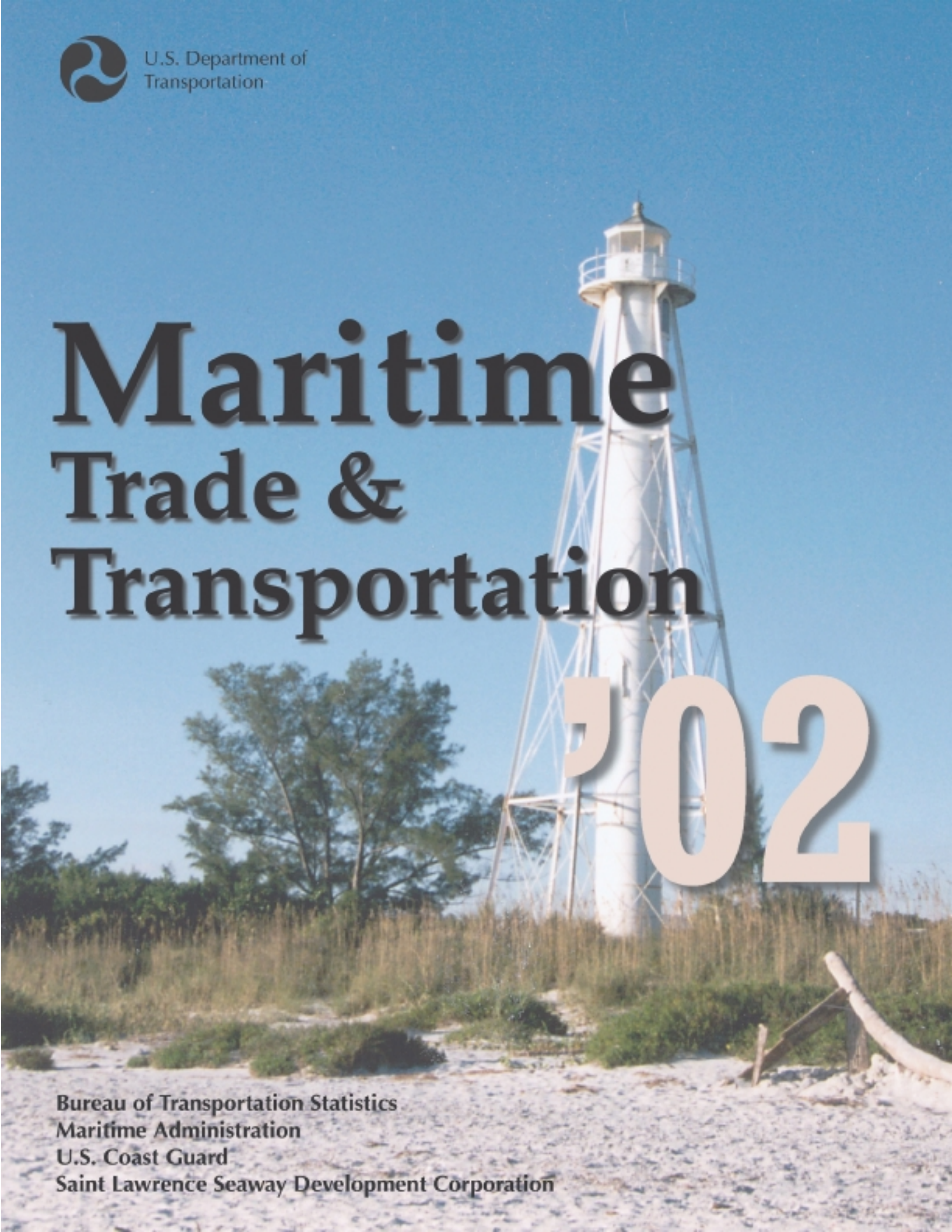

U.S. Department of Transportation

# Maritime Trade & Transportation '02

Bureau of Transportation Statistics
Maritime Administration
U.S. Coast Guard
Saint Lawrence Seaway Development Corporation

U.S. Department of
Transportation

# Maritime Trade & Transportation '02

**Bureau of Transportation Statistics**
**Maritime Administration**
**U.S. Coast Guard**
**Saint Lawrence Seaway Development Corporation**

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# Foreword

The Marine Transportation System (MTS) contributes to U.S. economic growth, enhances U.S. global competitiveness, and supports national security objectives. The MTS consists of an extensive network of waterways, ports, and their intermodal connectors, vessels, vehicles, and system users. Each component of this system is dependent on the other for the smooth and efficient flow of waterborne trade, transportation, and U.S. foreign and domestic commerce. The aftermath of September 11 has emphasized even more the importance of the efficiency, safety, and security of the entire U.S. transportation system.

This report is a cooperative effort of the members of the Maritime Data Group sponsored by the Bureau of Transportation Statistics. Members of the group are the Maritime Administration, the U.S. Coast Guard, the Bureau of Transportation Statistics, the U.S. Army Corps of Engineers, the Saint Lawrence Seaway Development Corporation, and the National Oceanic and Atmospheric Administration. This report is a summary update of the first *Maritime Trade and Transportation* report released in 2000 and is the result of an ongoing effort by the Maritime Data Group to provide quality, timely, comprehensive, and relevant maritime-related statistics and information to all levels of federal, state, and local government and to private industry.

This report provides an update on major trends in maritime trade, transportation, and shipbuilding, and includes special reports on the Saint Lawrence Seaway and on maritime transport and the environment. The data in this report are grouped to reflect U.S. Department of Transportation strategic goals related to mobility, economic growth, safety and environment, and national security.

| Ashish K. Sen | Capt. William G. Schubert | Adm. James M. Loy | Albert S. Jacquez |
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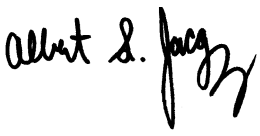
|  |  |  |  |
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# Table of Contents

# Waterborne Trade and Transportation Services

USCG

The U.S. water transportation services industry comprises companies that carry freight or passengers on the open seas, the Great Lakes, or U.S. inland waterways as well as companies that offer lighterage[1] and towing services, operate canals and terminals, and companies that charter vessels and handle cargo. The major segments of the industry are domestic and international freight transportation, passenger transportation, and port and cargo handling services. The data in this chapter portray global trends in vessel types, average length of haul, earnings, and the world fleet. The tables also highlight water-industry trends in freight transportation and passenger travel through 2000. Finally, data on port facilities, locations, port calls, and financing are shown.

[1]Lighterage is the carriage of goods by a lighter (a ship or barge used to load or unload a vessel) and charges assessed therefrom.

Table 1-1
**Global Trade Growth v. Fleet Growth**

| | 1996 | 1997 | 1998 | 1999 | 2000 | Compound annual growth 1996–00 |
|---|---|---|---|---|---|---|
| **Trade (million metric tons)** | | | | | | |
| Dry bulk[a] | 1,816 | 1,901 | 1,871 | 1,867 | 1,987 | 2.3 |
| Tanker | 2,022 | 2,112 | 2,146 | 2,131 | 2,216 | 2.3 |
| General cargo | 1,182 | 1,260 | 1,313 | 1,356 | 1,429 | 5.0 |
| Container | 462 | 503 | 529 | 583 | 641 | 9.0 |
| Other general cargo | 720 | 757 | 784 | 773 | 788 | 2.3 |
| **Total** | **5,020** | **5,273** | **5,330** | **5,354** | **5,632** | **3.0** |
| **Fleet (million deadweight tons[b])** | | | | | | |
| Dry bulk[a] | 243 | 253 | 264 | 264 | 267 | 2.4 |
| Tanker | 287 | 291 | 296 | 303 | 307 | 1.7 |
| General cargo | 107 | 109 | 114 | 119 | 122 | 3.3 |
| Container | 45 | 50 | 57 | 62 | 65 | 9.6 |
| Other general cargo | 62 | 59 | 57 | 57 | 57 | –-2.1 |
| **Total** | **637** | **653** | **674** | **686** | **696** | **2.2** |

[a]Iron ore, coal, grain, bauxite/aluminum, phosphorus rock and minor bulk.

[b]Cargo carrying capacity of a ship when immersed to the appropriate load line, measured in metric tons.

SOURCE: Clarkson Shipping Review & Outlook, spring 2000.

- Between 1996 and 2000, global trade growth (metric tons) exceeded global fleet growth (deadweight tons). The apparent improvement in fleet productivity reflects an acceleration in delivery of newly built ships, which are more productive than the vessels they replace, and the increasing use of dedicated car carriers and Roll on/Roll off vessels.

Table 1-2
**Top Five Vessel Sharing Agreements as of Feb. 1, 2001**

| | Carriers[a] | Vessels | TEUs |
|---|---|---|---|
| Grand Alliance | 14 | 117 | 500,063 |
| New World Alliance | 8 | 86 | 340,456 |
| Cosco | 9 | 77 | 200,654 |
| Maersk Sealand | 12 | 68 | 183,676 |
| CMA-CGM | 8 | 73 | 171,944 |
| **Total of top five** | **51** | **421** | **1,396,793** |
| **Total sharing agreements** | | **1,867** | **3,625,690** |

[a]Includes regional partners.

KEY: TEU = Twenty-foot equivalent unit.

SOURCE: MDS Transmodal, Containership Databank (Chester, England: February 2001).

- As of February 1, 2001, 39 percent of the world shared containership capacity was involved in the top five vessel sharing agreements.

