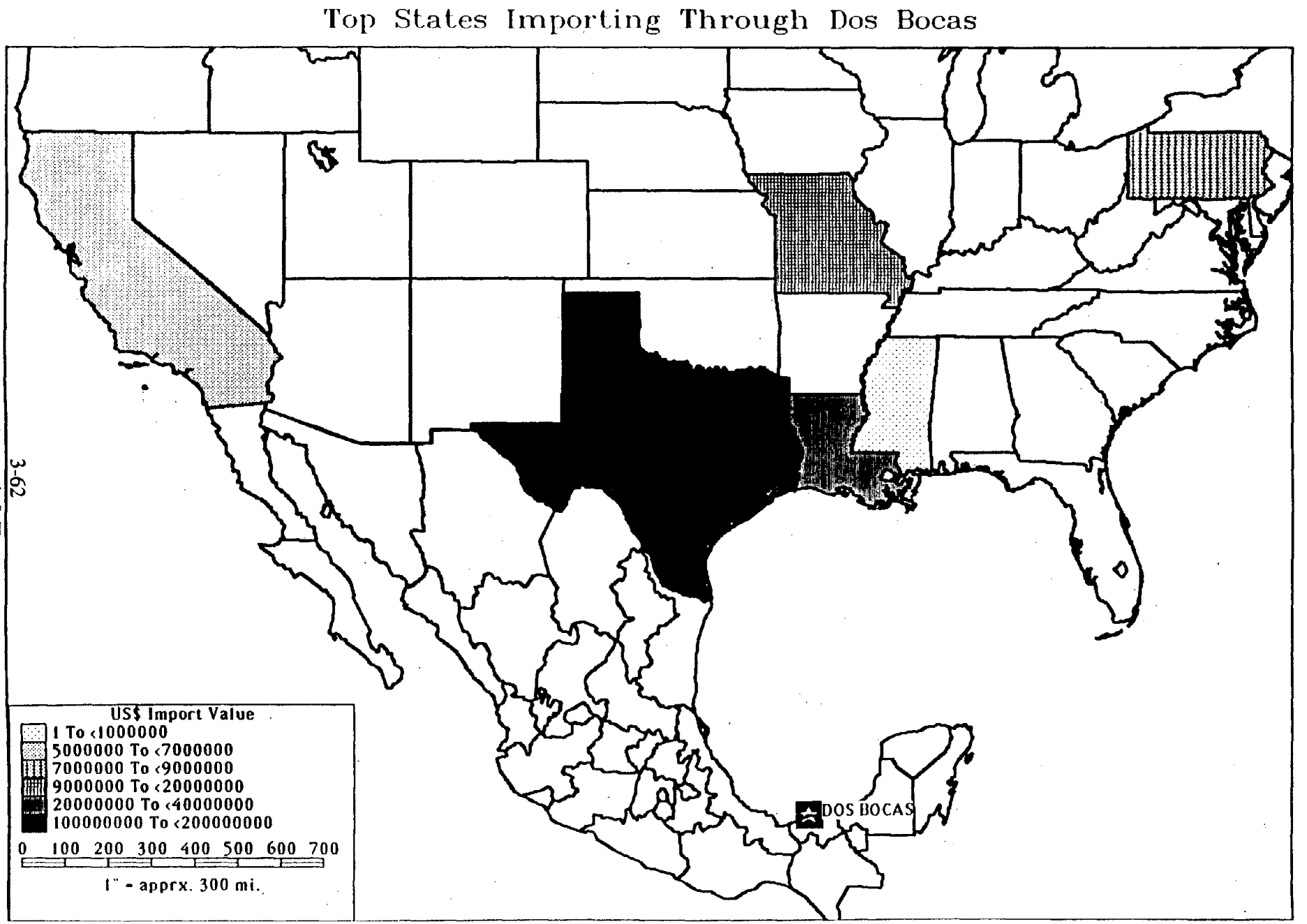

Top States Importing Through Dos Bocas
US$ Import Value
1 To <1000000
5000000 To <7000000
7000000 To <9000000
9000000 To <20000000
20000000 To <40000000
100000000 To <200000000
0 100 200 300 400 500 600 700
1" = apprx. 300 mi.
DOS BOCAS

FIGURE 3-34.

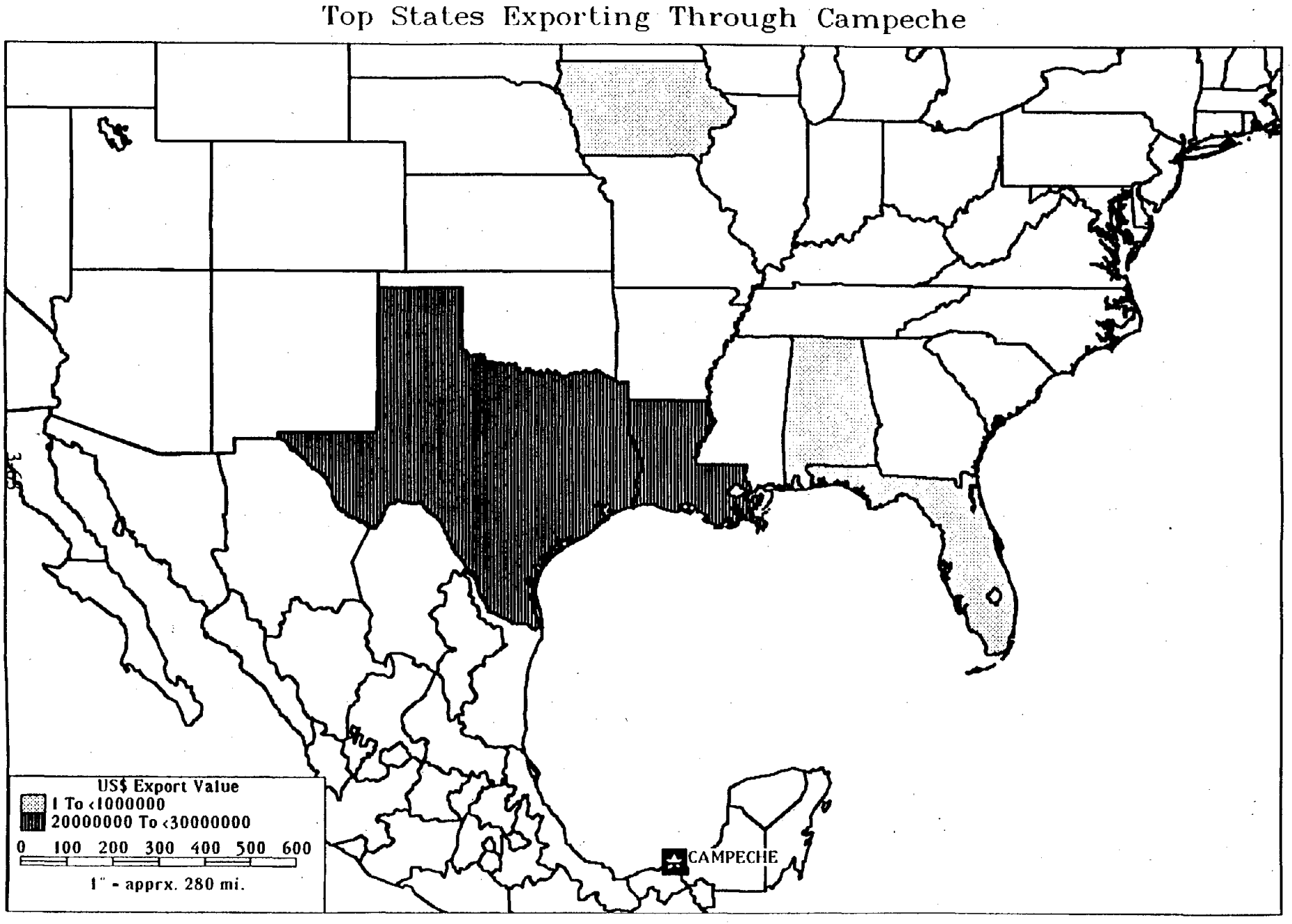

Top States Exporting Through Campeche
US$ Export Value
1 To <1000000
20000000 To <30000000
0 100 200 300 400 500 600
1" - apprx. 280 mi.
CAMPECHE

FIGURE 3-35.

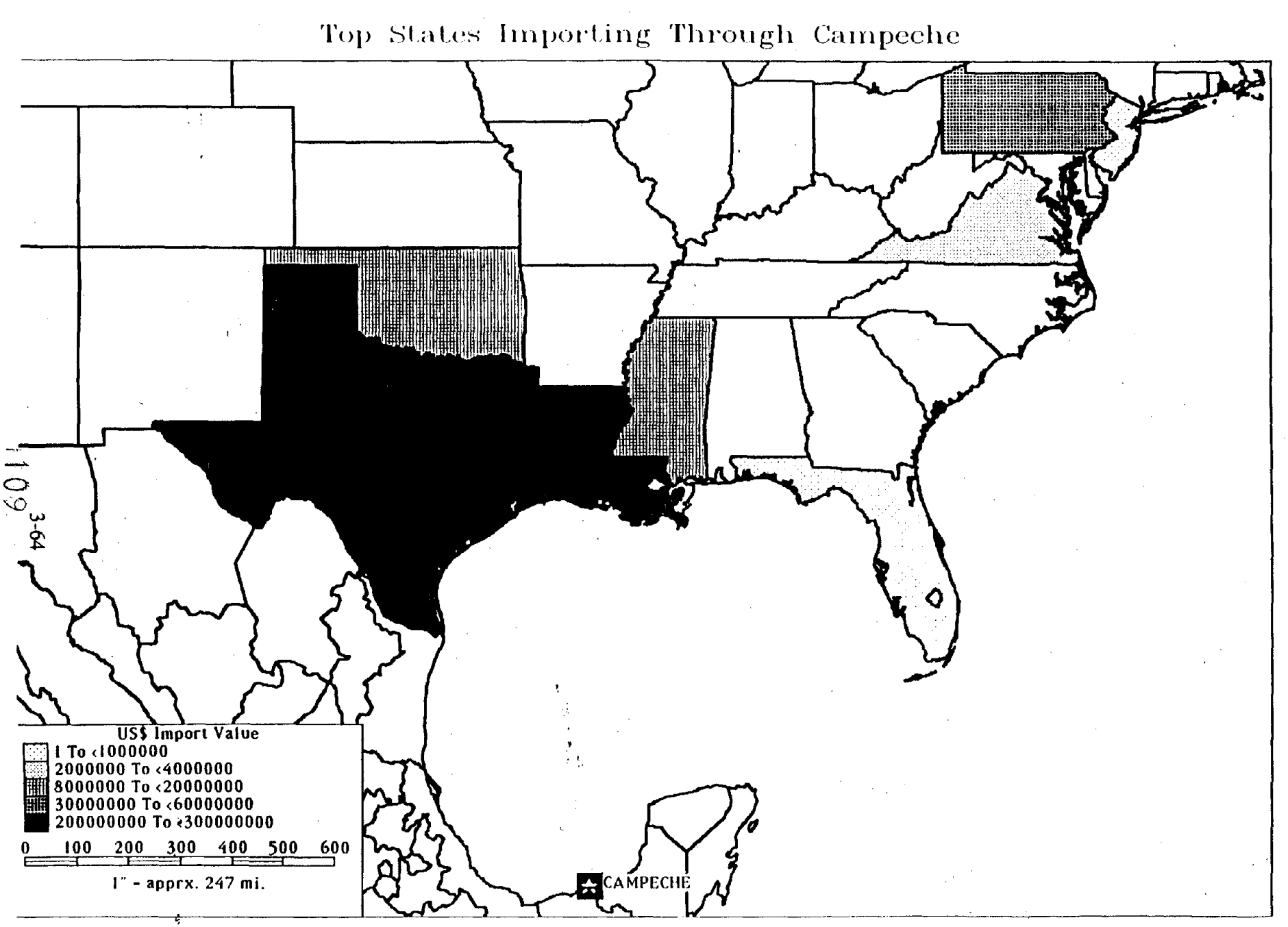

Top States Importing Through Campeche
1109 3-64
US$ Import Value
1 To <1000000
2000000 To <4000000
8000000 To <20000000
30000000 To <60000000
200000000 To <300000000
0 100 200 300 400 500 600
1" - apprx. 247 mi.
CAMPECHE

FIGURE 3-36.

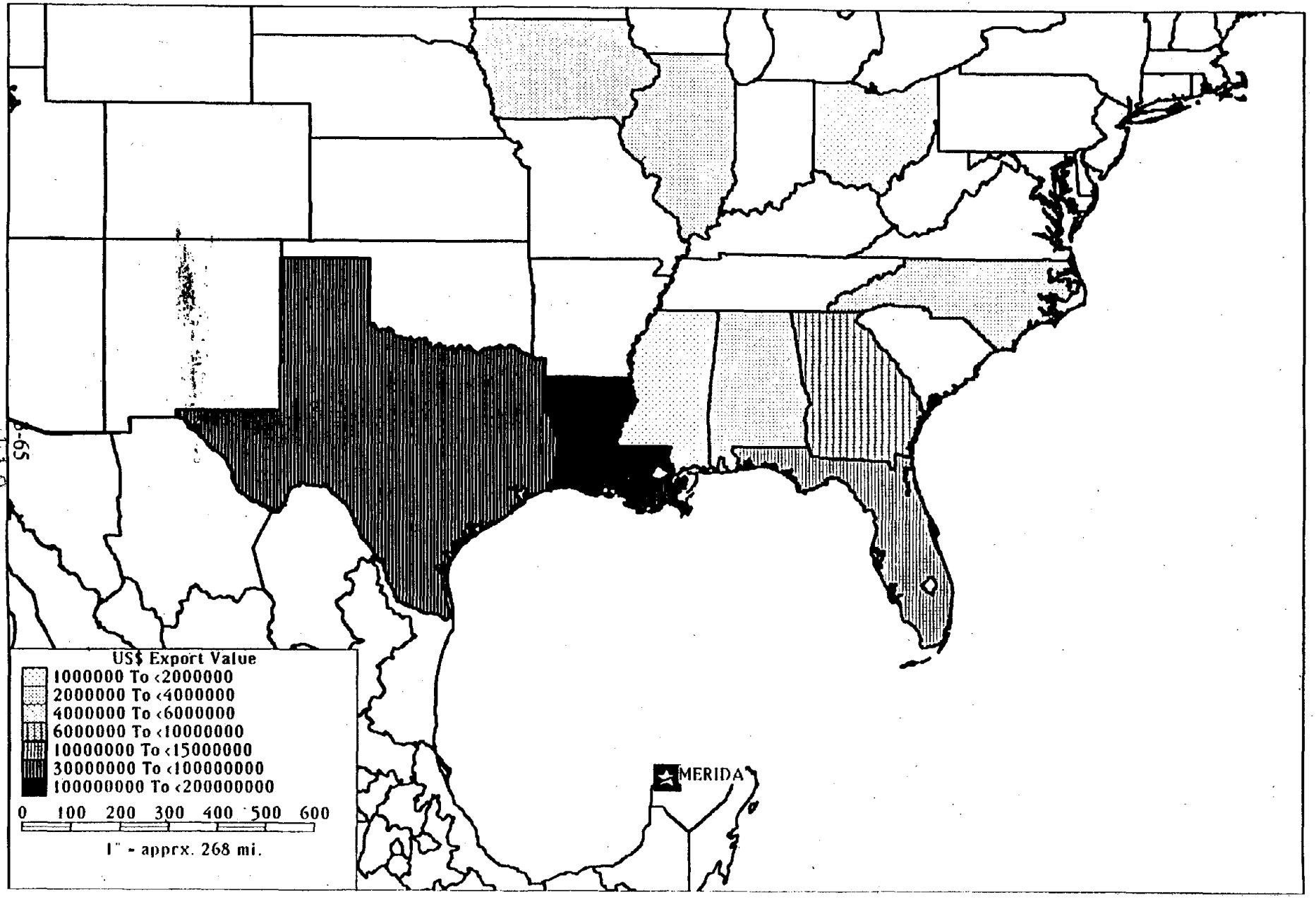

Top States Exporting Through Merida
US$ Export Value
1000000 To <2000000
2000000 To <4000000
4000000 To <6000000
6000000 To <10000000
10000000 To <15000000
30000000 To <100000000
100000000 To <200000000
0 100 200 300 400 500 600
1" - apprx. 268 mi.
MERIDA

FIGURE 3-37.

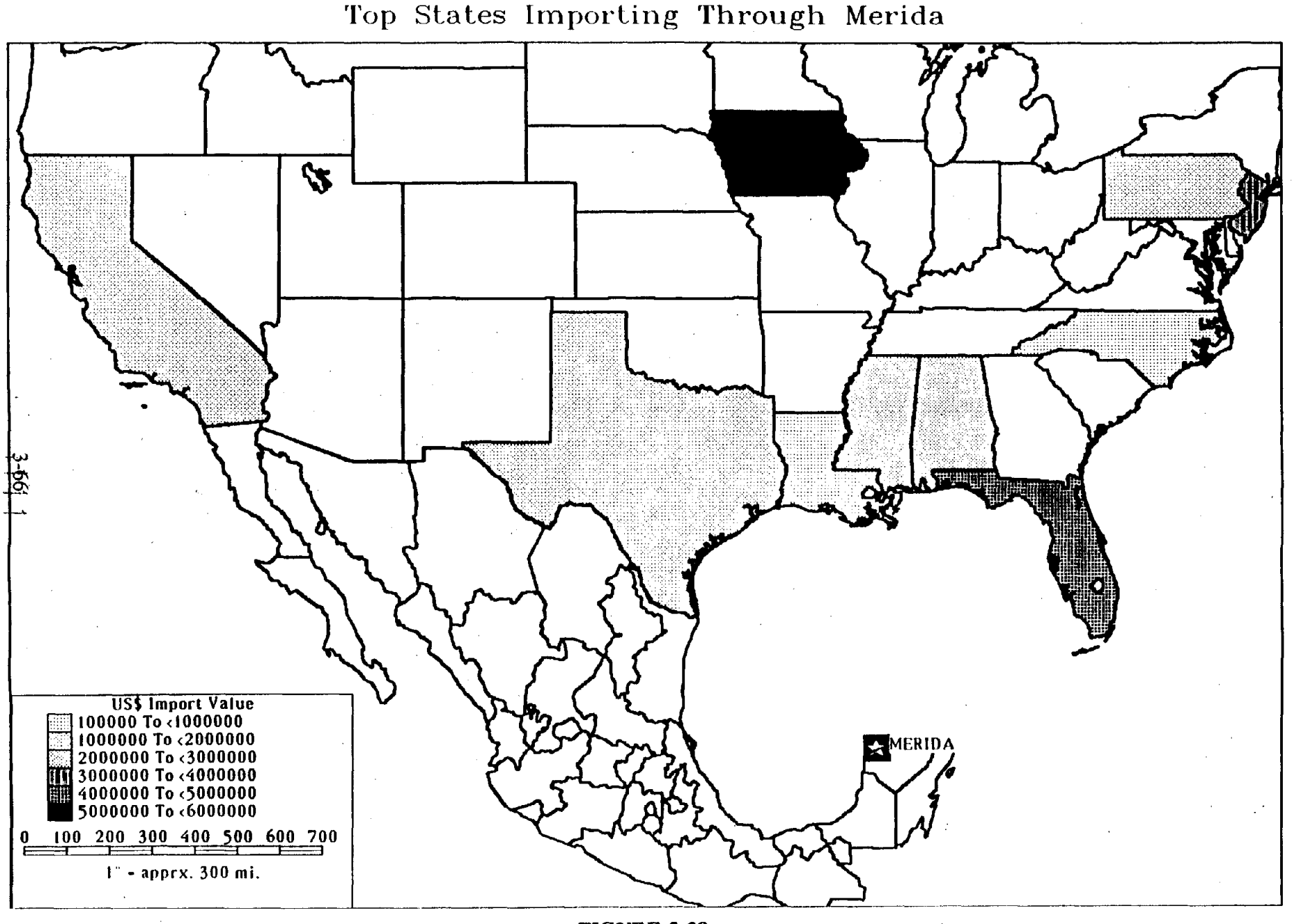

Top States Importing Through Merida
US$ Import Value
100000 To <1000000
1000000 To <2000000
2000000 To <3000000
3000000 To <4000000
4000000 To <5000000
5000000 To <6000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.
MERIDA
3-66.1

FIGURE 3-38.