Table 1-3
**World Ranking of Top 15 Containership Carriers, by TEUs Operated on Known Route Deployment as of May 2001**

| | Owned | | Chartered | | Total | |
|---|---|---|---|---|---|---|
| **Carrier** | **Ships** | **TEUs[a]** | **Ships** | **TEUs** | **Ships** | **TEUs** |
| Maersk SeaLand | 117 | 415,424 | 151 | 239,830 | 268 | 655,254 |
| P&O Nedlloyd | 60 | 208,113 | 81 | 161,102 | 141 | 369,215 |
| MSC | 83 | 171,626 | 65 | 118,382 | 148 | 290,008 |
| APL | 41 | 140,719 | 52 | 107,939 | 93 | 248,658 |
| Cosco | 107 | 193,402 | 15 | 24,360 | 122 | 217,762 |
| Evergreen | 56 | 194,324 | 7 | 14,278 | 63 | 208,602 |
| Hanjin | 20 | 89,738 | 30 | 89,234 | 50 | 178,972 |
| CMA-CGM | 14 | 39,438 | 47 | 119,145 | 61 | 158,583 |
| K-Line | 23 | 68,369 | 39 | 84,606 | 62 | 152,975 |
| NYK | 37 | 95,221 | 32 | 53,768 | 69 | 148,989 |
| Mitsui OSK | 27 | 89,525 | 30 | 55,407 | 57 | 144,932 |
| OOCL | 20 | 83,512 | 28 | 60,518 | 48 | 144,030 |
| Hyundai | 19 | 73,307 | 19 | 67,682 | 38 | 140,989 |
| CSCL | 27 | 15,864 | 47 | 111,119 | 74 | 126,983 |
| Yangming | 26 | 89,573 | 19 | 36,662 | 45 | 126,235 |
| **Total** | **677** | **1,968,155** | **662** | **1,344,032** | **1,339** | **3,312,187** |
| **World total** | | | | | **7,119** | **7,032,886** |

[a]TEU = Twenty-foot equivalent units.

SOURCE: Containerisation International, CI-online, www.CI-online.co.uk as of May 2001.

- The top 15 carriers operate 47 percent of existing world full containership capacity expressed in TEUs.
- Maersk SeaLand fleet operates 9.3 percent of existing world containership TEU capacity.

Table 1-4
**Top 20 Ranking of World Merchant Fleet by Country of Registry as of January 1, 2001[a]**

| | Tanker | | Dry bulk | | Container | | Other[b] | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) |
| Panama[c] | 1,089 | 57,641 | 1,379 | 81,447 | 500 | 14,578 | 1,689 | 14,385 | 4,657 | 168,052 |
| Liberia[c] | 592 | 44,256 | 370 | 22,676 | 229 | 6,956 | 307 | 4,814 | 1,498 | 78,703 |
| Malta[c] | 350 | 21,502 | 437 | 18,238 | 50 | 871 | 558 | 5,230 | 1,395 | 45,841 |
| Bahamas[c] | 262 | 27,941 | 140 | 8,123 | 56 | 1,575 | 565 | 7,461 | 1,023 | 45,099 |
| Greece | 281 | 26,400 | 259 | 14,272 | 46 | 1,794 | 108 | 838 | 694 | 43,304 |
| Cyprus[c] | 172 | 7,912 | 461 | 20,062 | 125 | 2,809 | 549 | 5,441 | 1,307 | 36,224 |
| Singapore[c] | 396 | 17,874 | 128 | 8,516 | 172 | 4,051 | 185 | 2,654 | 881 | 33,096 |
| Norway (NIS)[c] | 307 | 17,481 | 88 | 6,928 | 5 | 102 | 259 | 3,675 | 659 | 28,186 |
| China | 261 | 3,626 | 326 | 10,800 | 103 | 1,782 | 758 | 5,955 | 1,448 | 22,163 |
| Hong Kong[c] | 35 | 1,255 | 193 | 12,353 | 53 | 1,611 | 55 | 1,189 | 336 | 16,409 |
| United States | 142 | 8,447 | 15 | 604 | 90 | 3,058 | 207 | 3,721 | 454 | 15,830 |
| Japan | 253 | 8,291 | 154 | 5,645 | 23 | 691 | 191 | 975 | 621 | 15,602 |
| Marshall Islands[c] | 94 | 11,062 | 64 | 3,514 | 25 | 760 | 12 | 166 | 195 | 15,501 |
| India | 101 | 5,212 | 115 | 4,521 | 8 | 152 | 70 | 550 | 294 | 10,435 |
| Italy | 221 | 4,248 | 42 | 3,637 | 22 | 696 | 121 | 1,162 | 406 | 9,742 |
| Philippines | 66 | 284 | 166 | 7,616 | 7 | 80 | 218 | 1,625 | 457 | 9,606 |
| Saint Vincent[c] | 96 | 1,085 | 129 | 4,607 | 27 | 176 | 509 | 3,722 | 761 | 9,590 |
| Bermuda | 27 | 4,840 | 28 | 3,699 | 16 | 459 | 34 | 363 | 105 | 9,361 |
| Turkey | 92 | 1,142 | 152 | 5,986 | 21 | 213 | 269 | 1,538 | 534 | 8,879 |
| Republic of Korea | 129 | 1,384 | 99 | 5,054 | 45 | 836 | 207 | 1,085 | 480 | 8,360 |
| **Total of top 20** | **4,966** | **271,880** | **4,745** | **248,299** | **1,623** | **43,253** | **6,871** | **66,551** | **18,205** | **629,983** |
| **Total of all flags** | **7,079** | **328,944** | **5,628** | **280,237** | **2,561** | **67,930** | **13,050** | **99,656** | **28,318** | **776,767** |

[a]Oceangoing self-propelled vessels of 1,000 gross tons and above. U.S. data in this table differ from data in Table 1-7 because, in order to facilitate country comparisons, vessel size is limited here.

[b]Breakbulk ships, partial containerships, refrigerated cargo ships, barge carriers, cruise/passenger, and specialized cargo ships.

[c]Open registry—a term used to denote a type of registry offered by a country to foreign nationals or corporations that provides favorable tax, regulatory, and other incentives.

KEY: NIS = Norweigan International Shipping Registry.

SOURCE: Lloyd's Maritime Information Services, Ship Particulars, computer file extract (London: Lloyd's Register, January 2001).

- Eight of the top 10 registries are open registries.
- The top five registries account for nearly half (49 percent) of the total world merchant fleet deadweight.

Table 1-5

**Top 20 Ranking of World Merchant Fleet by Country of Owner as of January 1, 2001[a]**

| | Tanker | | Dry bulk | | Container | | Other[b] | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) |
| Greece | 793 | 63,137 | 1,341 | 66,301 | 136 | 3,815 | 809 | 8,678 | 3,079 | 141,931 |
| Japan | 723 | 37,343 | 794 | 45,304 | 193 | 5,400 | 945 | 8,793 | 2,655 | 96,839 |
| Norway | 481 | 36,842 | 179 | 11,203 | 21 | 667 | 588 | 8,615 | 1,269 | 57,327 |
| United States | 413 | 32,902 | 126 | 6,187 | 100 | 3,235 | 399 | 5,425 | 1,038 | 47,749 |
| China | 293 | 6,135 | 556 | 22,524 | 182 | 3,677 | 920 | 7,530 | 1,951 | 39,867 |
| Hong Kong | 120 | 14,355 | 237 | 17,609 | 49 | 1,505 | 124 | 1,789 | 530 | 35,258 |
| Germany | 162 | 3,880 | 110 | 4,834 | 650 | 16,427 | 857 | 6,141 | 1,779 | 31,282 |
| Korea (South) | 194 | 6,816 | 194 | 14,076 | 103 | 2,607 | 307 | 1,847 | 798 | 25,345 |
| Singapore | 319 | 11,983 | 91 | 3,314 | 122 | 2,535 | 162 | 1,454 | 694 | 19,286 |
| Taiwan | 34 | 2,483 | 147 | 8,292 | 195 | 6,565 | 129 | 1,069 | 505 | 18,410 |
| Denmark | 165 | 8,073 | 32 | 2,127 | 120 | 5,217 | 264 | 1,458 | 581 | 16,875 |
| United Kingdom | 146 | 7,259 | 60 | 4,574 | 90 | 3,295 | 215 | 1,605 | 511 | 16,733 |
| Russia | 344 | 6,425 | 127 | 2,722 | 34 | 800 | 1,101 | 4,298 | 1,606 | 14,245 |
| Italy | 239 | 5,129 | 70 | 5,440 | 11 | 269 | 146 | 1,743 | 466 | 12,581 |
| India | 112 | 5,539 | 125 | 5,363 | 3 | 87 | 65 | 654 | 305 | 11,643 |
| Saudi Arabia | 70 | 9,763 | 1 | 2 | 5 | 248 | 26 | 460 | 102 | 10,474 |
| Sweden | 134 | 7,920 | 11 | 464 | 1 | 11 | 172 | 1,746 | 318 | 10,142 |
| Turkey | 84 | 1,140 | 153 | 5,724 | 24 | 235 | 249 | 1,557 | 510 | 8,656 |
| Iran | 33 | 4,124 | 47 | 1,916 | 7 | 180 | 53 | 899 | 140 | 7,120 |
| Switzerland | 45 | 1,354 | 46 | 2,181 | 74 | 2,328 | 72 | 875 | 237 | 6,738 |
| **Total of top 20** | **4,904** | **272,601** | **4,447** | **230,166** | **2,120** | **59,105** | **7,603** | **66,635** | **19,074** | **628,501** |
| **Total of all flags** | **7,079** | **328,944** | **5,628** | **280,237** | **2,561** | **67,930** | **13,050** | **99,656** | **28,318** | **776,767** |

[a]Based on parent company nationality.