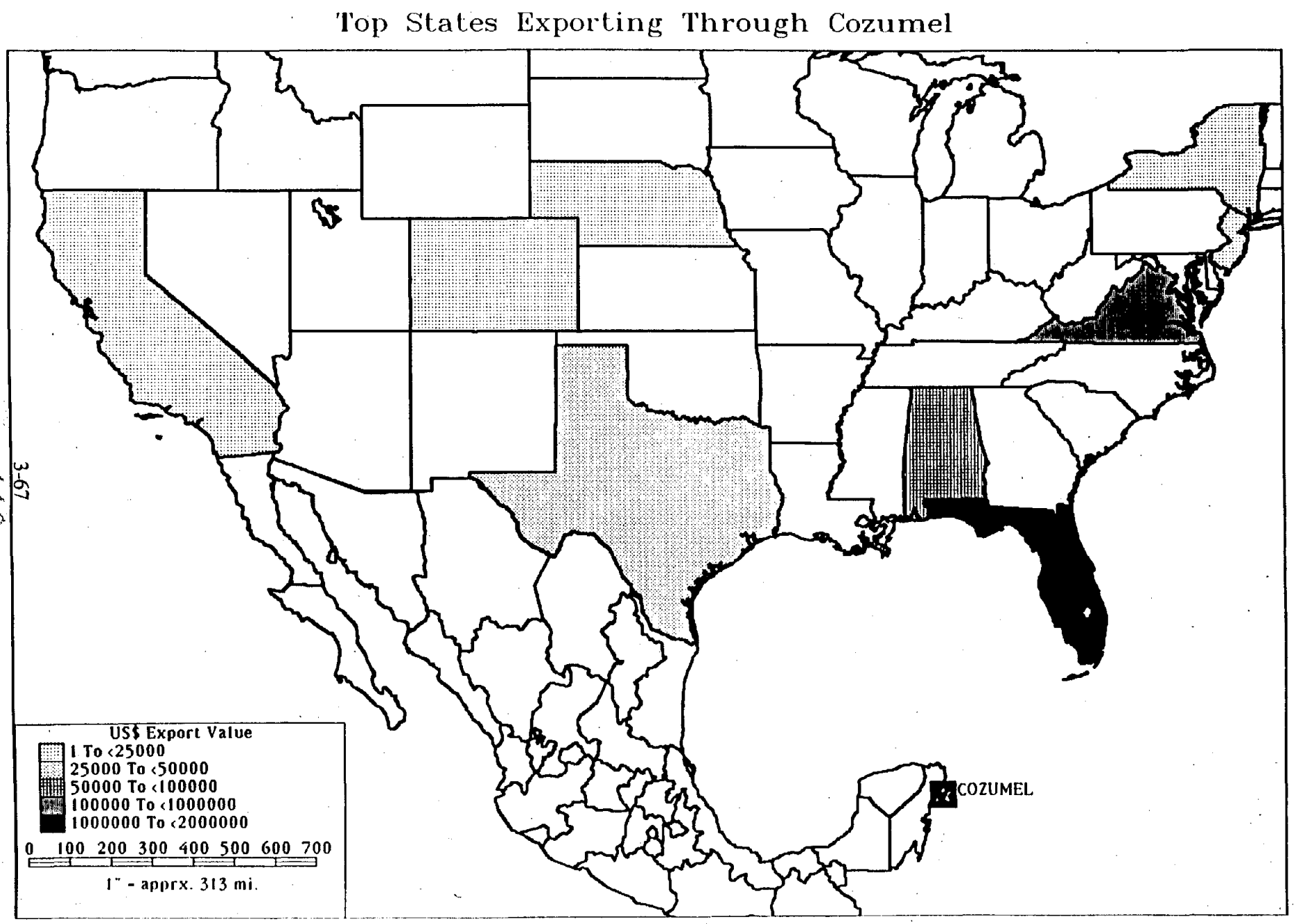

Top States Exporting Through Cozumel
US$ Export Value
1 To <25000
25000 To <50000
50000 To <100000
100000 To <1000000
1000000 To <2000000
0 100 200 300 400 500 600 700
1" - apprx. 313 mi.
COZUMEL

FIGURE 3-39.

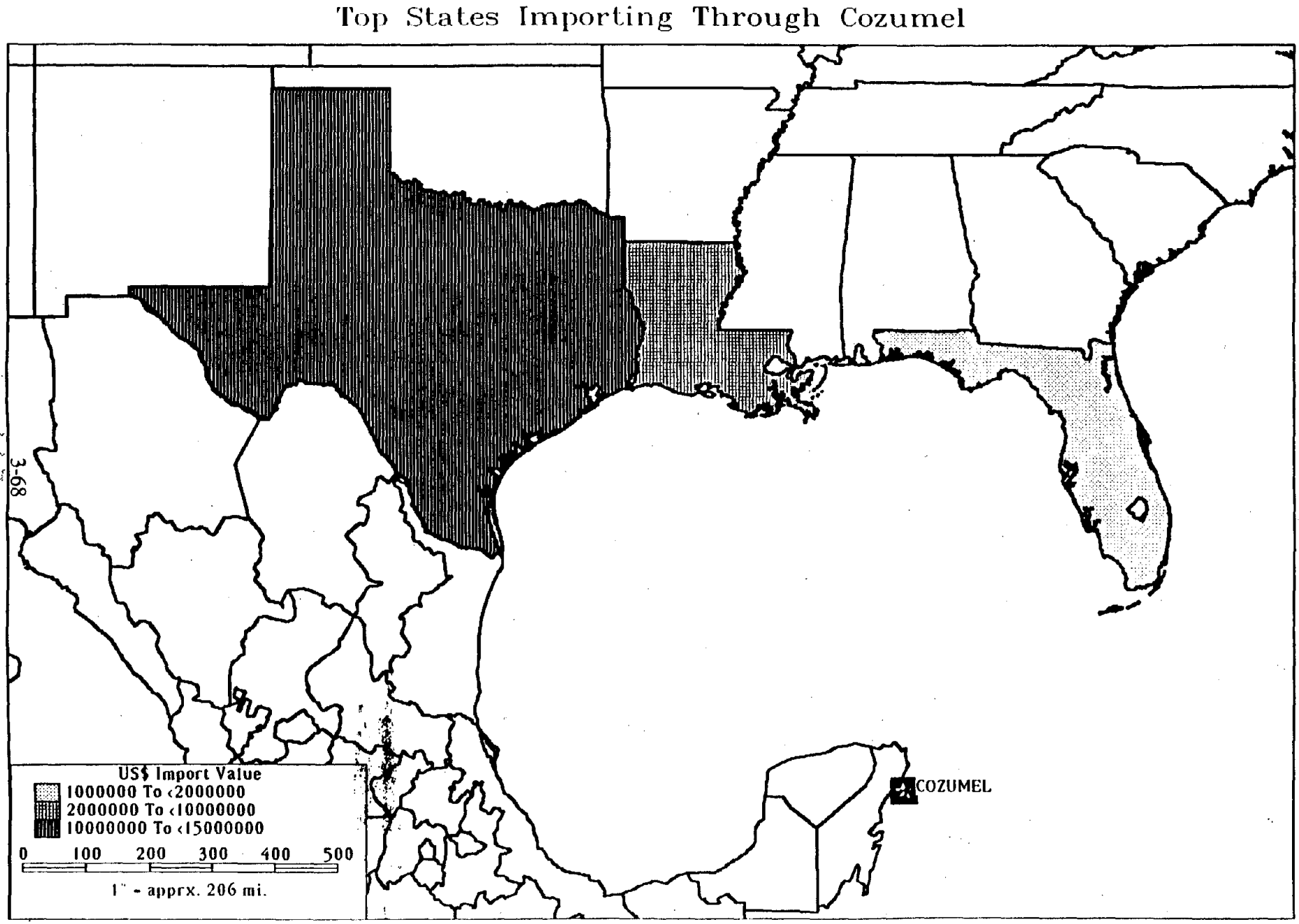

Top States Importing Through Cozumel
US$ Import Value
1000000 To <2000000
2000000 To <10000000
10000000 To <15000000
0 100 200 300 400 500
1" = apprx. 206 mi.
COZUMEL

FIGURE 3-40.

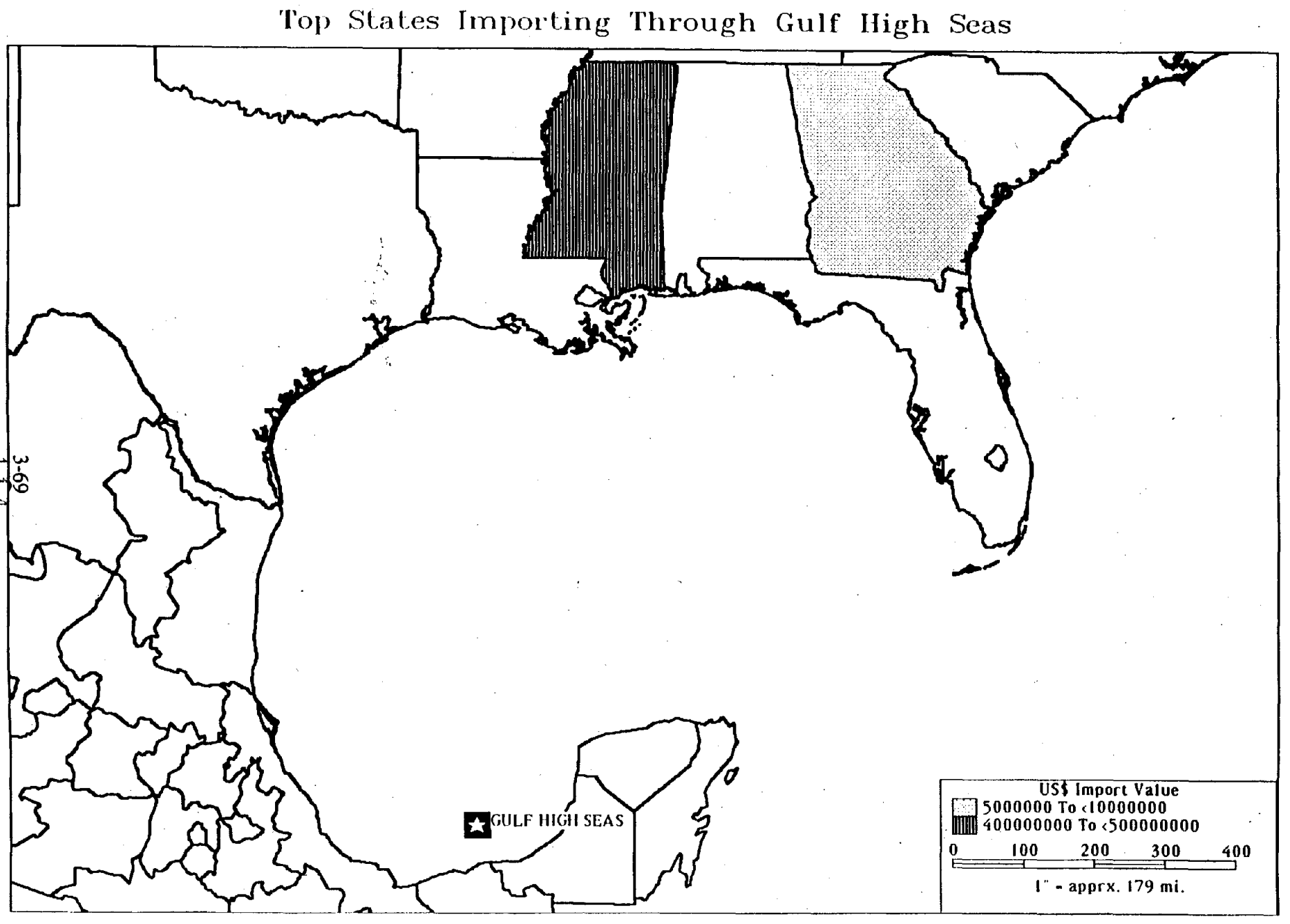

Top States Importing Through Gulf High Seas
GULF HIGH SEAS
US$ Import Value
5000000 To <10000000
400000000 To <500000000
0
100
200
300
400
1" = apprx. 179 mi.

FIGURE 3-41.

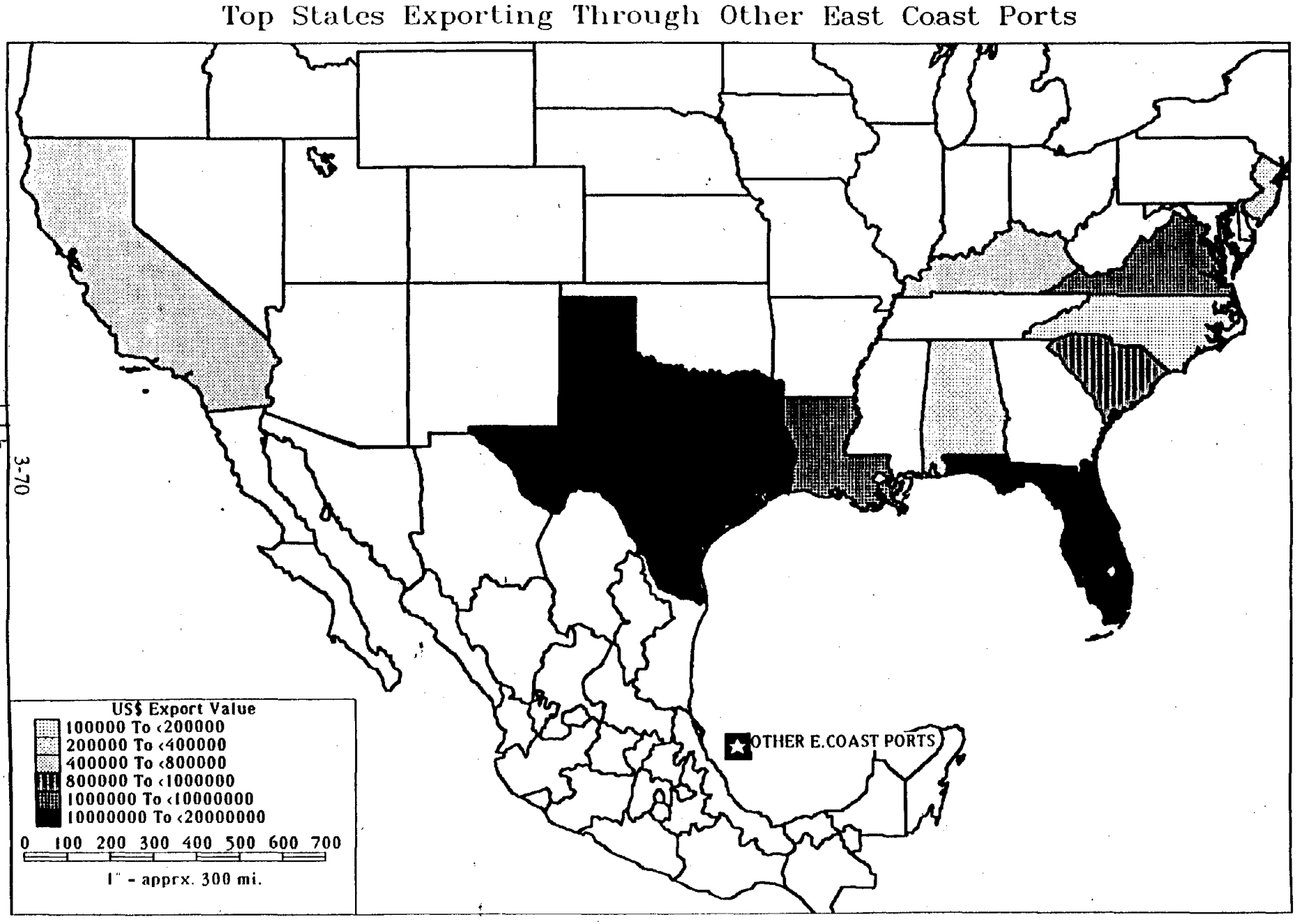

Top States Exporting Through Other East Coast Ports
US$ Export Value
100000 To <200000
200000 To <400000
400000 To <800000
800000 To <1000000
1000000 To <10000000
10000000 To <20000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.
OTHER E.COAST PORTS

FIGURE 3-42.

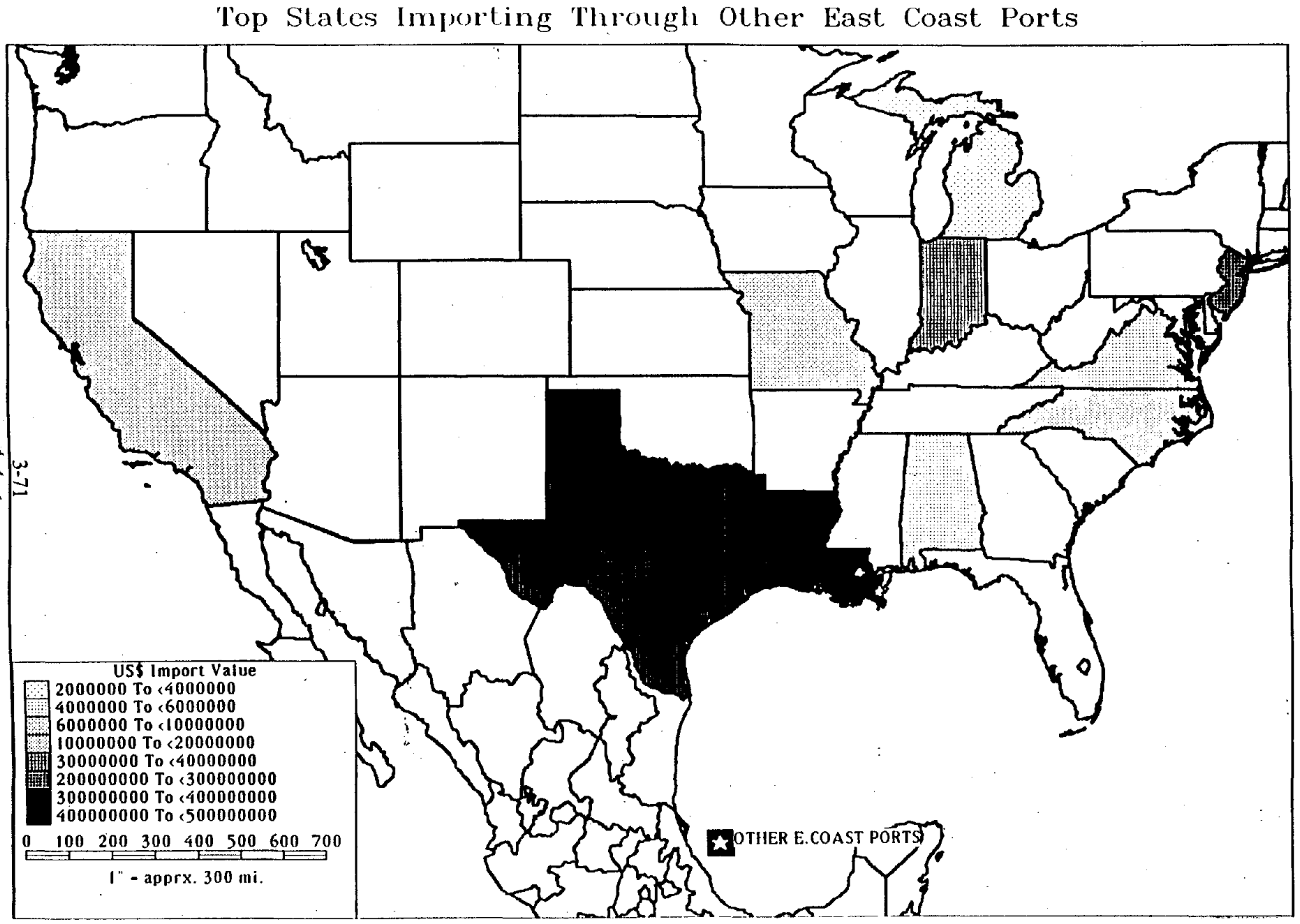

Top States Importing Through Other East Coast Ports
US$ Import Value
2000000 To <4000000
4000000 To <6000000
6000000 To <10000000
10000000 To <20000000
30000000 To <40000000
200000000 To <300000000
300000000 To <400000000
400000000 To <500000000
0 100 200 300 400 500 600 700
1" = apprx. 300 mi.
OTHER E.COAST PORTS

FIGURE 3-43.