[b]Breakbulk ships, partial containerships, refrigerated cargo ships, barge carriers, cruise/passenger, and specialized cargo ships.

KEY: dwt = deadweight tons.

SOURCE: Lloyd's Maritime Information Services, Ship Particulars, computer file extract (London: Lloyd's Register, January 2001).

- Greek owners account for about 18 percent of the total world fleet capacity.
- German owners account for the largest national share of the world containership fleet—about 24 percent.
- The United States ranks 4th as a fleet owner (down from 3rd in 1997).

Table 1-6
**World Open Registry[a] Trends, Oceangoing Self-Propelled Vessels of 1,000 Gross Tons and Over, 1990–2001 (Thousands of tons)**

| | 1990 | | 1999 | | 2000 | | 2001 | |
|---|---|---|---|---|---|---|---|---|
| Flag of registry | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) | Number of vessels | dwt (thousands) |
| Panama | 3,189 | 70,537 | 4,485 | 145,769 | 4,620 | 155,348 | 4,657 | 168,052 |
| Liberia | 1,409 | 88,275 | 1,644 | 97,232 | 1,608 | 89,949 | 1,498 | 78,703 |
| Malta | 293 | 6,257 | 1,312 | 39,311 | 1,448 | 45,282 | 1,395 | 45,841 |
| Bahamas | 530 | 19,719 | 1,042 | 40,944 | 1,037 | 43,169 | 1,023 | 45,099 |
| Cyprus | 1,054 | 29,729 | 1,431 | 36,059 | 1,365 | 35,956 | 1,307 | 36,224 |
| Singapore | 407 | 11,494 | 879 | 31,436 | 883 | 33,853 | 881 | 33,096 |
| Norway (NIS) | 587 | 28,800 | 655 | 30,373 | 660 | 29,731 | 659 | 28,186 |
| Hong Kong | — | — | 191 | 10,190 | 242 | 11,773 | 336 | 16,409 |
| Marshall Islands | — | — | 112 | 10,901 | 132 | 11,621 | 195 | 15,501 |
| Saint Vincent | — | — | 784 | 11,554 | 791 | 10,506 | 761 | 9,590 |
| Isle of Man | 81 | 3,150 | 149 | 6,756 | 145 | 6,690 | 152 | 8,248 |
| Denmark (DIS) | 199 | 6,288 | 309 | 6,654 | 315 | 6,701 | 325 | 7,727 |
| Kerguelen | 17 | 455 | 73 | 4,413 | 73 | 4,658 | 77 | 5,373 |
| Netherlands | 326 | 3,638 | 411 | 3,814 | 563 | 5,484 | 501 | 4,583 |
| Vanuatu | 73 | 1,611 | 83 | 1,809 | 79 | 1,670 | 56 | 1,305 |
| Luxembourg | 1 | 3 | 27 | 975 | 43 | 2,179 | 44 | 1,294 |
| Gibraltar | — | — | 16 | 512 | 24 | 698 | 42 | 882 |
| Honduras | — | — | 234 | 783 | 248 | 934 | 246 | 860 |
| Sri Lanka | 37 | 314 | 21 | 282 | 22 | 288 | 17 | 236 |
| Mauritius | 6 | 220 | 15 | 236 | 13 | 208 | 6 | 81 |
| **Total open registries** | **8,209** | **270,490** | **13,873** | **480,002** | **14,311** | **496,698** | **14,178** | **507,291** |
| **Percent of all registries** | **34.8%** | **42.4%** | **49.9%** | **63.5%** | **50.6%** | **64.5%** | **50.1%** | **65.3%** |
| **Total registries** | **23,596** | **637,493** | **27,825** | **755,435** | **28,259** | **769,794** | **28,318** | **776,767** |

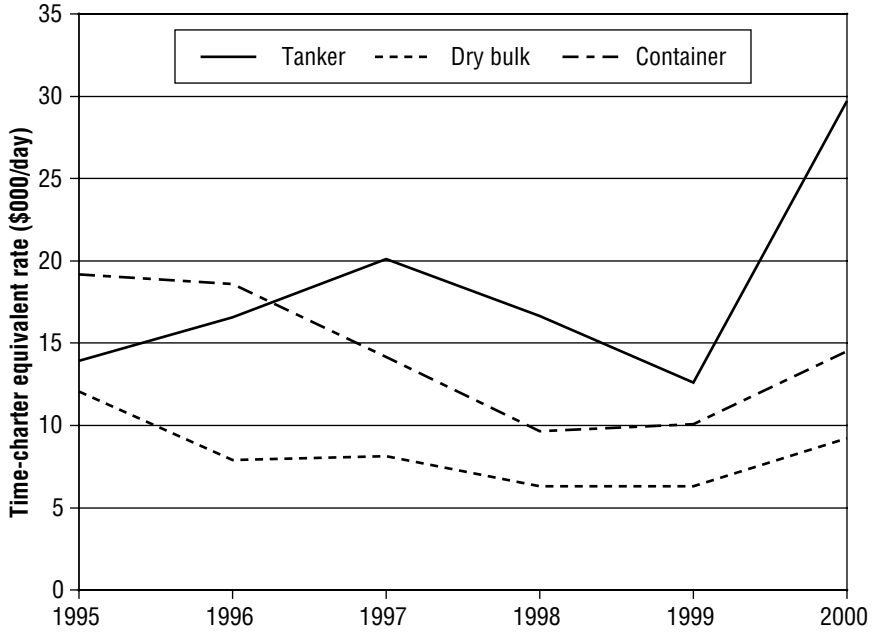
KEY: — = not available.

[a]An open registry is a type of registry offered by a country to foreign nationals or corporations that provides favorable tax, regulatory, and other incentives.

SOURCE: Lloyd's Maritime Information Services, Ship Particulars, computer file extract (London: Lloyd's Register, January 2001).

- The number of vessels in the open registry fleet increased by 73 percent from 1990 to 2001. The world fleet grew by 20 percent during the same period.
- The number of Liberian open-registry vessels dropped by nearly 7 percent between 2000 and 2001.
- Panama and Liberia combined accounted for 43 percent of the open-registry fleet in 2001.

Figure 1-1
**Average Earnings Per Day by Vessel Type**




SOURCE: Clarkson Research Studies, C. Tyler, ed., *Shipping Review and Outlook* (London: Spring, 2001).

- The Asian economic downturn in 1998 and rising newbuilding deliveries have kept earnings for dry bulk carriers and containerships below mid-1990s levels.

Table 1-7

**U.S.-Flag Cargo Carrying Vessels by Area of Operation (Carrying capacity expressed in thousands of deadweight tons (dwt)) as of October 1, 2001**

| | Total | | Liquid Carriers | | Dry Bulk Carriers | | Containerships | | Other freighters | |
|---|---|---|---|---|---|---|---|---|---|---|
| Area of Operation | Number of vessels | dwt | Number of vessels | dwt | Number of vessels | dwt | Number of vessels | dwt | Number of vessels | dwt |
| **Total** | **3,835** | **31,877** | **2,148** | **16,400** | **760** | **5,970** | **126** | **3,424** | **801** | **6,083** |
| **Foreign Trade** | **336** | **6,292** | **66** | **1,353** | **164** | **1,468** | **64** | **2,558** | **42** | **913** |
| Oceanborne | 315 | 5,987 | 58 | 1,315 | 151 | 1,201 | 64 | 2,558 | 42 | 913 |
| Great Lakes | 21 | 305 | 8 | 38 | 13 | 267 | 0 | 0 | 0 | 0 |
| **Domestic Trade** | **3,326** | **22,224** | **2,054** | **14,163** | **596** | **4,502** | **57** | **780** | **619** | **2,779** |
| Coastal | 1,346 | 14,098 | 580 | 9,369 | 327 | 2,044 | 57 | 780 | 382 | 1,905 |
| Inland Waterway | 1,901 | 6,085 | 1,466 | 4,750 | 214 | 529 | 0 | 0 | 221 | 806 |
| Great Lakes | 79 | 2,041 | 8 | 44 | 55 | 1,929 | 0 | 0 | 16 | 68 |
| **Government** | **173** | **3,361** | **28** | **884** | **0** | **0** | **5** | **86** | **140** | **2,391** |
| **Total Self-Propelled** | **467** | **16,276** | **122** | **7,177** | **62** | **2,464** | **91** | **3,200** | **192** | **3,435** |
| **Foreign Trade** | **139** | **5,282** | **17** | **1,043** | **17** | **788** | **64** | **2,558** | **41** | **893** |
| Oceanborne | 133 | 5,046 | 17 | 1,043 | 11 | 552 | 64 | 2,558 | 41 | 893 |
| Great Lakes | 6 | 236 | 0 | 0 | 6 | 236 | 0 | 0 | 0 | 0 |
| **Domestic Trade** | **155** | **7,633** | **77** | **5,250** | **45** | **1,676** | **22** | **556** | **11** | **151** |
| Coastal | 109 | 5,976 | 75 | 5,231 | 2 | 59 | 22 | 556 | 10 | 130 |
| Inland Waterway | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Great Lakes | 46 | 1,657 | 2 | 19 | 43 | 1,617 | 0 | 0 | 1 | 21 |
| **Government** | **173** | **3,361** | **28** | **884** | **0** | **0** | **5** | **86** | **140** | **2,391** |
| **Total Non-Self-Propelled**[a] | **3,368** | **15,601** | **2,026** | **9,223** | **698** | **3,506** | **35** | **224** | **609** | **2,648** |
| **Foreign Trade** | **197** | **1,010** | **49** | **310** | **147** | **680** | **0** | **0** | **1** | **20** |
| Oceanborne | 182 | 941 | 41 | 272 | 140 | 649 | 0 | 0 | 1 | 20 |
| Great Lakes | 15 | 69 | 8 | 38 | 7 | 31 | 0 | 0 | 0 | 0 |
| **Domestic Trade** | **3,171** | **14,591** | **1,977** | **8,913** | **551** | **2,826** | **35** | **224** | **608** | **2,628** |
| Coastal | 1,237 | 8,122 | 505 | 4,138 | 325 | 1,985 | 35 | 224 | 372 | 1,775 |
| Inland Waterway | 1,901 | 6,085 | 1,466 | 4,750 | 214 | 529 | 0 | 0 | 221 | 806 |
| Great Lakes | 33 | 384 | 6 | 25 | 12 | 312 | 0 | 0 | 15 | 47 |
| **Vessels Less Than 1,000 Gross Tons** | | | | | | | | | | |
| **Total** | **27,552** | **40,939** | **1,767** | **2,689** | **21,705** | **34,449** | **4** | **2** | **4,076** | **3,799** |
| **Foreign Trade** | **101** | **51** | **6** | **4** | **95** | **47** | **0** | **0** | **0** | **0** |
| Oceanborne | 69 | 42 | 3 | 2 | 66 | 40 | 0 | 0 | 0 | 0 |
| Great Lakes | 32 | 9 | 3 | 2 | 29 | 7 | 0 | 0 | 0 | 0 |
| **Domestic Trade** | **27,451** | **40,888** | **1,761** | **2,685** | **21,610** | **34,402** | **4** | **2** | **4,076** | **3,799** |
| Coastal | 1,847 | 1,432 | 110 | 117 | 380 | 549 | 1 | 1 | 1,356 | 765 |
| Inland Waterway | 25,493 | 39,301 | 1,647 | 2,565 | 21,211 | 33,828 | 3 | 1 | 2,632 | 2,907 |
| Great Lakes | 111 | 155 | 4 | 3 | 19 | 25 | 0 | 0 | 88 | 127 |
| **Total Self-Propelled** | **111** | **56** | **20** | **14** | **3** | **2** | **0** | **0** | **88** | **40** |
| **Domestic Trade** | **111** | **56** | **20** | **14** | **3** | **2** | **0** | **0** | **88** | **40** |
| Coastal | 75 | 31 | 17 | 10 | 0 | 0 | 0 | 0 | 58 | 21 |
| Inland Waterway | 27 | 21 | 1 | 3 | 0 | 0 | 0 | 0 | 26 | 18 |
| Great Lakes | 9 | 4 | 2 | 1 | 3 | 2 | 0 | 0 | 4 | 1 |
| **Total Non-Self-Propelled** | **27,441** | **40,883** | **1,747** | **2,675** | **21,702** | **34,447** | **4** | **2** | **3,988** | **3,759** |
| **Foreign Trade** | **101** | **51** | **6** | **4** | **95** | **47** | **0** | **0** | **0** | **0** |
| Oceanborne | 69 | 42 | 3 | 2 | 66 | 40 | 0 | 0 | 0 | 0 |
| Great Lakes | 32 | 9 | 3 | 2 | 29 | 7 | 0 | 0 | 0 | 0 |
| **Domestic Trade** | **27,340** | **40,832** | **1,741** | **2,671** | **21,607** | **34,400** | **4** | **2** | **3,988** | **3,759** |
| Coastal | 1,772 | 1,401 | 93 | 107 | 380 | 549 | 1 | 1 | 1,298 | 744 |
| Inland Waterway | 25,466 | 39,280 | 1,646 | 2,562 | 21,211 | 33,828 | 3 | 1 | 2,606 | 2,889 |
| Great Lakes | 102 | 151 | 2 | 2 | 16 | 23 | 0 | 0 | 84 | 126 |

[a] Includes Integrated Tug Barge (ITB) Units as of October 1, 2001

NOTE: All vessels engaged in domestic trade and all non-self propelled vessels (except ITBs) as of January 1, 2001

SOURCE: U.S. Maritime Administration, Office of Statistical and Economic Analysis, adapted from U.S. Army Corps of Engineers and U.S. Coast Guard data.

Table 1-8

**U.S.-Flag Fleet of Passenger Vessels, Tugs/Towboats, and Other Work Boats[a] as of January 1, 2002**

| Type of vessel | Number | Capacity unit |
|---|---|---|
| **Passenger vessels** | | |
| < 150 passenger capacity | 650 | 45,401 |
| >= 150 passenger capacity | 385 | 237,944 |
| **Total** | **1,035** | **283,345** |
| **Tugs/towboats** | | |
| < 1,500 horsepower | 3,350 | 2,492,735 |
| >= 1,500 horsepower | 2,042 | 7,367,314 |
| **Total** | **5,392** | **9,860,049** |
| **Other work boats[b]** | | |
| < 1,000 tons capacity | 1,444 | 281,584 |
| >= 1,000 tons capacity | 115 | 251,758 |
| **Total** | **1,559** | **533,342** |

[a]Inventory data.

[b]Includes crewboats, supply, and utility vessels.

SOURCE: U.S. Maritime Administration, Office of Statistical and Economic Analysis; adapted from U.S. Army Corps of Engineers and U.S. Coast Guard data.

Table 1-9

## U.S. Waterborne Foreign Trade 2000 (Thousand metric tons)*

| Region | Africa | Australia/ New Zealand | Canada | Europe/ Mediterranean | Far East S.E. Asia | Latin America | Middle East/ South Asia | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | **Full container ship** | | | | |
| Far West | 207.16 | 2,043.83 | 750.30 | 4,009.88 | 56,363.01 | 2,142.10 | 2,062.71 | 67,578.99 |
| Southeast | 1,167.79 | 457.45 | 253.20 | 13,677.32 | 9,459.54 | 9,780.72 | 1,916.54 | 36,712.55 |
| Middle Atlantic | 1,077.94 | 459.58 | 427.24 | 9,780.78 | 5,315.50 | 4,637.66 | 1,199.98 | 22,898.68 |
| Southwest | 813.67 | 181.78 | 81.22 | 4,007.58 | 302.07 | 4,220.73 | 1,018.27 | 10,625.32 |
| Puerto Rico | 357.35 | 2.98 | 177.75 | 318.87 | 224.18 | 606.01 | 29.23 | 1,716.37 |
| Northeast | 49.60 | 25.64 | 185.85 | 520.10 | 85.89 | 272.83 | 22.78 | 1,162.70 |
| Great Lakes | 6.54 | 5.91 | 646.70 | 268.99 | 35.64 | 17.77 | 6.47 | 988.02 |
| Alaska | — | 1.25 | 44.98 | 69.24 | 221.42 | 7.65 | — | 344.54 |
| Hawaii | — | 50.18 | 13.33 | 2.76 | 169.46 | 2.27 | 2.69 | 240.69 |
| Plains | 1.16 | — | 31.65 | 28.25 | — | 2.91 | — | 63.98 |
| **Total** | **3,681.00** | **3,229.00** | **2,612.00** | **32,684.00** | **72,177.00** | **21,691.00** | **6,259.00** | **142,332.00** |
| | | | | **Tanker ship** | | | | |
| Southwest | 23,047.69 | 1,166.26 | 921.54 | 17,916.03 | 6,687.39 | 107,860.85 | 46,957.99 | 204,557.76 |
| Southeast | 18,389.26 | 372.75 | 1,954.81 | 19,006.26 | 2,819.85 | 63,535.32 | 45,656.72 | 151,734.96 |
| Middle Atlantic | 30,619.91 | 65.50 | 6,126.97 | 19,481.97 | 1,143.02 | 18,370.85 | 5,624.39 | 81,432.61 |
| Far West | 292.86 | 1,008.63 | 2,098.22 | 750.79 | 9,552.56 | 15,257.35 | 13,730.55 | 42,690.95 |
| Puerto Rico | 7,906.97 | 13.08 | 75.87 | 2,005.58 | 92.97 | 17,000.97 | 2,076.90 | 29,172.34 |
| Northeast | 1,221.19 | 1.58 | 6,120.56 | 1,778.60 | 159.15 | 7,231.06 | 124.90 | 16,637.03 |
| Hawaii | — | 1,000.56 | 48.59 | 2.12 | 3,905.39 | 117.45 | — | 5,074.10 |
| Alaska | — | 211.46 | 114.79 | 66.37 | 4,413.91 | 48.55 | — | 4,855.08 |
| Great Lakes | 8.59 | 0.54 | 644.72 | 80.40 | — | 6.00 | 85.56 | 825.81 |
| Plains | 0.50 | — | 3.96 | 11.58 | — | — | — | 16.05 |
| **Total** | **81,487.00** | **3,840.00** | **18,110.00** | **61,100.00** | **28,775.00** | **229,428.00** | **114,257.00** | **536,997.00** |
| | | | | **Dry-bulk ship** | | | | |
| Southeast | 13,049.62 | 1,807.31 | 7,465.34 | 44,708.10 | 51,525.03 | 48,980.69 | 5,337.67 | 172,873.75 |
| Far West | 1,423.35 | 3,613.00 | 2,766.50 | 3,099.88 | 39,183.97 | 5,500.66 | 1,407.96 | 56,995.32 |
| Great Lakes | 1,155.46 | 326.69 | 34,614.33 | 3,098.45 | 267.59 | 847.87 | 26.26 | 40,336.65 |
| Southwest | 8,327.29 | 72.86 | 835.55 | 8,194.19 | 4,904.70 | 14,019.85 | 1,601.87 | 37,956.31 |
| Middle Atlantic | 1,545.91 | 627.72 | 12,002.23 | 5,956.56 | 3,032.38 | 8,354.72 | 123.10 | 31,642.61 |
| Northeast | 241.18 | 0.72 | 1,498.62 | 887.38 | 458.87 | 3,400.69 | 91.07 | 6,578.53 |
| Plains | 140.63 | — | 1,959.63 | 946.80 | — | 4.27 | — | 3,051.33 |
| Alaska | — | 79.05 | 411.15 | 249.64 | 1,937.67 | 271.72 | 16.14 | 2,965.38 |
| Puerto Rico | 129.37 | 0.89 | 225.19 | 542.84 | 188.21 | 1,148.87 | 9.49 | 2,244.85 |
| Hawaii | — | 148.16 | 11.79 | — | 1,094.20 | 0.75 | — | 1,254.90 |
| **Total** | **26,013.00** | **6,676.00** | **61,790.00** | **67,684.00** | **102,593.00** | **82,530.00** | **8,614.00** | **355,900.00** |