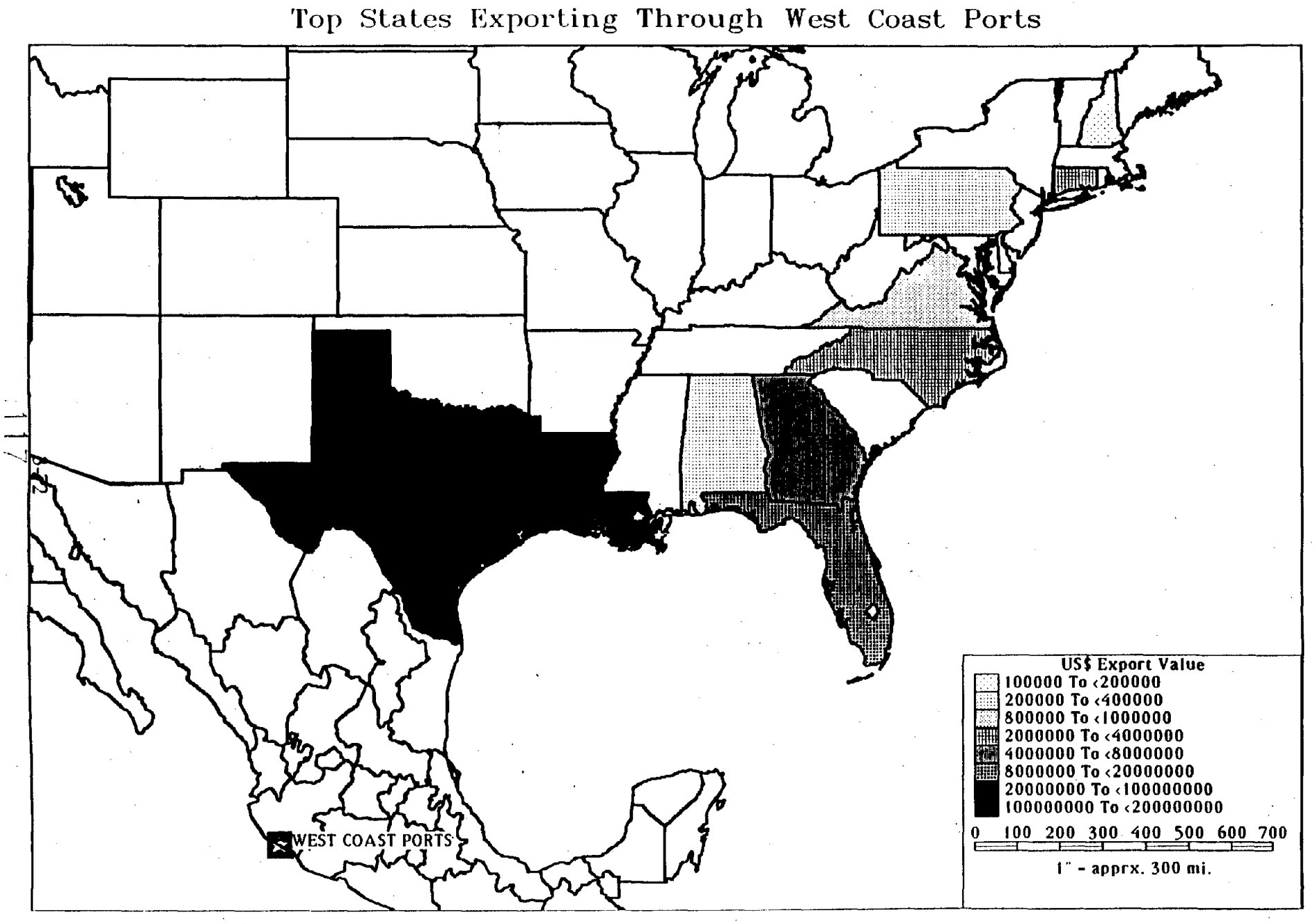

Top States Exporting Through West Coast Ports
US$ Export Value
100000 To <200000
200000 To <400000
800000 To <1000000
2000000 To <4000000
4000000 To <8000000
8000000 To <20000000
20000000 To <100000000
100000000 To <200000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.
WEST COAST PORTS

FIGURE 3-44.

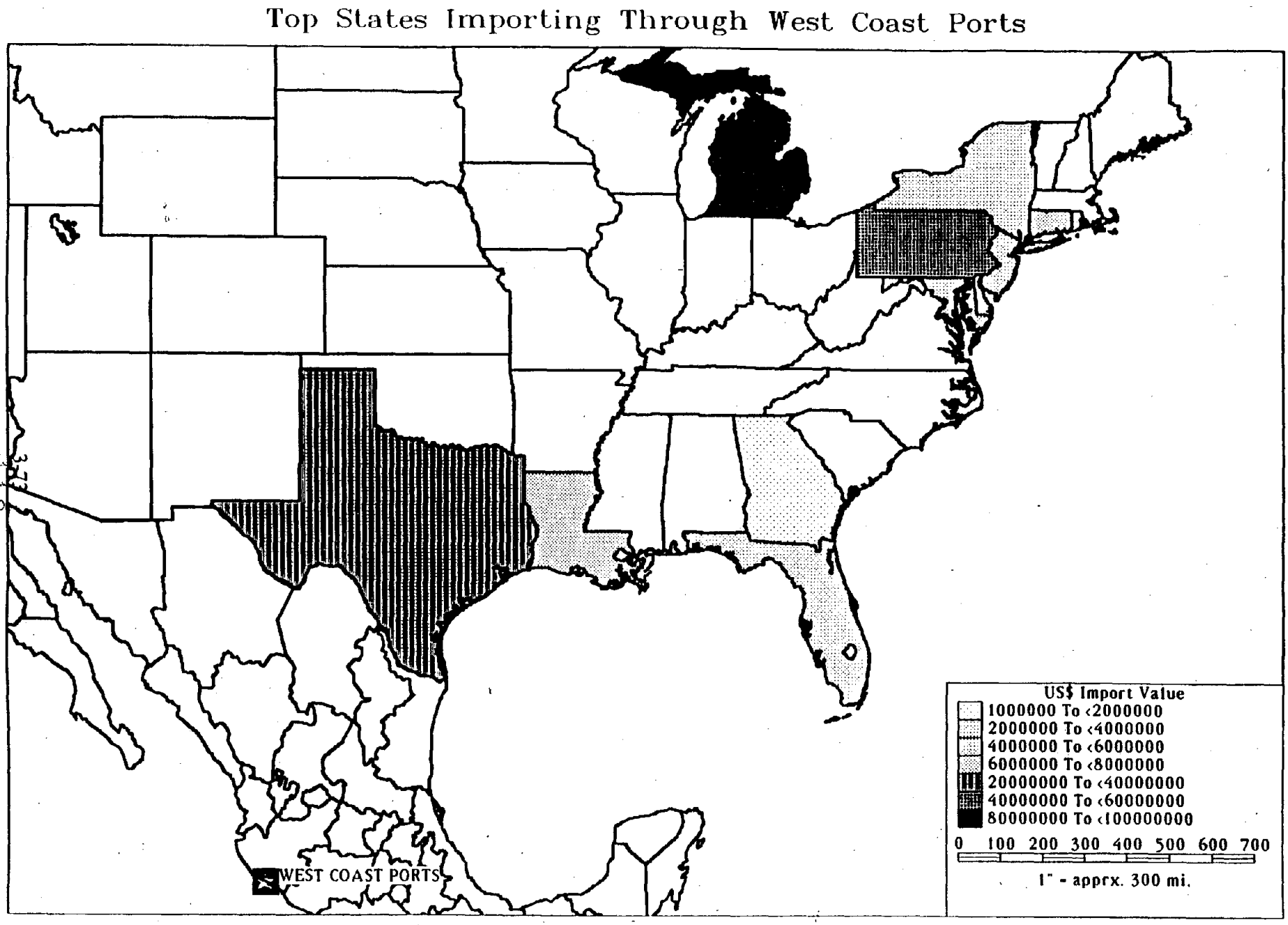

Top States Importing Through West Coast Ports
US$ Import Value
1000000 To <2000000
2000000 To <4000000
4000000 To <6000000
6000000 To <8000000
20000000 To <40000000
40000000 To <60000000
80000000 To <100000000
0 100 200 300 400 500 600 700
1" - apprx. 300 mi.
WEST COAST PORTS

FIGURE 3-45.

4. EMERGING TRADE CORRIDORS

4.1 INTRODUCTION

It is clear from the assessment of maritime infrastructure that there is more than adequate capacity to handle any realistic level of trade increase between the U.S. and Mexico by water. The port system now has excess capacity of approximately 30 percent. Since Mexican trade is only about 6 percent of total existing trade, this trade would have to experience extreme growth if it were to create a problem. Thus, it is only reasonable to conclude that, at least in terms of physical infrastructure, the present system can accommodate both present and future trade with Mexico.

This aside, the question of emerging trade corridors remains. The pattern of trade discussed in Chapter 3 was dominated by one commodity and concentrated within a few routes. Participants at the Roundtable sessions and at the Future Assessment session did not believe that patterns would change in any significant way, although several expressed local interest in developing more trade with Mexico. Thus, as a first approximation, future trading patterns should be very similar to the current patterns.

Total trade with Mexico has grown rapidly over the past several years. In part this is a response to Mexico joining GATT.[1] At this time, tariffs on a wide range of commodities fell, and U.S. produced goods were more readily able to reach Mexican markets. Mexico reduced its highest tariffs from 100 percent ad valorem to 20 percent. The trade weighted average tariff went from 25 percent in 1985 to 10 percent in 1989.[2] During this period of trade liberalization, a new equilibrium relationship was being established between the U.S. and Mexico. In fact, much of the benefits from trade liberalization may already have been reaped.

The period from 1989 to 1992, the most recent years for which data are available, continued to experience dramatic increases in trade between the two countries. Table 4-1 contains the average annual rates of growth for total exports and imports.

Both measures show rapid growth for exports and for imports. However, exports did increase more rapidly, and in 1991, U.S. exports exceeded imports. A part of this positive balance of trade must be attributable to the continued economic liberalization within Mexico. Increases in the traffic levels across the U.S.-Mexico land border, estimated from Barton Aschman, data are higher than the shipment estimates would imply, running approximately 15 percent per year, and more in line with the growth in dollar volume of trade.

---

[1]Mexico joined the General Agreement on Tariffs and Trade in August of 1986.

[2]The Likely Impact on the United States of a Free Trade Agreement with Mexico. United States International Trade Commission, USITC Publication 2343, February 1991.

TABLE 4-1. TOTAL TRADE ANNUAL GROWTH RATE
(in %)

	U.S. Exports	U.S. Imports
in dollars[3]	17.6	09.0
in number of shipments[4]	09.3	07.6

Waterborne trade grew at a slower rate than general trade. Thus indicating that the types of commodities carried by water were not experiencing as rapid a growth as commodities in general or a mode shift away from the water modes has occurred. As can be seen in Table 4-2, waterborne trade, measured in dollars, grew at a far slower rate than total trade. However, the growth, as measured in terms of tonnage, was slower yet, indicating a shift to somewhat higher valued goods. Only the proxy measure for shipments shows a waterborne growth similar to that of total U.S.-Mexican trade.

TABLE 4-2. TOTAL WATERBORNE TRADE GROWTH RATE
(in %)

	U.S. Exports	U.S. Imports
in dollars	05.0	04.4
in weight	00.9	04.8
in number of shipments	07.4	10.1

The pattern for Eastern Coast and Gulf ports was different from both of the above. The East Coast and Gulf ports did better than average for export growth, but import growth was below the average for waterborne commerce. Both East Coast and Gulf port exports and imports performed less well than the national trends as shown in Table 4-3.

Historical trends provide some insight into the relative changes among modes, but the time period over which they are calculated is too short to use blindly in extrapolating continued growth. Unfortunately the institutional changes brought about after Mexico joined GATT makes a longer series less useful as well.

[3]Both rates are calculated on current dollars. Thus, the absolute value of the rate includes inflation.

[4]'Shipments' are the record counts in the foreign trade data maintained by U.S. Bureau of the Census. It is used here as a proxy for actual shipments, regardless of size, and as a measure of demand placed upon the FIS.

TABLE 4-3. EAST COAST AND GULF PORTS GROWTH RATE
(in %)

	U.S. Exports	U.S. Imports
in dollars	07.7	02.9
in weight	07.0	04.6
in number of shipments	07.8	13.5

The International Trade Commission (ITC) has reviewed a series of econometric models that attempt to estimate the impacts of NAFTA on the U.S., Mexico, and Canada economies.[5] Unfortunately, none examines the issue from a transportation perspective. In fact, for the purposes of the studies, it was generally not necessary to estimate absolute future values. Comparisons of the differential effects of alternative scenarios suited the objectives better.[6] In a later study, the ITC estimated the impacts of NAFTA on selected economic sectors.[7] This study identified a range of impacts from over the long run of 5.2 percent to 27.1 percent for exports to Mexico and of 3.4 percent to 15.4 percent for imports. These changes are expected to take place over the 15-year phase in period and, as a result, are quite small when calculated on an annual basis (for exports a range of 0.3 percent to 1.7 percent per year and for imports a range of 0.2 percent to 1.0 percent).

In spite of the lack of readily available models to estimate the future flow of trade between the U.S. and Mexico and the lack of a long history of stable trading relationships that would otherwise permit surer extrapolation, some estimates of the future patterns can be made. this is because there are a limited number of significant commodities and a small number of current trade routes. It is easiest to approach this by segmenting flows into petroleum and non-petroleum. This is done below.

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[5]Economy-Wide Modeling of the Economic Implications of a FTA with Mexico and a NAFTA with Canada and Mexico, United States International Trade Commission, Publications 2516, May 1992.

[6]Barton Aschman has attempted to use one of the models reported on to estimate future flows. Their calculations show a baseline real growth rates over the 1993-2000 period of 4.7 percent for exports and 2.1 percent for imports. These estimates are not only more modest than the recent historical growth rates but also more intuitively acceptable. They are also much closer to realistic GNP growth rates for the two economies.

[7]Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement, United States International Trade Commission, Publication 2596, January 1993.

4.2 PETROLEUM GROWTH TRENDS

Petroleum imported into the U.S. is predominantly crude oil originating from the Mexican Gulf fields and being shipped from the Mexican ports of lower Veracruz to Campeche. The patterns discussed in Chapter 3 show the destinations to be the Gulf refinery centers of Houston and Pascagoula and the Mid-Atlantic complexes. Given the rigidity of the sources and sinks associated with this flow, there is no reason to believe that the pattern will change in the short to mid term. The outreach efforts support this position. The historical growth rate, measured in dollars (3.1 to 3.8 percent) or tonnage (3.9 to 4.6 percent), appears sustainable. ITC estimates of the impacts of NAFTA are that only minor changes would occur.

Institutional decisions within Mexico may affect the level of Mexican crude flowing to the U.S. The petroleum industry is currently protected from foreign control. However, foreign firms are being granted greater opportunities to participate in exploration, and this could lead to expanded production and shipments. The geographic patterns should not be affected, unless Mexico expands its refinery capacity significantly.

The petroleum exports to Mexico are predominately products refined in the U.S. and sent by water to Tuxpan (the closest port in terms of transit time to the population center of Mexico). Mexico has insufficient refinery capacity, which is partially a result of decisions to close a refinery without replacing its capacity. Recent improvements in the Mexican economy have resulted in growing demand for automobiles, and increasing environmental standards have resulted in increased demand for unleaded gasoline. These factors lead to the conclusion that current exports to Mexico are likely to continue until refinery capacity is expanded.

The recent trends in exports to Mexico are complicated by a noticeable shift to water shipments from Gulf and East Coast ports. Although exports rose on average 3.1 percent during the study period; exports from Gulf and East Coast ports rose by 59.8 percent (both measured in tonnage). Thus, part of the Gulf traffic is offset by drops elsewhere, most noticeably from California to Mexican west coast ports. By 1992, the Gulf and East Coast ports had captured 38.4 percent of the exports to Mexico, compared to 10.3 percent in 1989.

Given the current growing demand for petroleum products in Mexico, a forecasted growth of total waterborne trade of 3.1 percent is conservative. The Gulf and East Coast port trade should increase at the aggregate rate or better.

4.3 NON-PETROLEUM GROWTH TRENDS

Petroleum and petroleum products account for more than two-thirds of the total waterborne traffic between the U.S. and Mexico (30.5 percent of exports and 80.8 percent of imports). The trends for these commodities, thereby, determine the overall pattern for aggregate trade by water between the two countries. The growth in other commodities may impose different demands on the system.

The most significant waterborne import classes, after petroleum, are extractives and chemicals/plastics. The tonnages of these have been growing at annual rates of 3.9 percent and 21.3 percent, in aggregate, and at 8.9 percent and 20.0 percent for the East Coast and Gulf ports. Approximately 73 percent of the extractives are bound for either Texas or Florida, 70 percent of the chemicals are destined for the same states. The ITC study of likely impacts from NAFTA did not estimate any change for extractive industries; however, the impact on chemicals/plastics was considered to be minor to a fraction of a percent per year.

Trade in the remaining commodity classes has been falling in volume for the East Coast and Gulf ports, although growing elsewhere. This decline amounts to an average annual reduction of 3.6 percent.

Exports of non-petroleum products show a similar concentration in two other waterborne commodity classes. For exports the classes of importance are vegetables/products, which includes grains, and chemicals/plastics. Exports of vegetables/products represent the largest export by water from either the total port system or from East Coast and Gulf ports. Over the study period, tonnage of these commodities have fallen by 3.2 percent per year for total waterborne exports and by 1.4 percent for East Coast and Gulf ports. The predominant sources for these exports are Louisiana and the Midwestern agricultural states shipping to or through Louisiana. This trend seems unlikely to continue in the light of continued liberalization between the U.S. and Mexico. The ITC estimated impacts under NAFTA conditions of variable but significant positive impacts, especially for grain exports. Such exports would likely continue to be dominated by the New Orleans and Texas ports (which account for 98.4 percent of total tonnage) to the population centers of Central Mexico.

Chemicals and plastics exports by water have been growing at approximately 12 percent in total and from the East Coast and Gulf ports. The Louisiana and Texas ports also dominate this flow, originating 87.7 percent of the exports to Mexico. Such trade is likely to continue, with minor positive impacts from passage of a free trade agreement.

Waterborne commodity classes, other than those above, represent a very small proportion of total or East Coast and Gulf tonnage, approximately 5 percent in either case. Some of these commodities have been growing at fairly high rates but from such a small base that such continued growth could only be accommodated by significant changes in Mexican port capacity, especially container capacity.

4.4 WATER TRANSPORT INNOVATIONS

The patterns of trade for petroleum and non-petroleum products appear quite stable, and growth rates at or near recent rates are sustainable. If trade is elastic with respect to GDP, U.S. economic growth 2.5 to 3.0 percent and Mexican target growth at higher levels should provide a basis for reaching the growth levels of the recent past. Shifts in the transportation system, however, could provide a new basis for even higher growth. Some of the shifts are discussed below.

4.4.1 Intermodal Transportation

Current container traffic in Mexico is concentrated at the port of Veracruz. Secondary ports on the Gulf are Tuxpan and Altamira. There are plans to expand capacity, especially at Altamira. However, institutional and funding constraints limit the prospects for rapidly improving the situation. Even under the current more liberal regulations that apply to foreign investments in ports and under the broader liberalization envisioned in NAFTA, foreign investment will still be affected by the limited access to ground transportation linking the population centers to ports. Thus, in order to provide adequate capacity within the Mexican port system, ports, rails and highways must be improved.

The trade between Mexico, Canada and the U.S. that involves intermodal, ship-to-rail connection ("bridge"), is insignificant at present. If this trade develops, U.S. ports, that already handle intermodal cargo of other trades, have, in general, sufficient capacity to handle expected volumes with no immediate constraints.

With respect to U.S.-Mexico land bridges, there are three that have been identified by NPWI as potentially feasible:

- Midwest -- the most likely.
- Atlantic Coast -- less likely because of competition by all-water, direct call.
- Pacific Coast -- likely since there is no water service along the Mexican West Coast.

New Orleans and Houston would be most likely to serve as the U.S. bridge ports. Both ports have excellent rail connections to major U.S. railroads, and well-developed intermodal yards that currently serve non-Mexico cargo.

- New Orleans has connections to Eastern, Western, and Midwest railroads, but does not have on-dock intermodal yards.
- Houston has connection to Western railroads as well as a large intermodal yard located adjacent to the port's major container terminal. The yard has expansion potential.
- Galveston is the only smaller Gulf port with an intermodal yard inside its container terminal. The yard is only partially utilized.

4.4.2 Rail-Barge Connections

Several U.S. railroads have investigated establishing rail-barge serve to Mexico. Burlington Northern has begun regular service from Galveston to Coatzacoalcos, where the rail cars are transferred to FNM, the Mexican National Railroad. Such service represents an innovative application of existing technology and could be expanded to relieve some of the demand at

land border crossings, if the economics prove out. However, for this to expand beyond a niche market also requires improvements to the Mexican port and rail systems. There are proposals to expand to Veracruz and to Altamira, which are both closer to the industrial center of Mexico physically, but not necessarily in terms of transit time. In the U.S. there have been discussion of establishing service from a port further east, such as Gulfport.

4.4.3 New Technologies

Implementation of new water transportation technologies, such as River/Ocean (R/O) vessels and short-sea-river barges currently being used in Europe and Russia, would allow the inland waterway system to be used as an alternative to rail and truck transportation as North American trade between Canada, the United States and Mexico expands during the 1990's. Proponents of such an approach argue that there are comparative cost advantages and related environmental advantages (i.e., air quality, lowered cost of pollutant control) for bulk and general cargos that normally would move via unit train services.

Improvements in vessel technology have produced ships capable of using the Mid-America waterways system. R/O vessels now being used in Europe and Russia are gearless, commonly 450 to 460 feet long, 50 feet wide and draw only 11 feet to 12 feet of water. They are also designed to cross open water such as the gulf of Mexico or the Great Lakes. These ships would typically transport cargos of 3000 to 6000 tons and cost an estimated $4 million to $8 million to build.[8]

The River/Ocean market would be a specialty (niche) market. The R/O vessels have sufficient economies to serve small volumes of general cargos, including containers and minor bulk especially in a region with limited and costly transportation alternatives. The R/O service is estimated to be viable on a least total cost comparative analysis in the Lower Mississippi River. Relatively modest cargo requirements would be sufficient to anchor a port specific and/or shipper specific "semi-liner" scheduled service. These cargos could be supplemented by other high value shipments of used vehicles, machinery, etc.

Navigation by short-sea vessels is also technically feasible. The United States has a larger fleet of ocean-going barges and more extensive experience with their operation than many other countries. These vessels are concentrated on domestic coastal and short-sea trade (i.e., Caribbean Basin) and are chiefly liquid and dry bulk carriers, although there are also container, neo-bulk, break-bulk, and RO/RO highway trailer carriers. There are, however, limited short-sea services for the Mid-America waterway system.

Ocean barge services exist in Japan, other Far East countries, and in Venezuela. They handle principally petroleum, limestone, cement, coal, iron ore, steel, coke, and lumber. Sizes vary widely, including: units separable into four 300-500 dwt barges, each deliverable by a small pusher tug; deep notch push-tow units from 8000 to 12,000 dwt; and deep notch

[8] Source: LSU Port and Waterways Institute Survey (1993).

tanker barges of 37,000 dwt and 7200 horsepower tugs. A variety of barge designs could allow transport of more than one commodity or commodity type on the same ocean-going barge or barge unit.

Port cargo handling is an important cost factor of the total point-to-point transport cost and, also, might be an important advantage of the short-sea services. The short-sea service, unlike other water-related systems, can use shallow-draft ports. These ports can be located on the Gulf, Atlantic Coast, and the Great Lakes, corresponding with secondary ports in Mexico, Central America and other countries avoiding the congestion of the major (and expensive) deep-draft ports. New port activities can also trigger economic development of the ports' hinterlands, especially for industries which process the bulk and neo-bulk cargos hauled by the proposed short-sea services.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 SUMMARY

The following is a summary of the characteristics of waterborne commerce with Mexico from East Coast and Gulf ports.

General Trade Picture

- Recent rapid growth in trade with Mexico has benefited the border states more than the Eastern states. This is true if measured in absolute increases in trade or percentage increases in trade.

- Trade from states east of the Mississippi has risen, but at rates below the national average. Eastern exports increased at an annual rate of approximately 14 percent while the national increase was nearly 18 percent per year. Eastern imports increased over the first years of the study period but then fell to nearly the 1989 levels. Nationally, imports grew at about 9 percent per year.

- The eastern trade with Mexico is dominated by a relatively few Midwestern and Mid-Atlantic states, especially Michigan. These states have good highway and rail connections to Mexico, and the vast majority of the trade, in value terms, moves by highway or rail.

Waterborne Trade Picture

- Waterborne trade accounts for only 9.5 percent of total trade with Mexico by value.

- Recent growth in waterborne trade has been far below that of land or airborne trade.

- Of the waterborne trade, more than 90 percent flows through East Coast or Gulf ports.

- The Gulf ports dominate the trade. The top ten ports are all Gulf ports and these account for 80 percent of total U.S.-Mexico waterborne trade volume.

- The trade with Mexico is an important but small portion of total trade through East Coast and Gulf ports, representing only about 7.5 percent of total port throughput.

- The trade is low value, high tonnage commodities for which maritime transportation is especially cost effective.

- The trade is dominated by petroleum imports and agricultural exports.

- Of total imported petroleum from Mexico, 90 percent is carried by water. Water is the major mode of transportation for only one other class of commodities, i.e., importing of extractives. For all other commodity classes, land modes dominate the flows to and from the U.S.

- Gulf imports of petroleum have been growing, and this growth is partially a result of increased national trade and partially a shift from West Coast ports.

- NAFTA should have little impact on the volume of flows because the water mode susceptible commodities are not those most likely to be affected. The major exception is for the exports of grains to Mexico.

Corridor Issues

- Trading corridors by water are likely to remain relatively constant.

- Petroleum is likely to remain the dominant commodity, and this fixes the origin-destination pattern, since the sources of crude and the refinery capacities are relatively fixed.

- The development of new "corridors" may require the application of different technology. This technology can be "low tech" uses of techniques used elsewhere.

Market Areas for U.S. Ports

- The hinterlands for ports are not deep. Ports generally service the immediately surrounding states.

- Those exporting or importing states that lie more distant from the port states are in the Midwest or Mid Atlantic. This intermodal traffic depends upon good access by rail and highways to the ports themselves.

5.2 FINDINGS AND RECOMMENDATIONS

I. PORT CAPACITY

The port system has excess capacity. In general there is approximately 30 percent more capacity for foreign trade in the port system than is currently being used. Even taking into consideration specific port requirements for the different types of cargo currently handled, East Coast and Gulf ports can accommodate significant increases in total trade. Since the waterborne trade with Mexico, and with Canada, is small compared to total trade, U.S. ports can handle any reasonable increase in traffic from these countries.

There is a clear federal interest in maintaining a port system, in total, to accommodate the large tonnage of commodities now moving by water. However, in light of the degree of excess capacity in the system, it is not clear that this interest extends to each individual port. Although many of the decisions about further port development are made within the private sector or at the state or local government level, ports do create demands for federal funds to provide enabling infrastructure.

A broad based, national policy on port capacity is required. This policy should address the separate interests, roles, and responsibilities of the private sector, state and local governments, and the Federal Government. The objective should be to limit the amount of additional excess capacity created by clearly specifying the conditions under which local interests to expand facilities will be ratified by federal financing of supporting infrastructure. These conditions need to be based upon the incremental benefits of proposed investment rather than the economic development that simply locates trade at one port rather than a second.

II. MAJOR INFRASTRUCTURE NEEDS-PART ONE

The major infrastructure needs of the port systems are not at the ports but with access to ports. Ports are inherently transfer points and as a result intermodal connections are critical. Unlike land crossings for which borders are simply impediments to the smooth flow of goods and people, ports have the economic function of providing for the smooth transfer from one mode of transportation to another mode. Thus intermodal connections at or near the port are necessary for the marine mode, while intermodal facilities supporting land crossings can be distant from the crossing, if needed at all.

Current highway and rail access links to ports are often inadequate. Since ports are traditionally in urban areas, providing appropriate links to intermodal facilities and to the primary highway and rail networks is expensive and subject to local planning and governmental authorities.

Local planning organizations, local governments, and the communities surrounding ports play definitive roles in deciding what local improvements are needed or permissible. For these groups, port linkages may not be politically or economically feasible. Ports are often viewed as creating benefits for the nation as a whole but imposing costs upon the local community.

Port interests need to be integrated into local and MPO's planning processes. Ports do not need special attention or federal programs to direct funds to port needs. However, the ISTEA planning processes need to give adequate weight to port concerns. The Federal Government should develop guidelines to assist local planning bodies is assessing port needs in balance with other local needs and to determine appropriate methods to finance the needs.

III. MAJOR INFRASTRUCTURE NEEDS-PART TWO

The ability of the maritime industry to play a larger role in the trade with Mexico is also

determined in large part by the adequacy of infrastructure in Mexico. Mexican port operations are continuing to improve, however a more open Mexican port policy that would allow expanded foreign ownership and investment in port facilities would also enable the private sector to better meet shipping needs.

Access to Mexican ports is also constrained. Adequate land links between ports and the population and industrial centers are not present at the moment. Thus commodities bound for these destinations typically cross along the southwestern border. Mexican attempts to privatize portions of the highway systems have encountered operational and financial problems. Foreign investment in the railroad is still prohibited.

To a great extent, there is little the private sector or U.S. port authorities can do to affect the decision process in Mexico. The U.S. government can, however, recognize the importance of adequate Mexican transportation infrastructure to the success of any U.S. investment. Thus, it is in the national interest to work with the Mexican authorities to assist in improving Mexican access and port infrastructure. The Federal Government should continue to expand intergovernmental cooperation at all levels, from technical and planning levels to the highest policy levels. The objectives should be to identify joint projects beneficial to both nations that can be undertaken in partnership.

IV. INSPECTION AND CLEARANCE

Inspection and clearance procedures are generally adequate. Unlike the land border crossings, for which inspection and clearance issues are paramount, the Federal Inspection Services and Customshouse Brokers meet the demands of the maritime industry. Although, the maritime port environment is sufficiently different to prohibit direct comparisons to the land crossings, any assessment of methods of improving the process for land trade should identify the reasons why maritime users feel the system is working for them.

If a detailed study of methods of improving the inspection and clearance process to better meet the needs of shippers is begun, the investigation should attempt to determine why there is greater satisfaction among port interests and what is transferable to land ports of entry. This investigation should also evaluate the effectiveness of allowing ports to provide infrastructure for the inspection process. The report should also determine if there are methods of staffing facilities based upon demand, perhaps through private sector payments or contract inspection services.

V. USING PORTS AS ALTERNATIVES TO INVESTMENT IN BORDER CROSSINGS

Ports may be an alternative to land crossings, although shippers have had this option available and have not selected it. The current growth in trade is going in large part to the land crossings, some of which are located in congested urban areas. Expansion of this capacity is expensive, while the use of ports fall below capacity.

Although there is a practical limit to the amount of land traffic that could be diverted to water, improvements in the maritime mode could divert some of the traffic. In order to do this, the water industry must make some changes to better meet shipper needs. However, the Federal Government could help by identifying techniques of encouraging shifts to water that are more cost effective than investing in border infrastructure.

A portion of this activity could be to encourage low cost innovations in applying new technological options. These may be low tech applications for which the market feasibility is the major unknown. A low cost trial application could demonstrate if the market will accept the approach. The Federal Government may want to target any financial support to those applications directed toward the Mexican trades in particular, thereby relieving some of the pressure on border facilities.

A parallel activity would require proponents of new and expanded land border crossings to undertake an alternatives analysis that includes investments in waterborne transportation.

VI. FINANCING

Financing port infrastructure is increasingly an issue. Better sources of funds must be identified. Investments in ports are mixtures of private and public funds, although port authorities are relying more heavily upon revenues for investment or for revenue backed securities.

However, the major problems are with investments needed beyond the ports' authority. Thus, ports can not address their most pressing problems directly. Ports can not readily use their own resources in resolving access problems because the decision making authority lies in the hand of others, who respond to a wider constituency. To the extent that private sector funds could finance off port infrastructure, local authorities should be encouraged to permit private investment in off port transportation infrastructure. If such infrastructure could serve multiple uses, local authorities should investigate public/private joint ventures. ISTEA makes both possibilities more feasible.

To the extent possible, user charges should be used since these match the cost of providing infrastructure needs with those benefiting from the infrastructure. Private sector financing becomes a more feasible option if there is a revenue stream that can be used to compensate the providers of funds.

VII. DATA IMPROVEMENTS

Policy makers, planners, and the private sector are seriously hampered by inadequate trade and transportation data on North American flows. Trade statistics appear to be designed for accounting purposes rather than analytical uses, and transportation considerations are low in the design of the data bases. Roundtable participants also expressed concern about the timeliness of the data.

The Federal Government should develop a data program that can provide the information needed for policy, planning and the private sector. The Department of Transportation should initiate an investigation into the needs and the most effective methods of collecting, maintaining and disseminating the information.

The U.S. Bureau of the Census is responsive to customer demands and could take the lead role in maintaining the necessary information. However, to the extent that overall Census staffing constraints will not enable transportation related trade and traffic considerations to be a major driving force, alternatives should be investigated. These alternatives should include the Bureau of Transportation Statistics or a consortium of the DOT and the private sector.

As a first step in the process, the Department should continue to exploit the data amassed in the Section 6015 study and determine ways of integrating the various data sources so as to make the information available to the public in a user friendly format.

The Department of Transportation should also encourage the continuation of discussions among planners and officials of the three North American trading partners. The objective should be to develop ongoing data interchange programs useful in all three countries.

VIII. ENVIRONMENTAL ISSUES

Environmental regulations place constraints upon port development and port maintenance. It is the purpose of environmental regulations to induce or require ports to incorporate environmental objectives in their planning process. However, port interests expressed concern over inconsistencies among the various regulators.

The port community needs clear and consistent guidance on environmental and other regulations that affect operations and investments. The Department of Transportation Intermodal Office could undertake the role of balancing the environmental concerns of Environmental Protection Agency, the trade objectives of Department of Commerce, and the port promotional goals of MARAD.

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TA. TECHNICAL APPENDICES

TA.0 INTRODUCTION

The following technical appendices provide added detail to the discussions in the body of the report.

Technical Appendices 1 and 2

Technical Appendices 1 and 2 contain a more complete description of the grouping of commodities as classified under the harmonized system and the broad groups used for analysis in the study. In addition, more complete descriptions of the levels of trade for 1992 are provided. The two appendices differ only in that Technical Appendix 1 contains data on exports to Mexico and Technical Appendix 2 contains data on imports from Mexico. In each, the first column gives the commodity classification used in the study, column two gives a complete listings of the 2-digit harmonized classes contained in the study grouping, column three provides a short description of the 2-digit harmonized code, and column four gives the dollar value of trade for each of the 2-digit classes for 1992.

Technical Appendices 3 and 4

The third and fourth technical appendices provide detail on the hinterlands for U.S. ports. Appendix 3 shows those states exporting to Mexico by U.S. port. Appendix 4 shows the states importing from Mexico by U.S. port.

Technical Appendices 5 and 6

The fifth and sixth technical appendices provide detail on the U.S. hinterlands for Mexican ports. Appendix 5 shows those states exporting to Mexico by Mexican port. Appendix 6 shows the states importing from Mexico by Mexican port.

Technical Appendices 7 and 8

These appendices contain the data on the port to port flows for petroleum and non-petroleum products.

TA.1 TECHNICAL APPENDIX 1
STUDY COMMODITY CLASSIFICATION AND COMPONENTS
1992 EXPORTS TO MEXICO

Commodity Group Name	Commodity (HS 2 digit)	US Dollar Valu
ANIMALS/PRODUCTS	02 MEAT AND EDIBLE MEAT OFFAL	$ 533,191,87
ANIMALS/PRODUCTS	01 LIVE ANIMALS	$ 197,850,54
ANIMALS/PRODUCTS	15 ANIMAL OR VEGETABLE FATS, OILS ETC.	$ 190,007,56
ANIMALS/PRODUCTS	04 DAIRY PRODS; BIRDS EGGS; HONEY; ED	$ 143,642,10
ANIMALS/PRODUCTS	16 EDIBLE PREPARATIONS OF MEAT, FISH,	$ 63,414,35
ANIMALS/PRODUCTS	05 PRODUCTS OF ANIMAL ORIGIN, NESOI	$ 48,054,81
ANIMALS/PRODUCTS	03 FISH, CRUSTACEANS & AQUATIC INVERTE	$ 43,107,09
	Total for Animals/Products	$ 1,219,268,34
VEGETABLES/PRODUCTS	10 CEREALS	$ 862,974,84
VEGETABLES/PRODUCTS	12 OIL SEEDS ETC.; MISC GRAIN, SEED, F	$ 565,559,79
VEGETABLES/PRODUCTS	23 FOOD INDUSTRY RESIDUES & WASTE; PRE	$ 262,283,40
VEGETABLES/PRODUCTS	22 BEVERAGES, SPIRITS AND VINEGAR	$ 101,079,86
VEGETABLES/PRODUCTS	21 MISCELLANEOUS EDIBLE PREPARATIONS	$ 98,354,99
VEGETABLES/PRODUCTS	08 EDIBLE FRUIT & NUTS; CITRUS FRUIT O	$ 94,016,30
VEGETABLES/PRODUCTS	19 PREP CEREAL, FLOUR, STARCH OR MILK;	$ 72,410,63
VEGETABLES/PRODUCTS	07 EDIBLE VEGETABLES & CERTAIN ROOTS &	$ 67,652,03
VEGETABLES/PRODUCTS	17 SUGARS AND SUGAR CONFECTIONARY	$ 67,359,48
VEGETABLES/PRODUCTS	11 MILLING PRODUCTS; MALT; STARCH; INU	$ 66,622,19
VEGETABLES/PRODUCTS	18 COCOA AND COCOA PREPARATIONS	$ 58,276,80
VEGETABLES/PRODUCTS	20 PREP VEGETABLES, FRUIT, NUTS OR OTH	$ 48,960,83
VEGETABLES/PRODUCTS	13 LAC; GUMS, RESINS & OTHER VEGETABLE	$ 17,065,86
VEGETABLES/PRODUCTS	06 LIVE TREES, PLANTS, BULBS ETC.; CUT	$ 15,464,92
VEGETABLES/PRODUCTS	09 COFFEE, TEA, MATE & SPICES	$ 10,092,44
VEGETABLES/PRODUCTS	24 TOBACCO AND MANUFACTURED TOBACCO SU	$ 6,784,47
VEGETABLES/PRODUCTS	14 VEGETABLE PLAITING MATERIALS & PROD	$ 5,715,02
	Total for Vegetables/Products	$ 2,420,673,93
EXTRACTIVE	25 SALT; SULFUR; EARTH & STONE; LIME &	$ 74,041,46
EXTRACTIVE	26 ORES, SLAG AND ASH	$ 41,146,30
	Total for Extractive	$ 115,187,76
PETROLEUM	27 MINERAL FUEL, OIL ETC.; BITUMIN SUB	$ 1,239,287,88
	Total for Petroleum	$ 1,239,287,88
CHEMICALS/PLASTICS	39 PLASTICS AND ARTICLES THEREOF	$ 1,930,778,18
CHEMICALS/PLASTICS	29 ORGANIC CHEMICALS	$ 853,017,65
CHEMICALS/PLASTICS	40 RUBBER AND ARTICLES THEREOF	$ 442,421,29
CHEMICALS/PLASTICS	28 INORG CHEM; PREC & RARE-EARTH MET &	$ 289,661,02
CHEMICALS/PLASTICS	38 MISCELLANEOUS CHEMICAL PRODUCTS	$ 249,001,59
CHEMICALS/PLASTICS	32 TANNING & DYE EXT ETC; DYE, PAINT,	$ 158,044,49
CHEMICALS/PLASTICS	33 ESSENTIAL OILS ETC; PERFUMERY, COSM	$ 125,279,11
CHEMICALS/PLASTICS	34 SOAP ETC; WAXES, POLISH ETC; CANDLE	$ 100,506,59
CHEMICALS/PLASTICS	37 PHOTOGRAPHIC OR CINEMATOGRAPHIC GOO	$ 90,172,89
CHEMICALS/PLASTICS	31 FERTILIZERS	$ 77,935,19
CHEMICALS/PLASTICS	30 PHARMACEUTICAL PRODUCTS	$ 69,303,21
CHEMICALS/PLASTICS	35 ALBUMINOIDAL SUBST; MODIFIED STARCH	$ 59,167,35
CHEMICALS/PLASTICS	36 EXPLOSIVES; PYROTECHNICS; MATCHES;	$ 14,081,57
	Total for Chemicals/Plastics	$ 4,459,370,18
METALS/PRODUCTS	72 IRON AND STEEL	$ 881,590,59
METALS/PRODUCTS	73 ARTICLES OF IRON OR STEEL	$ 729,375,09
METALS/PRODUCTS	76 ALUMINUM AND ARTICLES THEREOF	$ 473,683,39
METALS/PRODUCTS	83 MISCELLANEOUS ARTICLES OF BASE META	$ 472,333,50
METALS/PRODUCTS	74 COPPER AND ARTICLES THEREOF	$ 227,493,60
METALS/PRODUCTS	82 TOOLS, CUTLERY ETC. OF BASE METAL &	$ 128,228,55