KEY: — Represents less than 500 metric tons.

[a]**BEA region**
Puerto Rico – Puerto Rico, Virgin Islands
Rocky Mountains – Colorado, Idaho, Montana, Utah, Wyoming
Far West – California, Oregon, Washington
Middle Atlantic – Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania
Northeast – Massachusetts, New Hampshire, Rhode Island, Connecticut, Maine
Plains – Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
Southeast – Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Virginia
Southwest – Arizona, New Mexico, Oklahoma, Texas
Other – America Samoa, Guam, Trust Territory of the Pacific Islands, U.S. Minor Outlying Islands, Transshipment Area, Other

* Breakbulk ships, partial containerships, refrigerated cargo ships, roll-on/roll-off, barge carriers, cruise/passenger, and specialized cargo ships.

*continued on next page*

Table 1-9 (cont'd)

**U.S. Waterborne Foreign Trade 2000 (Thousand metric tons)**

| Region | Africa | Australia/ New Zealand | Canada | Europe/ Mediterranean | Far East S.E. Asia | Latin America | Middle East/ South Asia | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | Other Ship* | | | | |
| Southeast | 4,001.19 | 620.86 | 1,185.70 | 20,114.23 | 5,507.56 | 17,967.78 | 3,695.31 | 53,092.61 |
| Southwest | 7,881.19 | 237.79 | 66.12 | 6,569.06 | 1,150.38 | 8,855.20 | 4,443.64 | 29,203.37 |
| Middle Atlantic | 3,991.03 | 205.93 | 2,261.80 | 11,580.35 | 1,664.48 | 5,545.05 | 705.42 | 25,954.06 |
| Far West | 65.17 | 1,390.16 | 2,824.99 | 2,053.07 | 7,812.89 | 2,276.63 | 1,349.50 | 17,772.40 |
| Puerto Rico | 648.89 | 6.50 | 207.44 | 1,557.32 | 124.87 | 2,233.65 | 43.81 | 4,822.47 |
| Northeast | 64.24 | 5.09 | 742.03 | 685.40 | 248.25 | 1,279.02 | 27.90 | 3,051.93 |
| Great Lakes | 79.52 | 8.33 | 1,665.37 | 460.51 | 22.21 | 43.30 | 9.34 | 2,288.58 |
| Alaska | — | 15.50 | 92.17 | 118.04 | 530.33 | 9.43 | — | 765.47 |
| Hawaii | — | 102.40 | 24.68 | * | 412.80 | 4.62 | * | 544.50 |
| Plains | 28.35 | * | 37.94 | 158.55 | * | 5.60 | — | 230.45 |
| **Total** | **16,760** | **2,593** | **9,108** | **43,297** | **17,474** | **38,220** | **10,275** | **137,726.00** |

* Breakbulk ships, partial containerships, refrigerated cargo ships, roll-on/roll-off, barge carriers, cruise/passenger, and specialized cargo ships.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Statistical and Economical Analysis, U.S.foreign waterborne transportation statistics data as of July 2002.

- Far West to Far East trade is heavily involved in U.S. container trade, making the Far West number one for total container trade.
- Southwest to Latin America trade is heavily involved in U.S. tanker trade, making Southwest number one for total tanker trade.
- Southeast to the Far East and Europe/Mediterranean trade is heavily involved in the dry-bulk trade, making Southeast number one for total dry-bulk trade.
- Great Lakes trade continues to be primarily dry-bulk trade.

Figure 1-2
**Tonnage of U.S. Waterborne Imports and Exports (Monthly data, not seasonally adjusted)**


SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Statistical and Economic Analysis, U.S. Foreign Waterborne Transportation Statistics data, available at http://www.marad.dot.gov/statistics/usfwts/index.html as of February 2002.

- Trade decline in early 1999 may have been due mainly to the financial crisis in Asia and Latin America.

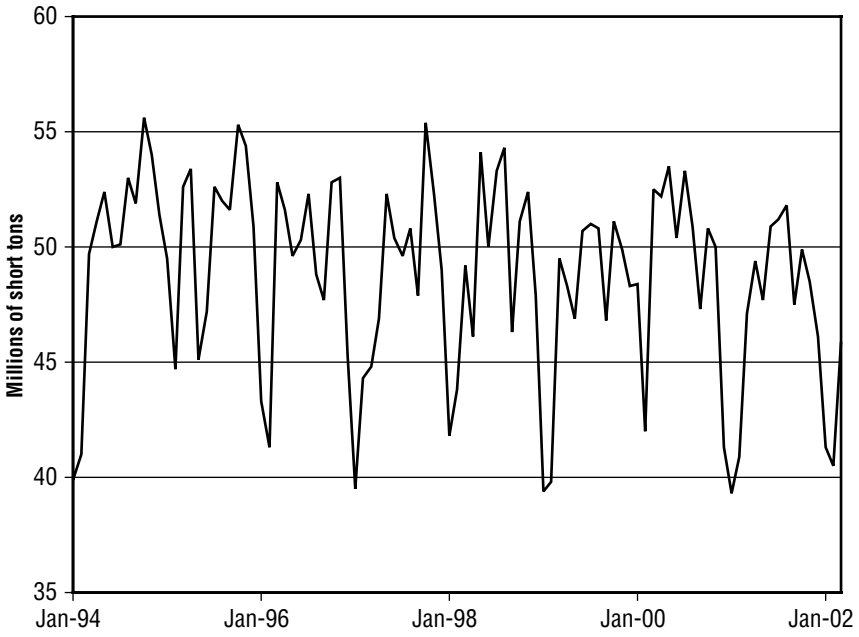
Table 1-10
**Domestic Deep-Sea Trade, Self-Propelled Vessel v. Barge by Length of Haul, 2000 (Million metric tons)**

| Miles | Barge | Vessel | Total | Percent by barge |
|---|---|---|---|---|
| <500 | 50.6 | 17.8 | 68.4 | 74% |
| 500-1,000 | 29.3 | 12.8 | 42.1 | 70% |
| 1,001-1,500 | 10.1 | 39.3 | 49.4 | 20% |
| 1,501-2000 | 3.6 | 25.2 | 28.8 | 13% |
| >2000 | 3.2 | 28.2 | 31.4 | 10% |
| **Total** | **96.8** | **123.3** | **220.1** | **44%** |

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, Part 5, Summaries (Fort Belvoir, VA: February 2001)

- 74 percent of barge traffic moved in trades of less than 1,000 miles.
- 80 percent of self-propelled vessel traffic moved in trades of more than 1,000 miles.

Figure 1-3
**Transported Tonnage on U.S. Inland Waterways: All Commodities (Monthly data, not seasonally adjusted)**




SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, Monthly Indicator, available at http://www.wrsc.usace.army.mil/dc/monthlyindicator.htm as of February 2002.

Table 1-11
**Major Commodities Shipped on Inland Waterways, 2000**[a]

| | Billions ton-miles | Million metric tons | Average haul-miles |
|---|---|---|---|
| Coal and coke | 55.3 | 168.6 | 327 |
| Petroleum | 35.3 | 181.5 | 194 |
| Crude | 8.2 | 38.1 | 215 |
| Products | 31.3 | 141.1 | 222 |
| Chemicals | 28.0 | 56.3 | 497 |
| Crude materials | 47.9 | 126.3 | 380 |
| Primary manufactured goods | 27.8 | 31.5 | 883 |
| Farm products | 83.0 | 82.4 | 1,007 |
| Manufactured goods | 0.9 | 11.2 | 80 |
| Other | 0.3 | 3.9 | 77 |
| **Total** | **278.5** | **661.7** | |

[a]Includes intraport shipments.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, Part 5, Summaries (Fort Belvoir, VA: February 2001)

- Petroleum and coal accounted for 53 percent of tonnage moved on inland waterways.
- Farm products accounted for only 12 percent of tonnage, but 30 percent of the ton-miles.