Commodity Group Name	Commodity (HS 2 digit)	US Dollar Value
METALS/PRODUCTS	80 TIN AND ARTICLES THEREOF	$ 18,402,526
METALS/PRODUCTS	75 NICKEL AND ARTICLES THEREOF	$ 10,605,467
METALS/PRODUCTS	81 BASE METALS NESOI; CERMETS; ARTICLE	$ 8,775,266
METALS/PRODUCTS	79 ZINC AND ARTICLES THEREOF	$ 8,476,515
METALS/PRODUCTS	78 LEAD AND ARTICLES THEREOF	$ 7,600,948
	Total for Metals/Products	$ 2,966,565,470
MACHINERY/APPLIANCES/VEH	85 ELECTRIC MACHINERY ETC; SOUND EQUIP	$ 7,667,130,226
MACHINERY/APPLIANCES/VEH	84 NUCLEAR REACTORS, BOILERS, MACHINER	$ 6,048,494,427
MACHINERY/APPLIANCES/VEH	87 VEHICLES, EXCEPT RAILWAY OR TRAMWAY	$ 4,426,433,616
MACHINERY/APPLIANCES/VEH	88 AIRCRAFT, SPACECRAFT, AND PARTS THE	$ 886,171,282
MACHINERY/APPLIANCES/VEH	86 RAILWAY OR TRAMWAY STOCK ETC; TRAFF	$ 69,726,613
MACHINERY/APPLIANCES/VEH	89 SHIPS, BOATS AND FLOATING STRUCTURE	$ 29,532,793
	Total for Machinery/Appliances/Vehicles	$19,127,488,955
MISCELLANEOUS	98 SPECIAL CLASSIFICATION PROVISIONS,	$ 1,660,461,780
MISCELLANEOUS	90 OPTIC, PHOTO ETC, MEDIC OR SURGICAL	$ 1,606,353,519
MISCELLANEOUS	48 PAPER & PAPERBOARD & ARTICLES (INC	$ 1,021,864,424
MISCELLANEOUS	94 FURNITURE; BEDDING ETC; LAMPS NESOI	$ 760,992,533
MISCELLANEOUS	62 APPAREL ARTICLES AND ACCESSORIES, N	$ 525,644,594
MISCELLANEOUS	44 WOOD AND ARTICLES OF WOOD; WOOD CHA	$ 511,754,611
MISCELLANEOUS	71 NAT ETC PEARLS, PREC ETC STONES, PR	$ 311,865,654
MISCELLANEOUS	47 PULP OF WOOD ETC; WASTE ETC OF PAPE	$ 297,464,457
MISCELLANEOUS	95 TOYS, GAMES & SPORT EQUIPMENT; PART	$ 260,772,041
MISCELLANEOUS	70 GLASS AND GLASSWARE	$ 192,474,591
MISCELLANEOUS	49 PRINTED BOOKS, NEWSPAPERS ETC; MANU	$ 181,555,026
MISCELLANEOUS	41 RAW HIDES AND SKINS (NO FURSKINS) A	$ 181,322,236
MISCELLANEOUS	52 COTTON, INCLUDING YARN AND WOVEN FA	$ 160,337,423
MISCELLANEOUS	56 WADDING, FELT ETC; SP YARN; TWINE,	$ 159,645,327
MISCELLANEOUS	54 MANMADE FILAMENTS, INCLUDING YARNS	$ 155,579,452
MISCELLANEOUS	61 APPAREL ARTICLES AND ACCESSORIES, K	$ 151,016,989
MISCELLANEOUS	96 MISCELLANEOUS MANUFACTURED ARTICLES	$ 121,044,879
MISCELLANEOUS	63 TEXTILE ART NESOI; NEEDLECRAFT SETS	$ 98,057,037
MISCELLANEOUS	64 FOOTWEAR, GAITERS ETC. AND PARTS TH	$ 92,791,640
MISCELLANEOUS	55 MANMADE STAPLE FIBERS, INCL YARNS &	$ 85,544,509
MISCELLANEOUS	59 IMPREGNATED ETC TEXT FABRICS; TEX A	$ 73,197,669
MISCELLANEOUS	42 LEATHER ART; SADDLERY ETC; HANDBAGS	$ 63,425,770
MISCELLANEOUS	58 SPEC WOV FABRICS; TUFTED FAB; LACE;	$ 63,101,250
MISCELLANEOUS	57 CARPETS AND OTHER TEXTILE FLOOR COV	$ 60,263,233
MISCELLANEOUS	91 CLOCKS AND WATCHES AND PARTS THEREO	$ 49,374,719
MISCELLANEOUS	68 ART OF STONE, PLASTER, CEMENT, ASBE	$ 46,467,378
MISCELLANEOUS	69 CERAMIC PRODUCTS	$ 45,344,16
MISCELLANEOUS	92 MUSICAL INSTRUMENTS; PARTS AND ACCE	$ 23,101,75
MISCELLANEOUS	93 ARMS AND AMMUNITION; PARTS AND ACCE	$ 20,003,74
MISCELLANEOUS	60 KNITTED OR CROCHETED FABRICS	$ 19,046,22
MISCELLANEOUS	97 WORKS OF ART, COLLECTORS' PIECES AN	$ 16,037,76
MISCELLANEOUS	67 PREP FEATHERS, DOWN ETC; ARTIF FLOW	$ 8,681,97
MISCELLANEOUS	65 HEADGEAR AND PARTS THEREOF	$ 8,357,28
MISCELLANEOUS	43 FURSKINS AND ARTIFICIAL FUR; MANUFA	$ 4,009,22
MISCELLANEOUS	66 UMBRELLAS, WALKING-STICKS, RIDING-C	$ 3,268,80
MISCELLANEOUS	50 SILK, INCLUDING YARNS AND WOVEN FAB	$ 2,521,47
MISCELLANEOUS	46 MFR OF STRAW, ESPARTO ETC.; BASKETW	$ 2,177,89
MISCELLANEOUS	53 VEG TEXT FIB NESOI; VEG FIB & PAPER	$ 1,799,12
MISCELLANEOUS	45 CORK AND ARTICLES OF CORK	$ 1,675,75
MISCELLANEOUS	51 WOOL & ANIMAL HAIR, INCLUDING YARN	$ 1,236,97
	Total for Miscellaneous	$ 9,049,634,89

TA.2 TECHNICAL APPENDIX 2
STUDY COMMODITY CLASSIFICATION AND COMPONENTS
1992 IMPORTS FROM MEXICO

Commodity Group Name	Commodity (HS 2 digit)	US Dollar Value
ANIMALS/PRODUCTS	01 LIVE ANIMALS	$ 343,335,29
ANIMALS/PRODUCTS	03 FISH, CRUSTACEANS & AQUATIC INVERTE	$ 203,123,02
ANIMALS/PRODUCTS	16 EDIBLE PREPARATIONS OF MEAT, FISH,	$ 47,443,79
ANIMALS/PRODUCTS	15 ANIMAL OR VEGETABLE FATS, OILS ETC.	$ 27,396,31
ANIMALS/PRODUCTS	05 PRODUCTS OF ANIMAL ORIGIN, NESOI	$ 18,345,71
ANIMALS/PRODUCTS	04 DAIRY PRODS; BIRDS EGGS; HONEY; ED	$ 2,257,13
ANIMALS/PRODUCTS	02 MEAT AND EDIBLE MEAT OFFAL	$ 1,539,17
	Total for Animals/Products	$ 643,440,43
VEGETABLES/PRODUCTS	07 EDIBLE VEGETABLES & CERTAIN ROOTS &	$ 723,221,21
VEGETABLES/PRODUCTS	08 EDIBLE FRUIT & NUTS; CITRUS FRUIT O	$ 480,152,75
VEGETABLES/PRODUCTS	09 COFFEE, TEA, MATE & SPICES	$ 271,495,92
VEGETABLES/PRODUCTS	22 BEVERAGES, SPIRITS AND VINEGAR	$ 262,414,64
VEGETABLES/PRODUCTS	20 PREP VEGETABLES, FRUIT, NUTS OR OTH	$ 124,195,63
VEGETABLES/PRODUCTS	19 PREP CEREAL, FLOUR, STARCH OR MILK;	$ 53,753,89
VEGETABLES/PRODUCTS	12 OIL SEEDS ETC.; MISC GRAIN, SEED, F	$ 35,063,21
VEGETABLES/PRODUCTS	17 SUGARS AND SUGAR CONFECTIONARY	$ 32,424,33
VEGETABLES/PRODUCTS	21 MISCELLANEOUS EDIBLE PREPARATIONS	$ 30,530,23
VEGETABLES/PRODUCTS	14 VEGETABLE PLAITING MATERIALS & PROD	$ 30,442,70
VEGETABLES/PRODUCTS	18 COCOA AND COCOA PREPARATIONS	$ 22,020,11
VEGETABLES/PRODUCTS	06 LIVE TREES, PLANTS, BULBS ETC.; CUT	$ 18,667,59
VEGETABLES/PRODUCTS	24 TOBACCO AND MANUFACTURED TOBACCO SU	$ 14,838,18
VEGETABLES/PRODUCTS	13 LAC; GUMS, RESINS & OTHER VEGETABLE	$ 10,968,11
VEGETABLES/PRODUCTS	11 MILLING PRODUCTS; MALT; STARCH; INU	$ 2,000,33
VEGETABLES/PRODUCTS	10 CEREALS	$ 511,81
VEGETABLES/PRODUCTS	23 FOOD INDUSTRY RESIDUES & WASTE; PRE	$ 222,30
	Total for Vegetables/Products	$ 2,112,923,01
EXTRACTIVE	25 SALT; SULFUR; EARTH & STONE; LIME &	$ 175,576,24
EXTRACTIVE	26 ORES, SLAG AND ASH	$ 91,243,70
	Total for Extractive	$ 266,819,94
PETROLEUM	27 MINERAL FUEL, OIL ETC.; BITUMIN SUB	$ 4,731,658,51
	Total for Petroleum	$ 4,731,658,51
CHEMICALS/PLASTICS	39 PLASTICS AND ARTICLES THEREOF	$ 342,944,29
CHEMICALS/PLASTICS	29 ORGANIC CHEMICALS	$ 300,656,26
CHEMICALS/PLASTICS	28 INORG CHEM; PREC & RARE-EARTH MET &	$ 195,494,16
CHEMICALS/PLASTICS	40 RUBBER AND ARTICLES THEREOF	$ 116,376,61
CHEMICALS/PLASTICS	37 PHOTOGRAPHIC OR CINEMATOGRAPHIC GOO	$ 59,783,64
CHEMICALS/PLASTICS	34 SOAP ETC; WAXES, POLISH ETC; CANDLE	$ 54,598,84
CHEMICALS/PLASTICS	38 MISCELLANEOUS CHEMICAL PRODUCTS	$ 50,745,31
CHEMICALS/PLASTICS	32 TANNING & DYE EXT ETC; DYE, PAINT,	$ 30,101,70
CHEMICALS/PLASTICS	33 ESSENTIAL OILS ETC; PERFUMERY, COSM	$ 18,741,88
CHEMICALS/PLASTICS	31 FERTILIZERS	$ 13,018,14
CHEMICALS/PLASTICS	30 PHARMACEUTICAL PRODUCTS	$ 8,153,57
CHEMICALS/PLASTICS	35 ALBUMINOIDAL SUBST; MODIFIED STARCH	$ 2,666,56
CHEMICALS/PLASTICS	36 EXPLOSIVES; PYROTECHNICS; MATCHES;	$ 2,386,43
	Total for Chemicals/Plastics	$ 1,195,667,44
METALS/PRODUCTS	73 ARTICLES OF IRON OR STEEL	$ 424,146,63
METALS/PRODUCTS	72 IRON AND STEEL	$ 231,741,83
METALS/PRODUCTS	74 COPPER AND ARTICLES THEREOF	$ 211,495,33
METALS/PRODUCTS	83 MISCELLANEOUS ARTICLES OF BASE META	$ 178,833,78
METALS/PRODUCTS	76 ALUMINUM AND ARTICLES THEREOF	$ 122,563,21
METALS/PRODUCTS	82 TOOLS, CUTLERY ETC. OF BASE METAL &	$ 59,397,32

Commodity Group Name	Commodity (HS 2 digit)	US Dollar Valu
METALS/PRODUCTS	79 ZINC AND ARTICLES THEREOF	$ 50,874,77
METALS/PRODUCTS	78 LEAD AND ARTICLES THEREOF	$ 32,788,15
METALS/PRODUCTS	81 BASE METALS NESOI; CERMETS; ARTICLE	$ 9,688,09
METALS/PRODUCTS	80 TIN AND ARTICLES THEREOF	$ 2,735,37
METALS/PRODUCTS	75 NICKEL AND ARTICLES THEREOF	$ 772,51
	Total for Metals/Products	$ 1,325,037,03
MACHINERY/APPLIANCES/VEH	85 ELECTRIC MACHINERY ETC; SOUND EQUIP	$ 9,600,732,14
MACHINERY/APPLIANCES/VEH	87 VEHICLES, EXCEPT RAILWAY OR TRAMWAY	$ 5,069,685,74
MACHINERY/APPLIANCES/VEH	84 NUCLEAR REACTORS, BOILERS, MACHINER	$ 3,133,129,37
MACHINERY/APPLIANCES/VEH	86 RAILWAY OR TRAMWAY STOCK ETC; TRAFF	$ 58,619,57
MACHINERY/APPLIANCES/VEH	88 AIRCRAFT, SPACECRAFT, AND PARTS THE	$ 17,748,69
MACHINERY/APPLIANCES/VEH	89 SHIPS, BOATS AND FLOATING STRUCTURE	$ 1,421,87
	Total for Machinery/Appliances/Vehicles	$17,881,337,40
MISCELLANEOUS	98 SPECIAL CLASSIFICATION PROVISIONS,	$ 1,165,649,12
MISCELLANEOUS	90 OPTIC, PHOTO ETC, MEDIC OR SURGICAL	$ 1,035,783,48
MISCELLANEOUS	62 APPAREL ARTICLES AND ACCESSORIES, N	$ 925,709,84
MISCELLANEOUS	94 FURNITURE; BEDDING ETC; LAMPS NESOI	$ 905,238,42
MISCELLANEOUS	99 SPECIAL IMPORT PROVISIONS, NESOI	$ 319,668,50
MISCELLANEOUS	44 WOOD AND ARTICLES OF WOOD; WOOD CHA	$ 291,221,12
MISCELLANEOUS	95 TOYS, GAMES & SPORT EQUIPMENT; PART	$ 280,035,69
MISCELLANEOUS	71 NAT ETC PEARLS, PREC ETC STONES, PR	$ 275,637,96
MISCELLANEOUS	70 GLASS AND GLASSWARE	$ 260,967,37
MISCELLANEOUS	64 FOOTWEAR, GAITERS ETC. AND PARTS TH	$ 212,106,53
MISCELLANEOUS	63 TEXTILE ART NESOI; NEEDLECRAFT SETS	$ 208,319,50
MISCELLANEOUS	61 APPAREL ARTICLES AND ACCESSORIES, K	$ 169,758,07
MISCELLANEOUS	69 CERAMIC PRODUCTS	$ 140,979,30
MISCELLANEOUS	48 PAPER & PAPERBOARD & ARTICLES (INC	$ 135,457,03
MISCELLANEOUS	42 LEATHER ART; SADDLERY ETC; HANDBAGS	$ 118,380,04
MISCELLANEOUS	96 MISCELLANEOUS MANUFACTURED ARTICLES	$ 104,817,24
MISCELLANEOUS	68 ART OF STONE, PLASTER, CEMENT, ASBE	$ 74,857,98
MISCELLANEOUS	49 PRINTED BOOKS, NEWSPAPERS ETC; MANU	$ 63,971,95
MISCELLANEOUS	92 MUSICAL INSTRUMENTS; PARTS AND ACCE	$ 38,643,30
MISCELLANEOUS	52 COTTON, INCLUDING YARN AND WOVEN FA	$ 37,323,79
MISCELLANEOUS	65 HEADGEAR AND PARTS THEREOF	$ 35,656,37
MISCELLANEOUS	55 MANMADE STAPLE FIBERS, INCL YARNS &	$ 33,573,89
MISCELLANEOUS	54 MANMADE FILAMENTS, INCLUDING YARNS	$ 33,056,33
MISCELLANEOUS	41 RAW HIDES AND SKINS (NO FURSKINS) A	$ 29,482,80
MISCELLANEOUS	91 CLOCKS AND WATCHES AND PARTS THEREO	$ 26,459,80
MISCELLANEOUS	56 WADDING, FELT ETC; SP YARN; TWINE,	$ 22,879,72
MISCELLANEOUS	93 ARMS AND AMMUNITION; PARTS AND ACCE	$ 20,216,26
MISCELLANEOUS	59 IMPREGNATED ETC TEXT FABRICS; TEX A	$ 12,347,56
MISCELLANEOUS	97 WORKS OF ART, COLLECTORS' PIECES AN	$ 9,923,41
MISCELLANEOUS	57 CARPETS AND OTHER TEXTILE FLOOR COV	$ 9,148,25
MISCELLANEOUS	58 SPEC WOV FABRICS; TUFTED FAB; LACE;	$ 6,548,66
MISCELLANEOUS	46 MFR OF STRAW, ESPARTO ETC.; BASKETW	$ 4,736,15
MISCELLANEOUS	47 PULP OF WOOD ETC; WASTE ETC OF PAPE	$ 4,597,39
MISCELLANEOUS	67 PREP FEATHERS, DOWN ETC; ARTIF FLOW	$ 4,403,21
MISCELLANEOUS	60 KNITTED OR CROCHETED FABRICS	$ 4,049,54
MISCELLANEOUS	51 WOOL & ANIMAL HAIR, INCLUDING YARN	$ 3,016,72
MISCELLANEOUS	53 VEG TEXT FIB NESOI; VEG FIB & PAPER	$ 1,426,62
MISCELLANEOUS	66 UMBRELLAS, WALKING-STICKS, RIDING-C	$ 741,88
MISCELLANEOUS	45 CORK AND ARTICLES OF CORK	$ 363,39
MISCELLANEOUS	43 FURSKINS AND ARTIFICIAL FUR; MANUFA	$ 110,92
	Total for Miscellaneous	$ 7,027,265,26

TA.3 TECHNICAL APPENDIX 3
U.S. PORT SERVICE AREAS, 1992 EXPORTS

US Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Northeast	CT	$ 2,120,109	25,776,400
Northeast	RI	$ 2,072,366	23,039,100
Northeast	ME	$ 693,709	1,926,982
Total Exported via Northeast		$ 4,886,184	50,742,482
Mid Atlantic	PA	$ 8,913,000	32,395,118
Mid Atlantic	NY	$ 5,719,536	13,542,227
Mid Atlantic	NJ	$ 2,564,549	6,841,097
Mid Atlantic	IL	$ 253,088	4,592,000
Mid Atlantic		$ 112,040	3,520,550
Mid Atlantic	IN	$ 46,000	131,625
Mid Atlantic	CT	$ 25,000	694
Mid Atlantic	MI	$ 20,388	170,378
Mid Atlantic	MS	$ 6,136	22,517
Total Exported via Mid Atlantic		$ 17,659,737	61,216,206
Southeast	NC	$ 5,087,515	499,228
Southeast		$ 3,880,859	205,778
Southeast	VA	$ 2,439,343	3,195,986
Southeast	SC	$ 1,292,137	2,522,128
Southeast	PA	$ 1,225,371	279,471
Southeast	IL	$ 512,277	39,978
Southeast	GA	$ 485,813	149,910
Southeast	NY	$ 361,665	32,220
Southeast	AL	$ 108,827	11,542
Southeast	MO	$ 105,588	170,848
Southeast	NJ	$ 104,613	32,857
Southeast	AR	$ 102,120	10,324
Southeast	KY	$ 86,183	2,767
Southeast	MD	$ 35,200	1,002
Southeast	MS	$ 19,200	38,490
Southeast	IN	$ 13,000	41,000
Total Exported via Southeast		$ 15,859,711	7,233,529
Florida	FL	$ 65,900,721	113,093,768
Florida		$ 44,178,716	20,812,032
Florida	NC	$ 1,265,007	59,131
Florida	LA	$ 1,077,281	4,885,628
Florida	SC	$ 908,959	129,272
Florida	IL	$ 773,199	139,044
Florida	TX	$ 744,059	93,674
Florida	TN	$ 625,177	69,976
Florida	CA	$ 566,831	89,665
Florida	NJ	$ 564,932	59,172
Florida	KY	$ 543,250	130,624
Florida	OH	$ 499,232	68,660
Florida	IN	$ 427,011	41,641
Florida	GA	$ 407,518	119,447
Florida	VA	$ 401,016	10,624
Florida	NY	$ 345,955	42,197
Florida	AL	$ 326,288	159,752
Florida	WI	$ 179,807	12,161

US Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Florida	NH	$ 165,556	2,721
Florida	PA	$ 130,013	22,006
Florida	MI	$ 129,989	13,687
Florida	MN	$ 122,555	14,500
Florida	IA	$ 37,412	2,927
Florida	OR	$ 33,353	1,017
Florida	PR	$ 32,304	3,488
Florida	NM	$ 28,210	1,667
Florida	WA	$ 27,654	9,598
Florida	NE	$ 23,000	14,062
Florida	MA	$ 18,703	9,041
Florida	UT	$ 18,429	12,997
Florida	CO	$ 13,955	482
Florida	AR	$ 12,700	9,264
Florida	CT	$ 11,252	13,079
Florida	MD	$ 8,481	912
Florida	RI	$ 6,787	154
Total Exported via Florida		$ 120,555,312	140,148,070
Mobile		$ 23,910,283	37,235,544
Mobile	TX	$ 10,146,363	11,765,691
Mobile	GA	$ 6,515,402	796,984
Mobile	IA	$ 5,387,845	1,369,711
Mobile	AL	$ 2,725,493	47,391,389
Mobile	IL	$ 2,509,728	376,250
Mobile	NC	$ 2,298,070	1,516,650
Mobile	FL	$ 1,621,137	828,452
Mobile	MS	$ 1,588,433	4,868,746
Mobile	OH	$ 1,398,316	402,197
Mobile	LA	$ 1,264,872	2,026,523
Mobile	MN	$ 1,005,333	91,041
Mobile	MO	$ 804,252	197,316
Mobile	IN	$ 652,538	233,909
Mobile	VA	$ 612,480	237,036
Mobile	PA	$ 456,826	124,270
Mobile	KS	$ 347,527	95,675
Mobile	NJ	$ 299,814	32,255
Mobile	NV	$ 261,675	44,245
Mobile	CA	$ 257,747	56,618
Mobile	WI	$ 209,905	5,897
Mobile	SC	$ 199,556	319,622
Mobile	WV	$ 166,600	365,516
Mobile	UT	$ 164,825	92,223
Mobile	AZ	$ 148,325	19,723
Mobile	TN	$ 135,732	24,674
Mobile	KY	$ 119,117	92,815
Mobile	NE	$ 99,933	15,116
Mobile	MA	$ 97,560	59,112
Mobile	MI	$ 95,547	29,318
Mobile	NY	$ 87,759	44,705
Mobile	AR	$ 78,343	88,622
Mobile	CO	$ 23,984	12,069
Mobile	OR	$ 11,000	5
Mobile	ID	$ 7,500	6,000

US Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Mobile	CT	$ 6,600	680
Mobile	WA	$ 6,135	2,098
Mobile	NH	$ 4,000	155
Mobile	DE	$ 3,668	9
Total Exported via Mobile		$ 65,730,223	110,868,861
New Orleans	LA	$ 525,024,886	3,138,880,700
New Orleans		$ 6,391,312	15,868,088
New Orleans	GA	$ 4,438,349	738,909
New Orleans	MS	$ 1,688,401	2,231,671
New Orleans	AL	$ 1,358,718	3,694,822
New Orleans	TX	$ 1,091,620	734,824
New Orleans	IL	$ 457,312	2,217,630
New Orleans	IA	$ 424,890	196,342
New Orleans	MI	$ 49,422	10,206
New Orleans	MO	$ 47,058	16,474
New Orleans	NJ	$ 3,546	694
Total Exported via New Orleans		$ 540,975,514	3,164,590,360
Port Arthur	TX	$ 65,448,847	463,321,075
Port Arthur		$ 6,897,473	21,878,387
Port Arthur	OK	$ 2,563,768	20,998,815
Port Arthur	OH	$ 141,145	17,233
Total Exported via Port Arthur		$ 75,051,233	506,215,510
Houston	TX	$ 582,022,119	2,532,486,468
Houston		$ 118,967,240	512,927,098
Houston	LA	$ 6,254,927	18,605,503
Houston	CA	$ 2,391,696	54,062
Houston	NM	$ 2,033,678	0
Houston	IL	$ 969,460	156,279
Houston	MO	$ 879,518	2,099,734
Houston	OK	$ 250,000	60,745
Houston	FL	$ 144,073	56,864
Houston	PA	$ 77,188	52,920
Houston	KS	$ 17,161	4,499
Houston	CT	$ 13,669	45,267
Houston	NY	$ 3,872	20
Houston	IA	$ 3,217	495
Total Exported via Houston		$ 714,027,818	3,066,549,954
Total East/Gulf Coasts Exports		$ 1,554,745,732	7,107,564,972

TA.4 TECHNICAL APPENDIX 4
U.S. PORT SERVICE AREAS, 1992 IMPORTS

US Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Northeast	CT	$ 13,603,457	93,196,112
Northeast	MI	$ 10,921,585	1,191,482
Northeast	MA	$ 220,569	22,195,513
Northeast	VI	$ 7,271	8,318
Northeast		$ 432	1
Total Imported via Northeast		$ 24,753,314	116,591,426
Mid Atlantic	NJ	$ 308,226,213	2,620,478,856
Mid Atlantic	MI	$ 138,030,955	14,700,859
Mid Atlantic	PA	$ 116,516,460	1,061,711,751
Mid Atlantic		$ 40,533,032	297,427,203
Mid Atlantic	NY	$ 16,821,378	45,818,675
Mid Atlantic	MD	$ 4,573,358	190,348,950
Mid Atlantic	MN	$ 1,169,332	18,835,892
Mid Atlantic	NH	$ 381,050	38,105,000
Mid Atlantic	LA	$ 207,435	3,362,000
Mid Atlantic	OH	$ 128,353	24,518
Mid Atlantic	MA	$ 83,877	32,249
Mid Atlantic	AR	$ 37,500	10,000
Mid Atlantic	IN	$ 7,315	382
Mid Atlantic	FL	$ 2,863	150
Total Imported via Mid Atlantic		$ 626,719,121	4,290,856,485
Southeast	NC	$ 35,223,510	273,803,151
Southeast	MI	$ 14,171,258	1,501,614
Southeast	VA	$ 10,669,910	109,087,851
Southeast	NJ	$ 6,404,436	6,111,194
Southeast	GA	$ 5,677,851	70,105,782
Southeast	FL	$ 5,065,083	21,329,828
Southeast	NY	$ 3,848,701	3,898,649
Southeast	OH	$ 1,386,714	8,011,396
Southeast	MS	$ 1,003,812	10,511,117
Southeast	TX	$ 671,780	6,405,187
Southeast		$ 615,116	21,857,501
Southeast	PA	$ 481,798	59,528,459
Southeast	CA	$ 252,550	11,841,000
Southeast	LA	$ 75,191	30,780
Southeast	PR	$ 17,045	14,740
Southeast	IL	$ 2,771	159
Southeast	SC	$ 2,245	2,538
Total Imported via Southeast		$ 85,569,771	604,040,946
Florida	PR	$ 115,447,027	293,228
Florida	FL	$ 103,013,557	1,532,354,694
Florida		$ 16,304,732	119,941,176
Florida	MS	$ 937,315	10,027,157
Florida	MA	$ 872,831	46,994
Florida	NY	$ 745,264	268,650
Florida	CA	$ 505,600	423,400
Florida	NJ	$ 384,173	377,644
Florida	TX	$ 164,643	41,487
Florida	PA	$ 127,145	34,762

US Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Florida	GA	$ 124,982	41,611
Florida	SC	$ 72,708	19,380
Florida	NC	$ 23,490	17,000
Florida	LA	$ 20,975	5,750
Florida	IL	$ 17,033	1,587
Florida	WI	$ 5,380	960
Total Imported via Florida		$ 238,766,855	1,663,895,480
Mobile	MS	$ 498,896,294	5,477,439,931
Mobile	TX	$ 38,618,100	494,767,128
Mobile	FL	$ 21,305,013	83,425,240
Mobile		$ 9,763,333	104,596,943
Mobile	AL	$ 6,541,746	9,953,913
Mobile	GA	$ 6,066,877	306,997
Mobile	IA	$ 5,608,262	119,765
Mobile	NJ	$ 2,920,491	203,460
Mobile	PA	$ 1,403,804	1,528,907
Mobile	CA	$ 1,350,903	194,057
Mobile	LA	$ 870,415	564,581
Mobile	NC	$ 761,899	532,014
Mobile	WA	$ 581,357	119,300
Mobile	MN	$ 376,904	426,388
Mobile	IL	$ 374,501	397,986
Mobile	KS	$ 343,196	90,291
Mobile	TN	$ 331,543	157,191
Mobile	MA	$ 177,239	125,268
Mobile	NY	$ 126,982	172,213
Mobile	VA	$ 82,045	179,780
Mobile	IN	$ 56,705	60,329
Mobile	RI	$ 42,528	43,854
Mobile	MO	$ 17,341	18,235
Mobile	OR	$ 8,393	5,535
Mobile	ME	$ 4,162	3,357
Mobile	WI	$ 3,720	1,950
Total Imported via Mobile		$ 596,633,753	6,175,434,613
New Orleans	LA	$ 862,322,717	8,776,080,605
New Orleans	TX	$ 510,906,628	4,792,295,361
New Orleans		$ 53,252,544	460,402,699
New Orleans	IN	$ 45,812,006	496,052,501
New Orleans	OK	$ 13,292,095	146,322,725
New Orleans	NY	$ 7,187,801	166,402,998
New Orleans	OH	$ 3,384,420	39,505,117
New Orleans	CA	$ 3,185,074	23,809,847
New Orleans	NJ	$ 3,121,658	6,110,045
New Orleans	CT	$ 1,765,499	13,363,933
New Orleans	PA	$ 1,000,806	2,464,548
New Orleans	IL	$ 622,683	6,739,755
New Orleans	PR	$ 85,172	99,769
New Orleans	SC	$ 5,215	469
New Orleans	FL	$ 2,400	77

US Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Total Imported via New Orleans		$ 1,505,946,718	14,929,650,449
Port Arthur	TX	$ 422,594,989	3,287,706,681
Port Arthur		$ 26,737,340	198,552,851
Port Arthur	CA	$ 14,579,243	119,986,068
Port Arthur	VI	$ 2,592	956
Total Imported via Port Arthur		$ 463,914,164	3,606,246,556
Houston	TX	$ 1,284,145,338	12,410,429,245
Houston	MI	$ 33,523,387	3,520,295
Houston	MO	$ 25,259,154	252,791,678
Houston		$ 14,211,343	266,216,873
Houston	FL	$ 4,075,265	29,287,388
Houston	CA	$ 3,099,044	15,104,589
Houston	LA	$ 2,545,501	2,069,350
Houston	CT	$ 1,786,959	5,656,550
Houston	NY	$ 1,667,606	16,348,409
Houston	VA	$ 1,073,880	44,374
Houston	NJ	$ 736,303	8,703,232
Houston	AL	$ 222,196	20,346
Houston	KY	$ 99,208	29,497
Houston	IN	$ 50,806	8,150
Houston	PR	$ 35,007	21,396
Houston	MD	$ 28,530	21,319
Houston	CO	$ 26,033	129
Houston	ME	$ 21,600	21,460
Houston	TN	$ 19,152	743
Houston	OK	$ 14,912	1,615
Total Imported via Houston		$ 1,372,641,224	13,010,296,638
Total East/Gulf Coasts Imports		$ 4,914,944,920	44,397,012,593

TA.5 TECHNICAL APPENDIX 5
MEXICAN PORT SERVICE AREAS, 1992 EXPORTS

Exported via US East and Gulf Coast Ports

Importing Mexican Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
West Coast Ports	LA	$ 116,479,402	847,145,197
West Coast Ports	TX	$ 51,747,630	440,358,524
West Coast Ports	FL	$ 11,077,635	26,350,019
West Coast Ports		$ 6,147,480	2,232,494
West Coast Ports	GA	$ 4,428,241	719,000
West Coast Ports	NC	$ 2,315,840	0
West Coast Ports	CT	$ 2,120,109	25,776,400
West Coast Ports	VA	$ 803,794	0
West Coast Ports	AL	$ 355,119	35,904,525
West Coast Ports	PA	$ 258,605	3,037,931
West Coast Ports	NH	$ 165,556	2,721
West Coast Ports	TN	$ 103,904	11,032
West Coast Ports	PR	$ 24,360	3,171
West Coast Ports	IL	$ 13,726	392
West Coast Ports	NY	$ 11,922	3,620
Imported to West Coast Ports		$ 196,053,323	1,381,545,026
Dos Bocas		$ 7,052,116	8,092,011
Dos Bocas	TX	$ 6,231,138	8,630,182
Dos Bocas	LA	$ 1,685,701	2,233,330
Dos Bocas	FL	$ 6,650	363
Imported to Dos Bocas		$ 14,975,605	18,955,886
Campeche State	TX	$ 28,905,772	9,193,743
Campeche State	LA	$ 21,179,166	5,985,390
Campeche State	AL	$ 670,897	100,000
Campeche State	IA	$ 424,890	196,342
Campeche State		$ 384,732	35,860
Campeche State	FL	$ 125,000	191,801
Imported to Campeche State		$ 51,690,457	15,703,136
Coatzacoalcos	TX	$ 62,385,050	314,087,975
Coatzacoalcos	LA	$ 22,449,902	151,515,107
Coatzacoalcos		$ 9,244,249	21,515,055
Coatzacoalcos	PA	$ 4,428,363	15,438,295
Coatzacoalcos	NM	$ 2,033,678	0
Coatzacoalcos	FL	$ 1,655,002	10,578,953
Coatzacoalcos	NC	$ 51,307	3,054
Coatzacoalcos	AL	$ 25,190	53,356
Coatzacoalcos	MS	$ 2,875	34,020
Imported to Coatzacoalcos		$ 102,275,616	513,225,815
Cozumel		$ 2,758,414	418,181
Cozumel	FL	$ 1,463,963	164,109
Cozumel	VA	$ 284,259	7,091
Cozumel	AL	$ 84,200	114,362
Cozumel	TX	$ 36,057	4,581
Cozumel	NE	$ 23,000	14,062
Cozumel	CO	$ 13,955	482
Cozumel	NY	$ 12,491	206
Cozumel	CA	$ 9,378	181

Exported via US East and Gulf Coast Ports

Importing Mexican Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Cozumel	NJ	$ 4,246	345
Imported to Cozumel		$ 4,689,9[illegible]	715,600
Merida	LA	$ 132,928,7[illegible]	745,365,140
Merida	TX	$ 31,089,8[illegible]	201,620,513
Merida		$ 27,908,6[illegible]	33,656,039
Merida	FL	$ 13,362,1[illegible]	16,225,236
Merida	GA	$ 6,703,3[illegible]	878,481
Merida	IA	$ 5,387,8[illegible]	1,369,711
Merida	IL	$ 3,563,0[illegible]	2,701,982
Merida	NC	$ 2,298,0[illegible]	1,516,650
Merida	AL	$ 2,064,7[illegible]	11,749,303
Merida	OH	$ 1,769,1[illegible]	450,812
Merida	MS	$ 1,719,0[illegible]	5,807,976
Merida	MN	$ 1,085,2[illegible]	96,179
Merida	IN	$ 1,070,9[illegible]	275,439
Merida	MO	$ 743,802	213,428
Merida	VA	$ 619,647	237,096
Merida	TN	$ 608,041	74,625
Merida	PA	$ 516,816	135,142
Merida	NJ	$ 428,006	54,167
Merida	KS	$ 347,527	95,675
Merida	NV	$ 261,675	44,245
Merida	WI	$ 230,056	7,989
Merida	SC	$ 199,556	319,622
Merida	UT	$ 183,254	105,220
Merida	WV	$ 166,600	365,516
Merida	MI	$ 157,490	39,621
Merida	AZ	$ 148,325	19,723
Merida	CA	$ 144,077	53,353
Merida	KY	$ 119,117	92,815
Merida	NY	$ 109,650	44,844
Merida	MA	$ 100,872	59,728
Merida	NE	$ 99,933	15,116
Merida	AR	$ 78,343	88,622
Merida	CO	$ 23,984	12,069
Merida	WA	$ 17,735	5,636
Merida	OR	$ 11,000	5
Merida	MD	$ 8,481	912
Merida	ID	$ 7,500	6,000
Merida	RI	$ 6,787	154
Merida	CT	$ 6,600	680
Merida	NH	$ 4,000	155
Merida	DE	$ 3,668	9
Imported to Merida		$ 236,303,405	1,023,805,628
Vera Cruz	TX	$ 118,045,027	527,697,232
Vera Cruz	LA	$ 111,124,577	619,253,811
Vera Cruz		$ 21,926,595	48,019,537
Vera Cruz	FL	$ 13,343,755	55,847,594
Vera Cruz	NY	$ 5,221,468	13,496,118
Vera Cruz	PA	$ 4,656,505	8,846,040
Vera Cruz	NC	$ 3,444,475	413,844

Mexican Port Service Areas, 1992 US Exports
Exported via US East and Gulf Coast Ports

Importing Mexican Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Vera Cruz	OK	$ 2,813,768	21,059,560
Vera Cruz	NJ	$ 2,662,722	6,851,548
Vera Cruz	CA	$ 2,426,784	93,345
Vera Cruz	RI	$ 2,072,366	23,039,100
Vera Cruz	IL	$ 1,461,895	179,730
Vera Cruz	MO	$ 985,106	2,270,582
Vera Cruz	AL	$ 703,870	2,608,260
Vera Cruz	ME	$ 693,709	1,926,982
Vera Cruz	SC	$ 613,359	417,215
Vera Cruz	GA	$ 542,882	170,991
Vera Cruz	VA	$ 319,655	48,000
Vera Cruz	AR	$ 102,120	10,324
Vera Cruz	OH	$ 61,736	5,433
Vera Cruz	CT	$ 36,252	13,773
Vera Cruz	MD	$ 35,200	1,002
Vera Cruz	MS	$ 19,200	38,490
Vera Cruz	KS	$ 17,161	4,499
Vera Cruz	MA	$ 15,391	8,425
Vera Cruz	MI	$ 10,020	1,633
Vera Cruz	IN	$ 8,574	111
Vera Cruz	IA	$ 3,217	495
Imported to Vera Cruz		$ 293,367,389	1,332,323,674
Tuxpan	TX	$ 237,042,179	980,983,873
Tuxpan		$ 93,825,670	442,002,440
Tuxpan	LA	$ 16,813,622	80,758,397
Tuxpan	FI	$ 1,365,331	0
Tuxpan	SC	$ 674,000	2,099,673
Imported to Tuxpan		$ 349,720,802	1,505,844,383
Tampico/Altimira	TX	$ 108,977,240	484,939,617
Tampico/Altimira	LA	$ 107,256,298	692,627,096
Tampico/Altimira		$ 8,957,117	44,672,262
Tampico/Altimira	MS	$ 1,329,255	949,603
Tampico/Altimira	PA	$ 598,557	3,530,550
Tampico/Altimira	AL	$ 343,279	629,929
Tampico/Altimira	NC	$ 292,148	78,579
Tampico/Altimira	IL	$ 253,088	4,592,000
Tampico/Altimira	FL	$ 98,967	66,477
Tampico/Altimira	IN	$ 59,000	172,625
Tampico/Altimira	MI	$ 49,422	10,206
Tampico/Altimira	GA	$ 44,896	10,682
Tampico/Altimira	NJ	$ 33,533	25,658
Tampico/Altimira	NY	$ 20,136	88,500
Tampico/Altimira	SC	$ 4,778	5,240
Imported to Tampico/Altimira		$ 228,317,714	1,232,399,024
Other East Coast Ports		$ 24,946,156	11,397,906
Other East Coast Ports	FL	$ 17,947,882	3,853,891
Other East Coast Ports	TX	$ 12,622,951	29,058,490
Other East Coast Ports	VA	$ 1,358,594	3,149,618
Other East Coast Ports	LA	$ 1,286,945	159,935

Exported via US East and Gulf Coast Ports

Importing Mexican Port	Exporting State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Other East Coast Ports	SC	$ 875,986	129,125
Other East Coast Ports	KY	$ 543,250	130,624
Other East Coast Ports	CA	$ 455,392	37,949
Other East Coast Ports	AL	$ 272,030	97,770
Other East Coast Ports	NJ	$ 262,637	8,350
Other East Coast Ports	NC	$ 176,426	55,122
Other East Coast Ports	OH	$ 172,98[illegible]	22,375
Other East Coast Ports	WI	$ 159,65[illegible]	10,069
Other East Coast Ports	IL	$ 131,00[illegible]	39,067
Other East Coast Ports	MO	$ 107,50[illegible]	362
Other East Coast Ports	GA	$ 80,47[illegible]	18,036
Other East Coast Ports	MI	$ 58,0[illegible]	1,751
Other East Coast Ports	NY	$ 45,2[illegible]	4,369
Other East Coast Ports	TN	$ 42,7[illegible]	6,784
Other East Coast Ports	MN	$ 42,65[illegible]	9,362
Other East Coast Ports	IA	$ 37,41[illegible]	2,927
Other East Coast Ports	PA	$ 32,491	6,281
Other East Coast Ports	NM	$ 28,210	1,667
Other East Coast Ports	CT	$ 13,669	45,267
Other East Coast Ports	AR	$ 12,700	9,264
Other East Coast Ports	WA	$ 11,500	3,289
Imported to Other East Coast Ports		$ 61,724,561	48,259,650
Non-Mexican	FL	$ 7,219,635	700,641
Non-Mexican	LA	$ 2,417,577	19,354,951
Non-Mexican	TX	$ 2,370,073	11,827,002
Non-Mexican		$ 1,186,753	413,692
Non-Mexican	NY	$ 1,097,830	23,712
Non-Mexican	PA	$ 311,061	1,879,546
Non-Mexican	MS	$ 231,840	331,335
Non-Mexican	CA	$ 180,643	15,517
Non-Mexican	NJ	$ 146,310	26,007
Non-Mexican	KY	$ 86,183	2,767
Non-Mexican	NC	$ 72,326	7,760
Non-Mexican	VA	$ 66,890	1,841
Non-Mexican	IL	$ 52,346	8,010
Non-Mexican	GA	$ 47,206	8,060
Non-Mexican	OH	$ 34,776	9,470
Non-Mexican	OR	$ 33,353	1,017
Non-Mexican	SC	$ 32,973	147
Non-Mexican	MI	$ 20,388	170,378
Non-Mexican	PR	$ 7,944	317
Non-Mexican	TN	$ 6,236	2,209
Non-Mexican	WA	$ 4,554	2,771
Imported to Non-Mexican		$ 15,626,897	34,787,150
Total East/Gulf Coasts Exports		$ 1,554,745,732	7,107,564,972

TA.6 TECHNICAL APPENDIX 6
MEXICAN PORT SERVICE AREAS, 1992 IMPORTS

Mexican Port Service Areas, 1992 US Imports
Imported via US East and Gulf Coast Ports

Exporting Mexican Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
West Coast Ports	MI	$ 90,284,842	9,621,248
West Coast Ports	PA	$ 50,287,789	544,373,362
West Coast Ports	TX	$ 30,958,033	242,245,427
West Coast Ports		$ 10,167,568	96,380,243
West Coast Ports	LA	$ 7,568,773	67,581,890
West Coast Ports	CT	$ 6,544,955	39,537,381
West Coast Ports	FL	$ 4,821,093	182,815,569
West Coast Ports	NJ	$ 4,193,464	39,354,536
West Coast Ports	MD	$ 3,522,590	176,438,999
West Coast Ports	NY	$ 2,196,589	161,524,750
West Coast Ports	GA	$ 1,029,000	9,899,701
West Coast Ports	CA	$ 558,500	12,103,000
West Coast Ports	MS	$ 522,907	62,930,793
West Coast Ports	IL	$ 269,121	1,561,492
West Coast Ports	OH	$ 136,490	1,185,811
West Coast Ports	AR	$ 37,500	10,000
West Coast Ports	PR	$ 29,896	4,709
West Coast Ports	TN	$ 28,858	27,391
West Coast Ports	ME	$ 21,600	21,460
Exported from West Coast Ports		$ 213,179,568	1,647,617,762
Dos Bocas	TX	$ 195,847,382	1,953,739,961
Dos Bocas	LA	$ 39,435,293	505,106,110
Dos Bocas	MO	$ 18,734,154	191,555,678
Dos Bocas	PA	$ 8,722,873	67,691,226
Dos Bocas	CA	$ 6,179,804	58,577,317
Dos Bocas	MS	$ 667,353	1,757,665
Exported from Dos Bocas		$ 269,586,859	2,778,427,957
Campeche State	TX	$ 273,765,771	2,706,228,975
Campeche State	LA	$ 216,786,867	2,354,193,594
Campeche State	PA	$ 40,534,653	367,233,094
Campeche State		$ 22,371,642	224,874,562
Campeche State	OK	$ 13,292,095	146,322,725
Campeche State	MS	$ 10,316,926	125,132,014
Campeche State	VA	$ 3,859,363	36,672,029
Campeche State	FL	$ 518,385	193,016
Campeche State	NJ	$ 163,740	6,717
Exported from Campeche State		$ 581,609,442	5,960,856,726
Coatzacoalcos	TX	$ 1,261,703,925	8,851,852,883
Coatzacoalcos	LA	$ 189,298,867	1,516,553,566
Coatzacoalcos	FL	$ 93,640,818	1,169,031,997
Coatzacoalcos		$ 61,110,773	456,127,694
Coatzacoalcos	NC	$ 19,329,662	205,742,190
Coatzacoalcos	PA	$ 16,923,012	136,798,851
Coatzacoalcos	CT	$ 8,732,502	66,952,664
Coatzacoalcos	IN	$ 7,564,422	72,534,080
Coatzacoalcos	NY	$ 6,429,899	53,166,907
Coatzacoalcos	NJ	$ 4,241,702	34,885,493
Coatzacoalcos	GA	$ 3,910,851	49,650,137
Coatzacoalcos	CA	$ 3,160,350	23,792,347