Table 1-12
**Major Commodities Shipped on the Great Lakes, 2000**

| | Billion ton-miles | Million metric tons | Average haul-miles |
|---|---|---|---|
| Coal and coke | 9.6 | 18.4 | 522 |
| Petroleum | 0.6 | 1.7 | 353 |
| Chemicals | 0.05 | 0.1 | 500 |
| Crude materials | 41.0 | 79.7 | 514 |
| Primary manufactured goods | 1.1 | 3.5 | 314 |
| Farm products | 0.3 | 0.3 | 1037 |
| **Total** | **52.6** | **103.7** | **508** |

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calender year 2000, Part 5, National Summaries (Fort Belvoir, VA: February 2001)

- Crude materials accounted for 76 percent of the total tonnage and 78 percent of the total ton-miles. Crude materials include such commodities as forest products; pulp waste; paper; soil, gravel, and stone; iron ore and scrap; sulfur, clay, and silt; and slag.

Table 1-13
**U.S. Domestic Tanker Trade Flow by Region, 2000 (Thousand metric tons)**

| | Where received | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Shipped from** | **Alaska** | **Far West** | **Great Lakes** | **Hawaii** | **Middle Atlantic** | **Northeast** | **Plains** | **Puerto Rico** | **Rocky Mt.** | **Southeast** | **Southwest** | **Other** | **Total** |
| Alaska | 776 | 40,423 | — | 1,779 | — | — | — | — | — | — | — | — | 42,978 |
| Puerto Rico | — | 511 | — | — | 5,409 | 4,301 | — | 2,493 | — | 5,535 | 213 | — | 18,462 |
| Southwest | — | 1,267 | — | — | 2,831 | 898 | — | 426 | — | 10,283 | 317 | — | 16,023 |
| Southeast | — | 303 | — | — | 736 | 387 | — | 53 | — | 13,131 | 171 | 32 | 14,813 |
| Far West | 145 | 12,961 | — | 286 | — | — | — | 35 | — | 197 | 311 | 15 | 13,949 |
| Middle Atlantic | — | — | — | — | 5,759 | 531 | — | 11 | — | 358 | 598 | — | 7,258 |
| Other | — | — | — | — | — | — | — | — | — | 855 | 65 | — | 920 |
| Hawaii | 4 | 120 | — | 114 | — | — | — | — | — | — | — | 32 | 270 |
| Great Lakes | — | — | 210 | — | — | — | — | — | — | — | — | — | 210 |
| Northeast | — | — | — | — | 5 | 19 | — | — | — | 36 | — | 3 | 63 |
| **Total** | **925** | **55,586** | **210** | **2,178** | **14,741** | **6,136** | **—** | **3,017** | **—** | **30,396** | **1,675** | **82** | **114,945** |

KEY: — = not available.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, computer file.

- Alaska accounted for 37 percent of total domestic tanker trade in 2000.

Table 1-14
**U.S. Domestic Dry-Cargo Vessel Trade Flow by Region, 2000**

| | Where received | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Shipped from** | **Alaska** | **Far West** | **Great Lakes** | **Hawaii** | **Middle Atlantic** | **Northeast** | **Plains** | **Puerto Rico** | **Rocky Mt.** | **Southeast** | **Southwest** | **Other** | **Total** |
| Great Lakes | — | — | 70,879 | — | 2,094 | [a] | 3,272 | — | — | 5,570 | — | 644 | 82,460 |
| Middle Atlantic | — | — | 26 | — | 46,251 | 2,528 | — | 582 | — | 277 | — | 125 | 49,789 |
| Far West | 1,502 | 38,864 | — | 2,363 | — | — | — | — | 19 | — | — | 298 | 43,047 |
| Southeast | — | — | 5,572 | — | 486 | 2,154 | 1 | 1,522 | — | 22,900 | 2 | 5,930 | 38,568 |
| Plains | — | — | 24,092 | | 43 | — | 1,311 | — | — | 2 | — | — | 25,447 |
| Southwest | — | — | — | — | — | — | — | 283 | — | 4 | 14,037 | 352 | 14,677 |
| Northeast | — | — | [a] | — | 2,124 | 7,622 | — | — | — | [a] | — | 600 | 10,346 |
| Other | 356 | 306 | 729 | 116 | 106 | 600 | — | — | — | 4,330 | 203 | 26 | 6,772 |
| Hawaii | [a] | 485 | — | 1,049 | — | — | — | [a] | — | | — | 134 | 1,669 |
| Puerto Rico | — | — | — | [a] | 202 | — | — | 1,077 | — | 300 | 88 | [a] | 1,667 |
| Alaska | 719 | 296 | — | [a] | — | — | — | — | — | — | — | 356 | 1,371 |
| Rocky Mt | — | 19 | — | — | — | — | — | | [a] | — | — | — | 19 |
| **Total** | **2,577** | **39,972** | **101,297** | **3,528** | **51,308** | **12,903** | **4,584** | **3,464** | **19** | **33,384** | **14,330** | **8,465** | **275,832** |

[a]Less than 500 metric tons.
KEY: — = not available.
SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, computer file.

- Great Lakes accounted for 30 percent of total domestic dry-cargo vessel trade in 2000.

Table 1-15
**U.S. Domestic Tank-Barge (liquid) Trade Flow by Region, 2000**

| | Where received | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Shipped from** | **Alaska** | **Far West** | **Great Lakes** | **Hawaii** | **Middle Atlantic** | **Northeast** | **Plains** | **Puerto Rico** | **Rocky Mt.** | **Southeast** | **Southwest** | **Other** | **Total** |
| Southeast | — | — | 7,883 | — | 3,415 | 372 | 1,592 | 78 | — | 75,065 | 11,069 | 97 | 99,571 |
| Middle Atlantic | — | — | 67 | — | 51,876 | 15,722 | — | — | — | 2,056 | 393 | — | 70,114 |
| Southwest | — | — | 2,988 | — | 1,108 | 84 | 249 | 20 | — | 18,656 | 45,950 | 175 | 69,231 |
| Far West | 142 | 19,418 | — | — | — | — | — | — | 3 | — | — | — | 19,564 |
| Great Lakes | — | — | 4,800 | — | 184 | — | 554 | — | — | 2,748 | 344 | — | 8,630 |
| Northeast | — | — | | — | 220 | 2,633 | — | — | — | — | — | — | 2,853 |
| Puerto Rico | — | — | | — | — | — | — | 2,400 | — | 40 | 20 | 57 | 2,517 |
| Hawaii | — | 10 | | 1,336 | — | — | — | — | — | — | — | 4 | 1,349 |
| Other | 9 | — | | — | — | — | — | — | — | 1,216 | 91 | 1 | 1,318 |
| Plains | — | — | 215 | — | — | — | 189 | — | — | 510 | 54 | — | 968 |
| Alaska | 626 | 94 | — | — | — | — | — | — | — | — | — | 1 | 721 |
| Rocky Mt | — | 304 | | — | — | — | — | — | — | — | — | — | 304 |
| **Total** | **777** | **19,826** | **15,952** | **1,336** | **56,802** | **18,811** | **2,584** | **2,499** | **3** | **100,291** | **57,922** | **334** | **277,139** |

KEY: — = not available.
SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, computer file.

- Southeast accounted for 36 percent of total domestic tank-barge trade in 2000.

Table 1-16
**U.S. Domestic Dry-Cargo Barge Trade Flow by Region, 2000**

| | Where received | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Shipped from** | **Alaska** | **Far West** | **Great Lakes** | **Hawaii** | **Middle Atlantic** | **Northeast** | **Plains** | **Puerto Rico** | **Rocky Mt.** | **Southeast** | **Southwest** | **Other** | **Total** |
| Southeast | — | 1 | 45,216 | — | 18,794 | 964 | 6,754 | 1,355 | — | 137,987 | 5,578 | 57 | 216,706 |
| Great Lakes | — | — | 35,474 | — | 5,263 | — | 4,482 | — | — | 71,745 | 402 | 76 | 117,442 |
| Plains | — | — | 4,964 | | 65 | — | 13,165 | — | — | 31,700 | 955 | — | 50,849 |
| Middle Atlantic | — | — | 4,195 | — | 31,517 | 2,198 | 63 | 205 | — | 8,805 | 176 | — | 47,159 |
| Far West | 525 | 12,698 | — | 210 | — | — | — | — | 9 | — | 1 | | 13,443 |
| Southwest | — | — | 838 | — | 37 | — | 281 | 17 | — | 2,846 | 3,762 | 4 | 7,785 |
| Hawaii | — | 6 | — | 6,230 | — | — | — | — | — | — | — | 20 | 6,255 |
| Alaska | 925 | 335 | — | — | — | — | — | — | — | — | — | 1,131 | 2,392 |
| Northeast | — | — | — | — | 594 | 1,491 | — | 7 | — | 265 | — | — | 2,357 |
| Rocky Mt | — | 761 | — | — | — | — | — | — | [a] | — | — | — | 761 |
| Puerto Rico | — | — | — | — | 139 | — | — | 4 | — | 159 | — | — | 302 |
| Other | 20 | — | — | 2 | — | — | — | — | — | 115 | 2 | [a] | 138 |
| **Total** | **1,470** | **13,801** | **90,688** | **6,441** | **56,408** | **4,653** | **24,745** | **1,588** | **9** | **253,622** | **10,876** | **1,288** | **465,587** |

[a]Less than 500 metric tons.

KEY: — = not available.

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calendar year 2000, computer file.

- Southeast accounted for 47 percent of total domestic dry-cargo barge trade in 2000.