Imported via US East and Gulf Coast Ports

Exporting Mexican Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Coatzacoalcos	MS	$ 932,315	10,024,889
Coatzacoalcos	NH	$ 381,050	38,105,000
Exported from Coatzacoalcos		$ 1,677,360,14[illegible]	12,685,218,698
Cozumel	TX	$ 13,900,69[illegible]	2,411,182,609
Cozumel	LA	$ 2,843,03[illegible]	506,335,888
Cozumel		$ 1,216,792	273,384,400
Cozumel	FL	$ 1,137,45[illegible]	198,992,587
Exported from Cozumel		$ 19,097,9[illegible]	3,389,895,484
Merida	IA	$ 5,608,2[illegible]	119,765
Merida	FL	$ 4,161,4[illegible]	2,107,603
Merida		$ 3,518,7[illegible]	2,057,469
Merida	NJ	$ 3,118,8[illegible]	572,466
Merida	MS	$ 2,627,84[illegible]	3,180,382
Merida	AL	$ 2,222,928	631,145
Merida	TX	$ 1,952,122	653,588
Merida	PA	$ 1,403,804	1,528,907
Merida	CA	$ 1,350,903	194,057
Merida	LA	$ 891,390	570,331
Merida	NC	$ 785,389	549,014
Merida	WA	$ 581,357	119,300
Merida	MN	$ 376,904	426,388
Merida	IL	$ 374,501	397,986
Merida	KS	$ 343,196	90,291
Merida	GA	$ 308,859	108,335
Merida	TN	$ 302,685	129,800
Merida	MA	$ 177,239	125,268
Merida	NY	$ 126,982	172,213
Merida	IN	$ 56,705	60,329
Merida	PR	$ 53,047	54,000
Merida	RI	$ 42,528	43,854
Merida	MO	$ 17,341	18,235
Merida	WI	$ 9,100	2,910
Merida	OR	$ 8,393	5,535
Merida	ME	$ 4,162	3,357
Merida	VA	$ 2,250	210
Exported from Merida		$ 30,426,968	13,922,738
Vera Cruz	MI	$ 102,766,107	10,894,261
Vera Cruz	NY	$ 17,848,391	14,537,635
Vera Cruz	TX	$ 15,609,376	64,198,045
Vera Cruz	LA	$ 15,513,471	17,397,713
Vera Cruz	NJ	$ 7,022,890	14,807,494
Vera Cruz	FL	$ 5,508,752	23,307,413
Vera Cruz	VA	$ 2,566,200	107,468
[illegible]era Cruz	CT	$ 1,553,542	5,206,550
[illegible]era Cruz		$ 1,294,630	3,339,845
[illegible]era Cruz	MN	$ 1,169,332	18,835,892
[illegible]era Cruz	MA	$ 952,693	79,140
[illegible]era Cruz	MD	$ 846,701	11,023,807
[illegible]era Cruz	GA	$ 738,000	10,555,944

Imported via US East and Gulf Coast Ports

Exporting Mexican Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Vera Cruz	PA	$ 344,207	96,822
Vera Cruz	AL	$ 222,196	20,346
Vera Cruz	PR	$ 135,798	29,949
Vera Cruz	KY	$ 46,297	15,125
Vera Cruz	CA	$ 24,724	17,500
Vera Cruz	SC	$ 2,245	2,538
Exported from Vera Cruz		$ 174,165,552	194,473,487
Tuxpan	TX	$ 4,064,535	10,829,180
Tuxpan	CT	$ 324,916	520,000
Exported from Tuxpan		$ 4,389,451	11,349,180
Tampico/Altimira	LA	$ 22,009,165	35,464,995
Tampico/Altimira	FL	$ 18,619,446	67,630,404
Tampico/Altimira		$ 6,544,599	38,361,955
Tampico/Altimira	OH	$ 3,899,674	42,319,306
Tampico/Altimira	NJ	$ 3,150,163	6,132,215
Tampico/Altimira	NY	$ 2,679,614	3,411,340
Tampico/Altimira	TX	$ 1,076,816	2,101,141
Tampico/Altimira	MS	$ 525,444	2,112,306
Tampico/Altimira	PA	$ 513,835	650,210
Tampico/Altimira	IL	$ 353,562	5,178,263
Tampico/Altimira	MD	$ 232,597	2,907,463
Tampico/Altimira	MA	$ 201,830	22,195,258
Tampico/Altimira	PR	$ 90,405	61,811
Tampico/Altimira	IN	$ 50,806	8,150
Tampico/Altimira	VI	$ 9,863	9,274
Exported from Tampico/Altimira		$ 59,957,819	228,544,091
Gulf High Seas	MS	$ 475,986,449	5,256,874,662
Gulf High Seas	GA	$ 5,758,018	198,662
Gulf High Seas		$ 5,571,883	51,718,456
Exported from Gulf High Seas		$ 487,316,350	5,308,791,780
Other East Coast Ports	TX	$ 456,577,777	4,738,651,993
Other East Coast Ports	LA	$ 363,670,458	3,717,927,849
Other East Coast Ports	NJ	$ 288,158,250	2,469,109,369
Other East Coast Ports		$ 38,882,388	321,312,182
Other East Coast Ports	IN	$ 38,247,584	423,518,421
Other East Coast Ports	NC	$ 15,879,822	68,060,508
Other East Coast Ports	CA	$ 11,595,620	76,657,511
Other East Coast Ports	MO	$ 6,525,000	61,236,000
Other East Coast Ports	VA	$ 5,122,166	72,211,728
Other East Coast Ports	AL	$ 4,065,115	9,099,626
Other East Coast Ports	MI	$ 3,546,744	394,967
Other East Coast Ports	FL	$ 3,110,465	15,707,967
Other East Coast Ports	PA	$ 555,098	6,851,340
Other East Coast Ports	NY	$ 351,965	14,792
Other East Coast Ports	PR	$ 71,925	67,930
Other East Coast Ports	GA	$ 9,000	12,439

Mexican Port Service Areas, 1992 US Imports
Imported via US East and Gulf Coast Ports

Exporting Mexican Port	Importing State	Waterborne US Dollar Value	Waterborne Shipping Weight (kg)
Exported from Other East Coast Por		$ 1,236,369,377	11,980,834,622
Non-Mexican	PR	$ 115,203,180	210,734
Non-Mexican	NJ	$ 11,744,181	77,116,141
Non-Mexican		$ 10,738,885	1,438,441
Non-Mexican	MS	$ 9,258,179	35,965,494
Non-Mexican	LA	$ 8,024,916	60,981,130
Non-Mexican	FL	$ 1,946,287	6,610,821
Non-Mexican	TX	$ 1,645,083	9,961,287
Non-Mexican	OH	$ 863,373	4,035,914
Non-Mexican	NY	$ 764,272	81,957
Non-Mexican	VA	$ 275,836	320,570
Non-Mexican	AL	$ 253,783	223,142
Non-Mexican	PA	$ 244,782	44,615
Non-Mexican	GA	$ 115,912	29,172
Non-Mexican	CA	$ 102,513	17,229
Non-Mexican	SC	$ 77,953	19,849
Non-Mexican	KY	$ 52,911	14,372
Non-Mexican	MI	$ 49,492	3,774
Non-Mexican	CO	$ 26,033	129
Non-Mexican	MA	$ 22,754	358
Non-Mexican	IL	$ 19,804	1,746
Non-Mexican	TN	$ 19,152	743
Non-Mexican	OK	$ 14,912	1,615
Non-Mexican	NC	$ 14,026	453
Non-Mexican	IN	$ 7,315	382
Exported from Non-Mexican		$ 161,485,444	197,080,068
Total East/Gulf Coasts Imports		$ 4,914,944,920	44,397,012,593

TA.7 TECHNICAL APPENDIX 7
EXPORT ROUTES TO MEXICO
PETROLEUM AND NON-PETROLEUM PRODUCTS

US Port		Mexican Port	Petroleum Exports US Dollar Value	Petroleum Exports Shipping Weight
Houston	to	Tuxpan	$ 238,292,167	1,109,353,997
West Coast	to	West Coast Ports	$ 212,178,305	1,996,303,298
All Other US	to	West Coast Ports	$ 27,046,883	133,448,771
West Coast	to	Tuxpan	$ 13,497,642	74,550,799
New Orleans	to	Tuxpan	$ 12,312,615	56,822,798
Houston	to	Vera Cruz	$ 11,715,003	48,697,764
Port Arthur	to	Vera Cruz	$ 8,368,131	25,773,561
Port Arthur	to	Tuxpan	$ 6,351,173	31,859,736
New Orleans	to	Tampico/Altimira	$ 5,972,299	66,975,806
All Other US	to	Tuxpan	$ 5,936,702	29,620,717
Mid Atlantic	to	Vera Cruz	$ 5,934,260	15,380,778
Houston	to	Tampico/Altimira	$ 5,214,947	26,503,380
West Coast	to	Unknown	$ 5,143,084	53,181,878
All Other US	to	Tampico/Altimira	$ 4,479,229	12,561,720
All Other US	to	Vera Cruz	$ 3,099,240	6,725,567
Houston	to	Coatzacoalcos	$ 2,233,604	5,815,179
Houston	to	Unknown	$ 1,318,890	7,081,851
Mid Atlantic	to	Tampico/Altimira	$ 399,783	7,525,900
New Orleans	to	Vera Cruz	$ 223,430	1,128,443
Mobile	to	Merida	$ 102,128	517,585
Florida	to	Merida	$ 15,360	6,747
Mobile	to	West Coast Ports	$ 0	32,605,700
Total 1992 US Waterborne Exports of Petroleum to Mexico			$ 569,834,875	3,742,441,975

US Port	Mexican Port	Non-Petrol Exports US Dollar Value	Non-Petrol Exports Shipping Weight
New Orleans	to Merida	$ 127,573,699	721,089,297
New Orleans	to West Coast Ports	$ 115,857,629	846,661,452
New Orleans	to Vera Cruz	$ 88,558,037	567,693,480
Houston	to Tampico/Altimira	$ 77,404,934	209,656,196
Houston	to Tuxpan	$ 57,360,400	91,599,243
New Orleans	to Tampico/Altimira	$ 51,354,656	457,910,838
Houston	to West Coast Ports	$ 46,741,233	415,297,552
Houston	to Coatzacoalcos	$ 43,663,421	114,586,861
Houston	to Vera Cruz	$ 41,257,641	352,154,962
New Orleans	to Tampico/Altimira	$ 40,530,493	137,469,142
Houston	to Vera Cruz	$ 35,908,456	1,459,934
Houston	to Campeche State	$ 22,829,652	6,326,374
Houston	to Tampico/Altimira	$ 22,400,288	211,922,783
New Orleans	to Campeche State	$ 22,250,544	6,004,034
Mobile	to Merida	$ 20,919,396	26,191,456
Florida	to Other East Coast Ports	$ 20,898,962	4,038,401
Houston	to Vera Cruz	$ 18,044,616	48,780,546
Florida	to Merida	$ 17,257,884	2,725,453
Houston	to Coatzacoalcos	$ 17,206,821	155,712,074
Mobile	to Merida	$ 16,871,368	3,522,939
New Orleans	to Coatzacoalcos	$ 16,815,679	133,958,254
Houston	to Vera Cruz	$ 15,692,762	39,403,038
Houston	to Merida	$ 14,364,936	128,377,229
Port Arthur	to Tuxpan	$ 13,891,382	125,980,196
Florida	to Other East Coast Ports	$ 13,029,557	3,859,690
New Orleans	to Vera Cruz	$ 12,859,811	30,204,946
Houston	to Other East Coast Ports	$ 12,079,702	29,034,716
Port Arthur	to Merida	$ 10,099,094	72,661,806
Port Arthur	to Vera Cruz	$ 9,864,551	87,172,237
New Orleans	to Tampico/Altimira	$ 9,573,830	31,626,080
Florida	to West Coast Ports	$ 8,646,747	6,638
Port Arthur	to Tuxpan	$ 7,686,507	22,199,319
Houston	to Tuxpan	$ 6,992,449	41,959,157
New Orleans	to Coatzacoalcos	$ 6,957,830	20,916,555
Southeast	to West Coast Ports	$ 6,633,313	0
West Coast	to West Coast Ports	$ 6,285,782	1,308,116
Florida	to Vera Cruz	$ 6,269,633	1,182,496
Houston	to Dos Bocas	$ 6,231,138	8,630,182
Mobile	to Merida	$ 6,137,534	6,685,913
Port Arthur	to Coatzacoalcos	$ 6,075,174	51,528,300
Florida	to Merida	$ 5,797,739	4,609,830
Mobile	to Dos Bocas	$ 5,405,774	7,062,821
New Orleans	to West Coast Ports	$ 5,279,055	812,963
West Coast	to Unknown	$ 5,137,763	13,122,840
West Coast	to West Coast Ports	$ 4,730,537	11,921,692
Port Arthur	to Tampico/Altimira	$ 4,517,234	40,429,039
Florida	to Unknown	$ 4,513,477	366,977
Mid Atlantic	to Vera Cruz	$ 4,432,195	16,839,036
Mid Atlantic	to Coatzacoalcos	$ 4,428,363	15,438,295
Houston	to Vera Cruz	$ 4,382,725	272,684
Florida	to Other East Coast Ports	$ 4,173,718	2,657,287
Florida	to Vera Cruz	$ 3,877,283	19,713,767
West Coast	to Other East Coast Ports	$ 3,735,017	8,692,604
Florida	to Vera Cruz	$ 3,507,348	3,080,801
Florida	to Vera Cruz	$ 3,411,453	32,483,851

US Port		Mexican Port	Non-Petrol Exports US Dollar Value	Non-Petrol Exports Shipping Weight
Port Arthur	to	West Coast Ports	$ 3,233,605	22,000,000
New Orleans	to	Tuxpan	$ 2,994,343	22,190,893
Florida	to	Other East Coast Ports	$ 2,991,768	1,145,495
Southeast	to	Vera Cruz	$ 2,989,936	106,583
Houston	to	Campeche State	$ 2,959,979	1,924,023
All Other US	to	Tampico/Altimira	$ 2,950,153	1,149,856
Port Arthur	to	Tampico/Altimira	$ 2,949,645	25,239,805
Florida	to	Unknown	$ 2,926,163	327,601
Mobile	to	Merida	$ 2,898,580	1,576,287
Florida	to	Other East Coast Ports	$ 2,889,875	2,996,868
All Other US	to	Vera Cruz	$ 2,689,328	3,232,322
New Orleans	to	Merida	$ 2,684,601	6,058,960
Florida	to	Merida	$ 2,660,382	11,778,268
Mobile	to	Vera Cruz	$ 2,654,109	8,473,940
All Other US	to	Vera Cruz	$ 2,600,113	556,764
Florida	to	Merida	$ 2,499,997	2,281,663
New Orleans	to	Merida	$ 2,405,097	23,889,657
Florida	to	Other East Coast Ports	$ 2,378,599	995,417
New Orleans	to	Cozumel	$ 2,369,681	364,523
All Other US	to	Tampico/Altimira	$ 2,294,171	177,882
West Coast	to	West Coast Ports	$ 2,288,115	9,616,301
Mobile	to	Tampico/Altimira	$ 2,262,419	5,262,653
New Orleans	to	Unknown	$ 2,187,478	19,272,725
Mobile	to	Merida	$ 2,144,396	9,148,622
Florida	to	West Coast Ports	$ 2,121,820	26,215,435
Northeast	to	West Coast Ports	$ 2,120,109	25,776,400
Northeast	to	Vera Cruz	$ 2,072,366	23,039,100
New Orleans	to	Tampico/Altimira	$ 2,034,775	4,999,447
Houston	to	Campeche State	$ 1,894,397	156,431
Southeast	to	Vera Cruz	$ 1,682,083	634,694
Houston	to	West Coast Ports	$ 1,671,546	536,899
West Coast	to	West Coast Ports	$ 1,627,628	1,583,664
New Orleans	to	Vera Cruz	$ 1,571,842	75,567
West Coast	to	West Coast Ports	$ 1,538,173	601,483
West Coast	to	West Coast Ports	$ 1,491,261	27,498,832
Florida	to	Coatzacoalcos	$ 1,467,574	10,543,673
Southeast	to	Vera Cruz	$ 1,434,727	660,136
Houston	to	Coatzacoalcos	$ 1,415,048	2,836,880
Florida	to	Cozumel	$ 1,391,361	78,456
Florida	to	Tuxpan	$ 1,365,331	0
West Coast	to	Unknown	$ 1,342,330	7,422,678
New Orleans	to	Tuxpan	$ 1,341,777	1,534,691
Southeast	to	Other East Coast Ports	$ 1,315,894	3,147,986
Port Arthur	to	Campeche State	$ 1,307,526	748,632
New Orleans	to	Other East Coast Ports	$ 1,277,972	152,502
Mobile	to	Coatzacoalcos	$ 1,261,384	1,684,707
Houston	to	Vera Cruz	$ 1,254,166	528,092
New Orleans	to	Tampico/Altimira	$ 1,220,550	755,483
West Coast	to	Tampico/Altimira	$ 1,201,285	3,801,147
Mobile	to	Dos Bocas	$ 1,088,888	848,419
Florida	to	West Coast Ports	$ 1,073,307	4,881,863
New Orleans	to	Vera Cruz	$ 1,004,185	1,631,942
Florida	to	Unknown	$ 996,731	199,794
Florida	to	Merida	$ 979,064	957,498
Mid Atlantic	to	Unknown	$ 948,954	12,412

US Port	Mexican Port	Non-Petrol Exports US Dollar Value	Non-Petrol Exports Shipping Weight
All Other US	to West Coast Ports	$ 926,115	0
New Orleans	to Vera Cruz	$ 894,075	207,594
Houston	to West Coast Ports	$ 878,601	2,569,249
Houston	to Tampico/Altimira	$ 824,538	414,740
Mobile	to Vera Cruz	$ 799,465	499,000
Florida	to Vera Cruz	$ 789,643	2,101,263
All Other US	to Tampico/Altimira	$ 757,704	700,691
All Other US	to Vera Cruz	$ 756,174	245,981
Northeast	to Vera Cruz	$ 693,709	1,926,982
Houston	to Unknown	$ 682,341	4,705,000
Southeast	to Tuxpan	$ 674,000	2,099,673
New Orleans	to Dos Bocas	$ 632,425	988,419
Mobile	to West Coast Ports	$ 576,815	869,316
Florida	to West Coast Ports	$ 570,025	72,401
Mid Atlantic	to Tampico/Altimira	$ 517,998	816,775
Florida	to Cozumel	$ 502,563	222,799
New Orleans	to Dos Bocas	$ 491,448	510,035
Houston	to Unknown	$ 474,166	52,416
Southeast	to Vera Cruz	$ 446,043	354,322
Mobile	to Tampico/Altimira	$ 445,201	1,590,454
Mid Atlantic	to Vera Cruz	$ 442,695	103,433
Florida	to Coatzacoalcos	$ 429,693	59,308
West Coast	to Unknown	$ 397,420	64,624
New Orleans	to Merida	$ 389,290	1,306,259
Florida	to Cozumel	$ 367,935	34,579
All Other US	to Vera Cruz	$ 359,201	72,414
Mobile	to Unknown	$ 314,579	492,027
Mobile	to Dos Bocas	$ 312,032	139,314
Southeast	to Tampico/Altimira	$ 296,926	83,819
Port Arthur	to Tuxpan	$ 293,771	34,665
New Orleans	to Dos Bocas	$ 281,443	510,138
New Orleans	to Dos Bocas	$ 267,418	220,920
West Coast	to Unknown	$ 265,393	231,843
Port Arthur	to Vera Cruz	$ 242,295	523,353
Mobile	to Dos Bocas	$ 241,264	36,558
All Other US	to Tampico/Altimira	$ 237,021	17,387
Mobile	to Other East Coast Ports	$ 227,508	70,216
Florida	to Merida	$ 220,846	129,091
Houston	to West Coast Ports	$ 218,856	43,621
Mid Atlantic	to West Coast Ports	$ 197,047	2,985,561
Houston	to Merida	$ 179,744	69,591
All Other US	to West Coast Ports	$ 171,485	500
New Orleans	to Unknown	$ 169,672	35,359
New Orleans	to Tuxpan	$ 164,887	210,015
Mobile	to Unknown	$ 161,827	26,662
Southeast	to Unknown	$ 158,509	10,527
Mobile	to Unknown	$ 157,015	9,092
New Orleans	to Campeche State	$ 156,399	1,993
Mid Atlantic	to Unknown	$ 155,981	127,047
Mobile	to Tampico/Altimira	$ 151,514	3,049,000
Mid Atlantic	to Unknown	$ 143,808	1,749,914
Mobile	to Coatzacoalcos	$ 143,264	8,154
Port Arthur	to Other East Coast Ports	$ 141,145	17,233
West Coast	to Other East Coast Ports	$ 138,885	40,159
All Other US	to Vera Cruz	$ 134,889	44,595