Table 1-17
**Major Commodities Shipped via U.S. Domestic Ocean Trades, 2000**

| | Billion ton-miles | Million metric tons | Average haul-miles |
|---|---|---|---|
| Coal and coke | 8.5 | 13.1 | 649 |
| Petroleum | 190.0 | 152.9 | 1,243 |
| Crude | 78.8 | 43.2 | 1,824 |
| Products | 111.2 | 109.7 | 1,014 |
| Chemicals | 24.9 | 12.5 | 1,992 |
| Crude materials | 6.4 | 12.5 | 512 |
| Primary manufactured goods | 3.6 | 6.5 | 554 |
| Farm products | 9.9 | 5.3 | 1,868 |
| Manufactured goods | 14.2 | 7.9 | 1,797 |
| Other | 0.0 | 0.0 | 0 |
| **Total** | **257.5** | **210.7** | |

SOURCE: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, *Waterborne Commerce of the United States*, calender year 2000, Part 5, National Summaries (Fort Belvoir, VA: February 2001)

- Petroleum (crude and product) accounted for 73 percent of domestic deep-sea tons and ton-miles.
- Crude materials accounted for 6 percent of the total tons, but only 3 percent of the ton-miles, reflecting a short average length of haul. Crude materials include such commodities as forest products; pulp waste; paper; soil, gravel, and stone; iron ore and scrap; sulfur, clay, and silt; and slag.

Table 1-18
**Top 25 World Ports by Cargo Vessel Type and Calls, 2000[a] (Capacity in thousands of deadweight tons)**

| | Tanker[b] | | Dry bulk | | Container | | Other | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Calls | Capacity | Calls | Capacity | Calls | Capacity | Calls | Capacity | Calls | Capacity |
| Singapore | 5,351 | 436,844 | 4,581 | 242,709 | 11,286 | 354,686 | 3,232 | 63,656 | 24,450 | 1,097,895 |
| Hong Kong | 637 | 26,774 | 1,040 | 34,262 | 12,462 | 412,264 | 1,360 | 24,240 | 15,499 | 497,540 |
| Kaohsiung | 773 | 48,032 | 1,387 | 69,756 | 5,808 | 199,284 | 692 | 12,504 | 8,660 | 329,576 |
| Busan | 150 | 4,555 | 1,181 | 51,191 | 5,217 | 164,795 | 1,009 | 18,681 | 7,557 | 239,222 |
| Rotterdam | 2,112 | 121,957 | 900 | 73,730 | 2,528 | 110,192 | 1,579 | 33,243 | 7,119 | 339,122 |
| Antwerp | 990 | 34,071 | 921 | 41,747 | 2,111 | 76,312 | 2,183 | 44,795 | 6,205 | 196,924 |
| Yokohama | 505 | 36,129 | 530 | 17,725 | 3,298 | 103,399 | 1,663 | 30,212 | 5,996 | 187,465 |
| Keelung | 256 | 10,350 | 491 | 13,545 | 4,344 | 94,522 | 542 | 8,704 | 5,633 | 127,121 |
| Port Klang | 425 | 10,480 | 522 | 18,797 | 3,950 | 109,883 | 668 | 12,035 | 5,565 | 151,195 |
| Los Angeles/Long Beach | 911 | 66,045 | 783 | 37,568 | 2,955 | 124,281 | 677 | 15,057 | 5,326 | 242,951 |
| Nagoya | 265 | 28,669 | 814 | 51,991 | 2,699 | 91,331 | 1,374 | 24,596 | 5,152 | 196,587 |
| Houston | 2,988 | 134,809 | 748 | 28,342 | 614 | 19,799 | 779 | 24,881 | 5,129 | 207,831 |
| New Orleans | 1,371 | 81,956 | 2,676 | 119,270 | 388 | 10,853 | 655 | 21,957 | 5,090 | 234,036 |
| Kobe | 301 | 9,012 | 381 | 14,049 | 3,325 | 116,447 | 660 | 11,149 | 4,667 | 150,657 |
| New York | 1,271 | 65,965 | 301 | 10,099 | 2,172 | 87,463 | 861 | 23,104 | 4,605 | 186,631 |
| Taichung | 668 | 25,561 | 1,228 | 54,158 | 1,998 | 33,604 | 513 | 9,276 | 4,407 | 122,599 |
| Laem Chabang | 207 | 15,027 | 495 | 20,057 | 2,600 | 49,820 | 442 | 7,860 | 3,744 | 92,764 |
| San Francisco[c] | 787 | 50,653 | 626 | 22,619 | 1,936 | 82,958 | 226 | 6,841 | 3,575 | 163,071 |
| Santos | 637 | 17,342 | 727 | 31,262 | 1,547 | 42,749 | 637 | 14,336 | 3,548 | 105,688 |
| Hamburg | 440 | 14,349 | 565 | 32,753 | 1,745 | 74,067 | 764 | 16,210 | 3,514 | 137,379 |
| Tokyo | 1 | 260 | 222 | 7,692 | 2,987 | 102,198 | 238 | 4,547 | 3,448 | 114,697 |
| Durban | 442 | 23,604 | 809 | 27,354 | 1,043 | 29,088 | 1,115 | 21,028 | 3,409 | 101,074 |
| Shanghai | 180 | 6,208 | 782 | 44,157 | 1,763 | 47,449 | 582 | 10,718 | 3,307 | 108,532 |
| Le Havre | 699 | 53,308 | 104 | 6,681 | 2,013 | 82,329 | 433 | 9,768 | 3,249 | 152,086 |
| Osaka | 95 | 5,244 | 478 | 17,638 | 2,030 | 57,659 | 475 | 9,424 | 3,078 | 89,966 |
| **Total top 25 ports** | **22,462** | **1,327,204** | **23,292** | **1,089,151** | **82,819** | **2,677,433** | **23,359** | **478,822** | **151,932** | **5,572,609** |
| **Percent of total ports** | **16.2** | **15.2** | **18.4** | **18.4** | **45.8** | **49.5** | **20.3** | **20.4** | **27.1** | **24.9** |
| **Total all ports** | **138,296** | **8,751,934** | **126,246** | **5,917,050** | **180,766** | **5,406,073** | **115,127** | **2,344,277** | **560,435** | **22,419,335** |

[a]Oceangoing self-propelled vessels 10,000 gross tons and above.
[b]Includes chemical and gas.
[c]Includes other San Francisco Bay area ports.

SOURCE: Lloyd's Maritime Information Services, Vessel Movements, computer file, London, 2001.

- The top 10 ports accounted for 16 percent of vessel calls at world ports in 2000.

Table 1-19
**Top 25 U.S. Ports by Cargo Vessel Type and Calls, 2000[a] (Capacity in thousands of deadweight tons)**