US Port	Mexican Port	Non-Petrol Exports US Dollar Value	Non-Petrol Exports Shipping Weight
Florida to	Campeche State	$ 125,000	191,801
Florida to	Unknown	$ 121,084	28,080
Mobile to	Coatzacoalcos	$ 117,893	101,603
West Coast to	Unknown	$ 109,321	94,551
Florida to	Tampico/Altimira	$ 95,000	66,000
All Other US to	West Coast Ports	$ 94,420	95,311
West Coast to	Tampico/Altimira	$ 90,605	251,896
Southeast to	Vera Cruz	$ 84,687	33,626
Florida to	West Coast Ports	$ 82,564	78,368
Southeast to	Other East Coast Ports	$ 73,028	46,881
New Orleans to	Campeche State	$ 72,917	73,660
Mobile to	West Coast Ports	$ 70,965	6,956
All Other US to	Other East Coast Ports	$ 69,692	9,979
All Other US to	Tampico/Altimira	$ 68,000	43,932
Mobile to	West Coast Ports	$ 67,417	121,052
New Orleans to	Unknown	$ 63,973	47,561
New Orleans to	Other East Coast Ports	$ 61,312	17,630
Mobile to	Other East Coast Ports	$ 59,628	2,364
Southeast to	Tampico/Altimira	$ 57,896	51,682
Florida to	Cozumel	$ 50,553	4,844
Houston to	Other East Coast Ports	$ 49,436	11,033
Houston to	Unknown	$ 48,584	42,509
New Orleans to	Merida	$ 47,058	16,474
Mobile to	Other East Coast Ports	$ 38,250	0
Houston to	Coatzacoalcos	$ 36,100	12,049
New Orleans to	Campeche State	$ 34,000	226,799
Houston to	Unknown	$ 32,765	10,873
Houston to	Tampico/Altimira	$ 32,498	3,317
Mobile to	Merida	$ 31,548	18,666
Florida to	Unknown	$ 31,256	18,796
Port Arthur to	Campeche State	$ 30,000	47,628
Mobile to	Other East Coast Ports	$ 28,208	61,356
Mid Atlantic to	Tampico/Altimira	$ 22,790	20,550
Mid Atlantic to	Tampico/Altimira	$ 19,533	24,070
Houston to	Campeche State	$ 19,218	0
Mobile to	Coatzacoalcos	$ 18,168	17,310
Florida to	Tampico/Altimira	$ 17,967	2,065
Mobile to	Merida	$ 17,528	163,820
West Coast to	Vera Cruz	$ 15,000	8,709
New Orleans to	Dos Bocas	$ 12,967	3,818
Southeast to	West Coast Ports	$ 12,669	3,600
New Orleans to	Campeche State	$ 10,825	1,761
Mid Atlantic to	Unknown	$ 10,194	169,918
Houston to	Unknown	$ 9,450	9
Florida to	Dos Bocas	$ 6,650	363
Mid Atlantic to	Merida	$ 6,136	22,517
Houston to	Coatzacoalcos	$ 5,600	6,613
Houston to	Other East Coast Ports	$ 5,000	907
All Other US to	Unknown	$ 5,000	1,751
New Orleans to	Other East Coast Ports	$ 4,999	3,668
West Coast to	Unknown	$ 4,657	19,277
New Orleans to	Cozumel	$ 4,470	6,056
Mobile to	Dos Bocas	$ 4,158	4,899
New Orleans to	Vera Cruz	$ 4,028	1,723
West Coast to	Other East Coast Ports	$ 3,666	156

US Port	Mexican Port	Non-Petrol Exports US Dollar Value	Non-Petrol Exports Shipping Weight
Florida to	Cozumel	$ 3,400	4,343
West Coast to	West Coast Ports	$ 2,600	2,271
Total 1992 US Waterborne Exports of Non-Petroleum to Mexico		$ 1,300,810,846	5,764,147,955

TA.8 TECHNICAL APPENDIX 8
IMPORT ROUTES FROM MEXICO
PETROLEUM AND NON-PETROLEUM PRODUCTS

US Port	Mexican Port	Petroleum Imports US Dollar Value	Petroleum Imports Shipping Weight
Houston	from Coatzacoalcos	$ 507,782,471	3,686,764,830
New Orleans	from Coatzacoalcos	$ 498,825,151	3,657,065,270
New Orleans	from Other East Coast Ports	$ 484,417,261	4,937,404,634
Mobile	from Gulf High Seas	$ 481,208,648	5,308,580,829
Port Arthur	from Coatzacoalcos	$ 421,829,373	2,901,410,953
New Orleans	from Campeche State	$ 395,008,863	4,254,548,751
Houston	from Other East Coast Ports	$ 379,290,910	4,036,100,737
Mid Atlantic	from Other East Coast Ports	$ 309,121,973	2,623,963,460
Houston	from Dos Bocas	$ 204,316,836	2,002,205,444
Houston	from Campeche State	$ 124,734,189	1,117,241,787
All Other US	from Other East Coast Ports	$ 65,094,287	488,467,803
Mid Atlantic	from West Coast Ports	$ 61,769,638	592,426,107
New Orleans	from Dos Bocas	$ 49,699,993	648,196,305
Mid Atlantic	from Campeche State	$ 40,534,653	367,233,094
Mobile	from Coatzacoalcos	$ 36,418,994	400,889,947
All Other US	from Coatzacoalcos	$ 31,371,073	174,130,768
Mid Atlantic	from Coatzacoalcos	$ 30,935,027	244,125,437
Port Arthur	from Other East Coast Ports	$ 28,164,558	198,524,704
West Coast	from West Coast Ports	$ 25,745,528	283,333,226
Houston	from West Coast Ports	$ 19,423,291	219,254,765
Mid Atlantic	from Unknown	$ 11,462,422	76,994,259
Mobile	from Campeche State	$ 10,316,926	125,132,014
Florida	from Coatzacoalcos	$ 9,356,832	48,349,596
Northeast	from Coatzacoalcos	$ 8,732,502	66,952,664
Mid Atlantic	from Dos Bocas	$ 8,722,873	67,691,226
New Orleans	from Unknown	$ 7,770,737	60,807,649
New Orleans	from West Coast Ports	$ 6,297,221	57,349,568
Port Arthur	from Dos Bocas	$ 6,179,804	58,577,317
Port Arthur	from Campeche State	$ 5,775,304	58,682,935
Southeast	from Other East Coast Ports	$ 5,122,166	72,211,728
All Other US	from West Coast Ports	$ 4,885,639	32,115,290
Northeast	from West Coast Ports	$ 4,870,955	26,243,448
Mid Atlantic	from Tampico/Altimira	$ 4,753,333	26,701,643
Southeast	from Campeche State	$ 3,859,363	36,672,029
Houston	from Vera Cruz	$ 1,842,158	4,048,982
Houston	from Unknown	$ 1,473,227	9,912,180
All Other US	from Tampico/Altimira	$ 4,600	158
Total 1992 US Waterborne Imports of Petroleum from Mexico		$ 4,297,118,779	38,970,311,537

US Port	Mexican Port	Non-Petrol Imports US Dollar Value	Non-Petrol Imports Shipping Weight
Florida	from Unknown	$ 124,913,167	230,806
All Other US	from West Coast Ports	$ 83,751,037	67,321
Mid Atlantic	from Vera Cruz	$ 71,624,794	7,642,364
Mid Atlantic	from West Coast Ports	$ 66,437,982	7,072,234
Houston	from Coatzacoalcos	$ 48,574,152	169,207,532
Florida	from Coatzacoalcos	$ 48,543,283	745,961,574
West Coast	from West Coast Ports	$ 45,381,847	162,026,082
West Coast	from West Coast Ports	$ 40,792,161	2,947,725,226
Florida	from Coatzacoalcos	$ 34,917,863	396,047,429
New Orleans	from Tampico/Altimira	$ 26,741,526	39,863,014
Mobile	from Merida	$ 23,491,669	9,745,320
Houston	from Vera Cruz	$ 21,769,062	2,428,589
West Coast	from Other East Coast Ports	$ 20,284,377	2,089,803
Mobile	from Tampico/Altimira	$ 19,666,879	72,850,052
Southeast	from Coatzacoalcos	$ 18,506,986	239,120,289
Houston	from West Coast Ports	$ 17,842,714	1,904,871
Southeast	from Other East Coast Ports	$ 15,879,822	68,060,508
New Orleans	from Vera Cruz	$ 15,743,157	17,117,142
West Coast	from West Coast Ports	$ 15,196,210	74,340,746
Houston	from Vera Cruz	$ 12,814,531	48,711,162
Mid Atlantic	from Vera Cruz	$ 12,811,222	38,635,956
Southeast	from Vera Cruz	$ 12,752,296	10,283,875
Southeast	from West Coast Ports	$ 12,700,955	1,346,798
Houston	from Cozumel	$ 8,664,231	1,644,077,489
Mobile	from Unknown	$ 8,536,043	26,290,085
West Coast	from Unknown	$ 8,200,239	36,885,693
West Coast	from Unknown	$ 7,981,202	1,098,194
All Other US	from Vera Cruz	$ 7,837,797	1,330,996
Northeast	from Vera Cruz	$ 7,374,841	796,515
West Coast	from Merida	$ 7,244,123	50,866,568
Southeast	from Coatzacoalcos	$ 6,642,131	37,074,259
Houston	from West Coast Ports	$ 6,457,349	16,116,147
All Other US	from West Coast Ports	$ 6,325,573	32,393,910
West Coast	from Vera Cruz	$ 6,320,918	643,510
Mobile	from Gulf High Seas	$ 6,107,702	210,951
Mid Atlantic	from West Coast Ports	$ 5,221,696	182,370,984
All Other US	from Tampico/Altimira	$ 5,073,818	2,013,641
New Orleans	from Cozumel	$ 4,950,032	959,389,582
New Orleans	from Tampico/Altimira	$ 4,319,742	51,850,047
Mobile	from Other East Coast Ports	$ 4,163,909	9,323,114
Houston	from Tuxpan	$ 4,064,535	10,829,180
Florida	from Vera Cruz	$ 3,870,730	1,436,935
Houston	from Vera Cruz	$ 3,824,781	28,106,228
Southeast	from Vera Cruz	$ 3,643,009	382,472
Northeast	from Other East Coast Ports	$ 3,546,744	394,967
West Coast	from Unknown	$ 3,185,686	280,227
West Coast	from West Coast Ports	$ 3,030,634	37,122,584
New Orleans	from West Coast Ports	$ 2,942,671	23,525,055
New Orleans	from Other East Coast Ports	$ 2,610,918	23,000,209
Mobile	from Coatzacoalcos	$ 2,575,425	10,967,185
All Other US	from Vera Cruz	$ 2,525,938	790,014
New Orleans	from West Coast Ports	$ 2,407,704	164,226,851
Florida	from Merida	$ 2,381,699	1,703,692
Houston	from Other East Coast Ports	$ 2,300,361	4,238,055
Southeast	from West Coast Ports	$ 2,124,503	109,146,501

US Port	Mexican Port	Non-Petrol Imports US Dollar Value	Non-Petrol Imports Shipping Weight
Florida	from Merida	$ 2,047,340	1,539,935
Houston	from Cozumel	$ 1,903,021	2,498,796
Houston	from Vera Cruz	$ 1,890,018	1,614,028
All Other US	from Tampico/Altimira	$ 1,881,824	2,792,172
Florida	from West Coast Ports	$ 1,870,917	1,557,464
Port Arthur	from Cozumel	$ 1,704,840	388,048,130
New Orleans	from Coatzacoalcos	$ 1,648,960	27,099,845
West Coast	from West Coast Ports	$ 1,437,287	501,016
Florida	from Cozumel	$ 1,423,505	255,424,910
West Coast	from Dos Bocas	$ 1,421,631	5,486,635
Florida	from West Coast Ports	$ 1,416,101	106,581,928
Southeast	from Unknown	$ 1,379,923	10,686,842
New Orleans	from Tampico/Altimira	$ 1,363,955	4,293,030
All Other US	from Tampico/Altimira	$ 1,312,666	957,521
Florida	from Unknown	$ 1,243,213	6,516,271
West Coast	from West Coast Ports	$ 1,165,269	572,886
Florida	from Unknown	$ 1,160,016	108,448
All Other US	from Tampico/Altimira	$ 1,095,268	529,295
Florida	from Vera Cruz	$ 1,037,588	20,895,100
All Other US	from Vera Cruz	$ 1,025,181	1,712,726
West Coast	from Unknown	$ 990,947	57,318,885
West Coast	from Vera Cruz	$ 871,630	7,752,510
Mobile	from Merida	$ 863,055	197,264
All Other US	from Tampico/Altimira	$ 839,958	194,837
Southeast	from Vera Cruz	$ 738,000	10,555,944
Florida	from Vera Cruz	$ 690,273	341,487
Florida	from Merida	$ 689,783	296,513
Southeast	from Unknown	$ 686,054	4,000,000
Houston	from Campeche State	$ [illegible]	[illegible]
Mobile	from Dos Bocas	$ [illegible]	[illegible]
West Coast	from West Coast Ports	$ [illegible]	368,520
Houston	from Tampico/Altimira	$ 655,480	1,904,584
Southeast	from Tampico/Altimira	$ 651,744	4,000,000
Houston	from Tampico/Altimira	$ 564,190	40,677
Houston	from Vera Cruz	$ 542,299	557,833
Mid Atlantic	from Unknown	$ 536,005	137,416
Florida	from Campeche State	$ 518,385	193,016
Mid Atlantic	from Coatzacoalcos	$ 471,259	8,274,000
All Other US	from Vera Cruz	$ 459,859	345,498
Mid Atlantic	from Unknown	$ 447,572	49,138
Mobile	from Coatzacoalcos	$ 433,370	5,740,001
Mobile	from Merida	$ 421,448	146,045
All Other US	from Tampico/Altimira	$ 416,631	35,011
Florida	from West Coast Ports	$ 415,860	75,340,821
Mobile	from Cozumel	$ 408,413	140,006,550
All Other US	from Coatzacoalcos	$ 400,630	3,008,016
Southeast	from Unknown	$ 399,507	25,501
All Other US	from Other East Coast Ports	$ 397,803	192,720
Mid Atlantic	from Other East Coast Ports	$ 391,795	6,350,000
Mid Atlantic	from Other East Coast Ports	$ 389,111	16,038
Mid Atlantic	from Coatzacoalcos	$ 381,050	38,105,000
Southeast	from Other East Coast Ports	$ 369,600	320,000
Florida	from Vera Cruz	$ 342,591	184,706
Houston	from Tuxpan	$ 324,916	520,000
All Other US	from West Coast Ports	$ 317,292	55,891,000

US Port		Mexican Port	Non-Petrol Imports US Dollar Value	Non-Petrol Imports Shipping Weight
New Orleans	from	Coatzacoalcos	$ 310,742	1,050,894
Florida	from	Vera Cruz	$ 309,120	104,250
All Other US	from	Merida	$ 297,673	34,868
Mobile	from	West Coast Ports	$ 265,748	1,318,334
All Other US	from	Merida	$ 261,803	321,700
Florida	from	Vera Cruz	$ 260,234	381,611
Port Arthur	from	Coatzacoalcos	$ 257,693	1,001,561
Mobile	from	West Coast Ports	$ 257,159	61,612,459
Mobile	from	Unknown	$ 253,703	223,142
West Coast	from	Unknown	$ 250,392	78,150
Mid Atlantic	from	Tampico/Altimira	$ 232,597	2,907,463
New Orleans	from	Other East Coast Ports	$ 228,303	627,175
Houston	from	Unknown	$ 217,049	73,784
Florida	from	Coatzacoalcos	$ 216,884	10,432
New Orleans	from	Tampico/Altimira	$ 213,183	1,503,180
Northeast	from	Tampico/Altimira	$ 201,830	22,195,258
All Other US	from	Unknown	$ 200,747	20,604
All Other US	from	Merida	$ 188,199	321,448
Houston	from	Tampico/Altimira	$ 180,079	182,904
New Orleans	from	West Coast Ports	$ 180,000	44,452
All Other US	from	Vera Cruz	$ 178,549	127,737
Mid Atlantic	from	Unknown	$ 176,855	7,645
Florida	from	Merida	$ 164,045	23,924
Houston	from	Unknown	$ 164,036	100,891
Mobile	from	Campeche State	$ 163,740	6,717
Mobile	from	Merida	$ 158,653	206,050
New Orleans	from	Unknown	$ 151,433	498,134
All Other US	from	Unknown	$ 149,263	5,907
Florida	from	Other East Coast Ports	$ 138,588	115,662
Houston	from	Unknown	$ 136,964	36,529
Florida	from	Tampico/Altimira	$ 131,474	[illegible]
Florida	from	Vera Cruz	$ 127,078	57,611
Mid Atlantic	from	Unknown	$ 125,243	61,148
Florida	from	West Coast Ports	$ 117,409	85,989
Mobile	from	Merida	$ 116,501	16,794
Florida	from	Other East Coast Ports	$ 113,480	83,416
All Other US	from	Merida	$ 98,847	34,929
Southeast	from	Vera Cruz	$ 92,102	136,347
Florida	from	Unknown	$ 85,718	87,830
West Coast	from	Tampico/Altimira	$ 81,381	21,508
Mobile	from	Unknown	$ 79,795	179,570
West Coast	from	Tampico/Altimira	$ 78,534	15,389
Mid Atlantic	from	Tampico/Altimira	$ 70,333	54,340
Florida	from	Tampico/Altimira	$ 63,690	102,082
Mid Atlantic	from	West Coast Ports	$ 63,330	20,866
Florida	from	Merida	$ 62,225	39,946
Florida	from	Tampico/Altimira	$ 59,600	42,000
West Coast	from	Unknown	$ 59,252	35,958
Houston	from	West Coast Ports	$ 50,130	42,779
New Orleans	from	Tampico/Altimira	$ 45,000	1,528
All Other US	from	West Coast Ports	$ 43,351	25,988
Houston	from	Cozumel	$ 39,674	450,000
Houston	from	Vera Cruz	$ 39,561	35,895
New Orleans	from	Unknown	$ 36,807	43,688
Houston	from	Other East Coast Ports	$ 34,516	41,080

US Port	Mexican Port	Non-Petrol Imports US Dollar Value	Non-Petrol Imports Shipping Weight
Houston	from Other East Coast Ports	$ 33,491	37,554
Mobile	from West Coast Ports	$ 28,858	27,391
Mobile	from Merida	$ 27,412	5,634
Mid Atlantic	from Vera Cruz	$ 23,862	15,917
Florida	from Unknown	$ 21,281	7,736
West Coast	from Unknown	$ 21,275	1,999
Northeast	from Unknown	$ 18,739	255
Florida	from Other East Coast Ports	$ 18,000	1,000
All Other US	from Tampico/Altimira	$ 17,508	4,789
Southeast	from Tampico/Altimira	$ 17,045	14,740
Mid Atlantic	from West Coast Ports	$ 14,496	750
New Orleans	from Campeche State	$ 14,400	136,080
Florida	from Other East Coast Ports	$ 12,400	10,452
West Coast	from Other East Coast Ports	$ 12,383	16,711
West Coast	from Other East Coast Ports	$ 11,907	5,000
New Orleans	from Other East Coast Ports	$ 8,463	6,620
Northeast	from Tampico/Altimira	$ 7,271	8,318
Florida	from Other East Coast Ports	$ 7,108	2,531
Florida	from Tampico/Altimira	$ 6,795	1,265
Houston	from Other East Coast Ports	$ 5,900	978
Florida	from Tampico/Altimira	$ 5,216	2,155
New Orleans	from Unknown	$ 5,215	469
West Coast	from Tampico/Altimira	$ 4,971	2,084
Florida	from Cozumel	$ 4,226	27
New Orleans	from West Coast Ports	$ 2,881	1,200
Port Arthur	from Tampico/Altimira	$ 2,592	956
New Orleans	from Unknown	$ 2,400	77
Mobile	from Tampico/Altimira	$ 2,350	1,500
Southeast	from Unknown	$ 2,320	575
Southeast	from Vera Cruz	$ 2,245	2,538
West Coast	from Tampico/Altimira	$ 1,905	435
Florida	from Merida	$ 1,588	1,050
Florida	from Merida	$ 1,550	571
Houston	from Tampico/Altimira	$ 1,483	45
Northeast	from Tampico/Altimira	$ 432	1
Total 1992 US Waterborne Imports of Non-Petroleum from Mexico		$ 1,024,715,784	9,893,157,268

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