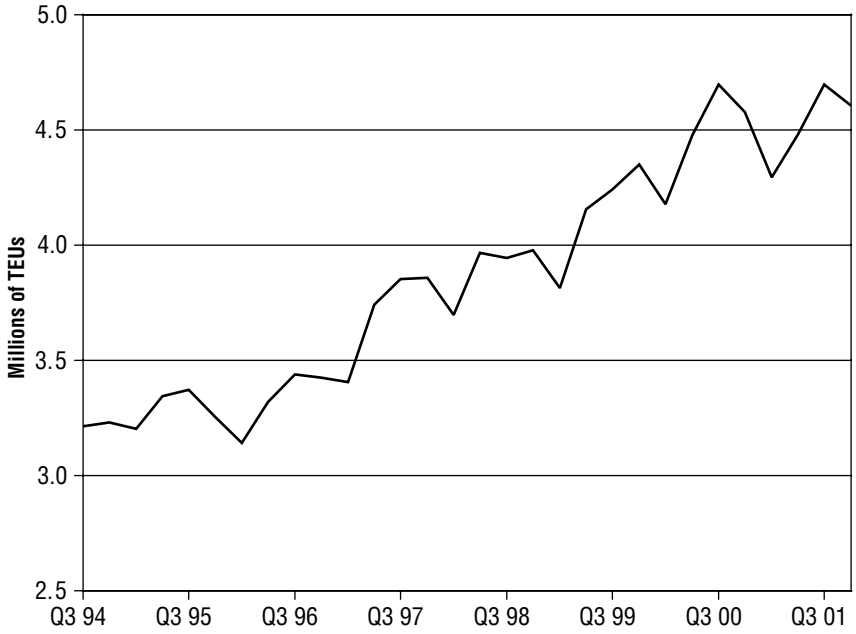
| | Tanker[b] | | Dry bulk | | Container | | Other | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Calls | Capacity | Calls | Capacity | Calls | Capacity | Calls | Capacity | Calls | Capacity |
| Los Angeles/ Long Beach | 911 | 66,045 | 783 | 37,568 | 2,955 | 124,281 | 677 | 15,057 | 5,326 | 242,951 |
| Houston | 2,988 | 134,809 | 748 | 28,342 | 614 | 19,799 | 779 | 24,881 | 5,129 | 207,831 |
| New Orleans | 1,371 | 81,956 | 2,676 | 119,270 | 388 | 10,853 | 655 | 21,957 | 5,090 | 234,036 |
| New York | 1,271 | 65,965 | 301 | 10,099 | 2,172 | 87,463 | 861 | 23,104 | 4,605 | 186,631 |
| San Francisco[c] | 787 | 50,653 | 626 | 22,619 | 1,936 | 82,958 | 226 | 6,841 | 3,575 | 163,071 |
| Philadelphia | 954 | 82,170 | 492 | 17,662 | 468 | 11,315 | 825 | 18,057 | 2,739 | 129,204 |
| Hampton Roads[d] | 155 | 7,602 | 436 | 26,602 | 1,557 | 61,943 | 348 | 14,271 | 2,496 | 110,417 |
| Charleston | 149 | 6,052 | 139 | 4,872 | 1,547 | 62,463 | 332 | 8,313 | 2,167 | 81,699 |
| Columbia River[e] | 277 | 13,894 | 1,279 | 46,457 | 262 | 10,025 | 345 | 7,061 | 2,163 | 77,436 |
| Savannah | 253 | 8,561 | 330 | 10,407 | 739 | 31,506 | 447 | 12,154 | 1,769 | 62,629 |
| Baltimore | 151 | 4,938 | 426 | 20,517 | 409 | 14,669 | 650 | 15,352 | 1,636 | 55,476 |
| Corpus Christi | 974 | 64,596 | 230 | 9,574 | 2 | 83 | 142 | 10,036 | 1,348 | 84,289 |
| San Juan (PRI) | 80 | 3,784 | 101 | 3,098 | 610 | 11,490 | 553 | 9,077 | 1,344 | 27,449 |
| Jacksonville | 204 | 8,848 | 190 | 6,946 | 305 | 7,989 | 592 | 11,749 | 1,291 | 35,532 |
| Beaumont | 1,053 | 76,914 | 99 | 4,483 | — | — | 67 | 4,704 | 1,219 | 86,101 |
| Miami | 11 | 472 | 65 | 2,519 | 766 | 25,522 | 370 | 6,041 | 1,212 | 34,553 |
| Texas City | 1,105 | 64,471 | 64 | 3,223 | 2 | 63 | 26 | 2,578 | 1,197 | 70,335 |
| Tacoma | 68 | 3,190 | 218 | 10,163 | 568 | 27,950 | 342 | 5,866 | 1,196 | 47,169 |
| Seattle | 49 | 2,786 | 229 | 10,253 | 794 | 31,182 | 78 | 1,348 | 1,150 | 45,569 |
| Port Everglades | 345 | 15,119 | 123 | 4,734 | 211 | 5,890 | 135 | 2,091 | 814 | 27,834 |
| Tampa | 228 | 6,379 | 367 | 13,750 | 6 | 127 | 178 | 3,372 | 779 | 23,628 |
| Mobile | 140 | 8,702 | 408 | 22,706 | 5 | 88 | 204 | 8,364 | 757 | 39,860 |
| Lake Charles | 518 | 37,749 | 115 | 5,203 | 3 | 62 | 79 | 1,921 | 715 | 44,935 |
| Honolulu | 141 | 10,677 | 84 | 4,802 | 339 | 8,987 | 112 | 2,434 | 676 | 26,900 |
| Freeport (Texas) | 516 | 30,660 | 18 | 646 | 46 | 766 | 61 | 3,664 | 641 | 35,737 |
| **Total top ports** | **14,699** | **856,992** | **10,547** | **446,515** | **16,704** | **637,472** | **9,084** | **240,293** | **51,034** | **2,181,273** |
| **Percent of total ports** | **76.6** | **67.4** | **83.4** | **86.0** | **96.0** | **96.9** | **84.7** | **85.5** | **85.1** | **79.9** |
| **Total all ports** | **19,183** | **1,271,983** | **12,649** | **519,297** | **17,401** | **657,619** | **10,722** | **280,942** | **59,955** | **2,729,841** |

[a]Oceangoing self-propelled vessels 1,000 gross tons and above.
[b]Includes chemical and gas.
[c]Includes other Bay area ports.
[d]Includes all Hampton Roads area ports (Norfolk, Newport News, etc.)
[e]Includes all Columbia River ports (Vancouver, Portland, Astoria, etc.)

SOURCE: Lloyd's Maritime Information Services, Vessel Movements, computer file London, January 2001.

- The top 10 U.S. ports accounted for 58 percent of vessel calls at U.S. ports in 2000.
- Major ports on the Atlantic and Pacific coasts serve primarily container trades, while major Gulf coast ports serve primarily tanker and dry bulk trades.

Figure 1-4
**U.S. International Waterborne Container Trade in Twenty-foot Equivalent Units (TEUs) (Quarterly data, not seasonally adjusted)**




SOURCE: Journal of Commerce, Port Import/Export Registry Service (PIERS) data, various years.

- U.S. international container traffic increased rapidly since the mid-1990s. However, the growth slowed recently due to the after-effects of the September 11 terrorist attack and the economic slowdown in the U.S.

Table 1-20
**Top 10 U.S. Container Ports (thousands of TEUs) and Channel Depth (in feet)**

| Port | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Authorized channel | Maintained channel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Los Angeles, CA | 1,639 | 1,627 | 1,786 | 1,849 | 1,873 | 2,085 | 2,293 | 2,552 | 3,228 | 3,425 | 70 | 60 |
| Long Beach, CA | 1,356 | 1,543 | 1,939 | 2,137 | 2,357 | 2,673 | 2,852 | 3,048 | 3,204 | 3,199 | 76 | 63 |
| New York, NY | 1,294 | 1,306 | 1,404 | 1,537 | 1,533 | 1,738 | 1,884 | 2,027 | 2,200 | 2,332 | 45 | 40 |
| Charleston, SC | 564 | 579 | 655 | 758 | 801 | 955 | 1,035 | 1,170 | 1,246 | 1,156 | 45 | 40 |
| Oakland, CA | 746 | 772 | 879 | 919 | 803 | 843 | 902 | 915 | 989 | 960 | 50 | 42 |
| Seattle, WA | 743 | 781 | 967 | 993 | 939 | 953 | 976 | 962 | 960 | 824 | 34 | 52 |
| Norfolk,VA | 519 | 519 | 570 | 647 | 681 | 770 | 793 | 829 | 850 | 885 | 55 | 50 |
| Houston, TX | 368 | 392 | 419 | 489 | 538 | 609 | 657 | 714 | 733 | 778 | 45 | 40 |
| Savannah, GA | 387 | 406 | 418 | 445 | 456 | 529 | 558 | 624 | 720 | 813 | 48 | 42 |
| Miami, FL | 418 | 469 | 497 | 497 | 505 | 624 | 602 | 618 | 684 | 717 | 42 | 42 |
| **Total top 10 ports** | **8,035** | **8,394** | **9,534** | **10,271** | **10,486** | **11,779** | **12,552** | **13,458** | **14,814** | **15,088** | | |
| **Percent of all ports** | **76%** | **69%** | **72%** | **77%** | **71%** | **79%** | **81%** | **81%** | **83%** | **83%** | | |
| **Total all ports** | **10,583** | **12,238** | **13,173** | **13,328** | **14,794** | **14,882** | **15,556** | **16,564** | **17,938** | **18,081** | | |

KEY: TEU = twenty-foot equivalent unit.

SOURCE: Journal of Commerce, Port Import/Export Reporting Service, various container data files and U.S. Army Corps of Engineers, Navigation Data Center, channel depth data, personal commuication June 2001.

- Container trade has become increasingly concentrated. The top 10 container ports handled 83 percent of U.S. container trade for the last 2 years, compared to 76 percent in 1992.
- Three of the top five container ports in the United States are on the west coast.
- Los Angeles and Long Beach, California, had the largest absolute growth in container traffic between 1995 and 2000 (measured in TEUs), rising 75 percent and 50 percent respectively.

Table 1-21
**Geographic Distribution of U.S. Waterway Facilities,[a] 2000**

| | Atlantic | | Gulf | | Pacific | | Great Lakes | | Inland | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deep | Shallow | Deep | Shallow | Deep | Shallow | Deep | Shallow | shallow | Deep | Shallow | All |
| Commercial facilities | 1,489 | 607 | 1,333 | 1,003 | 1,257 | 499 | 611 | 143 | 2,367 | 4,690 | 4,619 | 9,309 |
| Cargo | 810 | 225 | 808 | 438 | 624 | 210 | 393 | 70 | 1,676 | 2,635 | 2,619 | 5,254 |
| Service | 498 | 288 | 451 | 489 | 544 | 255 | 167 | 59 | 455 | 1,660 | 1,546 | 3,206 |
| Unused | 181 | 94 | 74 | 76 | 89 | 34 | 51 | 14 | 236 | 395 | 454 | 849 |
| Lock sites[b] | 0 | 14 | 1 | 44 | 2 | 9 | 3 | 20 | 137 | 6 | 224 | 230 |
| Lock chambers[b] | 0 | 14 | 1 | 44 | 3 | 13 | 6 | 20 | 175 | 10 | 266 | 276 |

[a]Waterways deeper than 12 feet (except for the 14-15 foot portions of the Columbia and Snake rivers) are classified as deep draft.

[b]Locks owned and/or operated by the U.S. Army Corps of Engineers in 1999.

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center Fact Card, available at http://www.wrsc.usace.army.mil/ndc/factcard.htm as of December 2001.

- There are 9,309 commercial waterway facilities in the United States. Of these, 4,690 (about half) are considered deep-draft and 4,619 (the other half) are considered shallow-draft facilities.

Table 1-22
**U.S. Public Port Capital Expenditures by Type of Facility, 1995–2000 (Thousands of current dollars)**

| | General cargo | Specialized general cargo | Dry bulk | Liquid bulk | Passenger | Other | Infrastructure | Dredging | Total per year |
|---|---|---|---|---|---|---|---|---|---|
| 2000 | $241,424 | $330,006 | $37,058 | $8,168 | $59,849 | $86,188 | $177,471 | $117,489 | $1,057,653 |
| 1999 | $127,864 | $436,750 | $57,701 | $16,074 | $71,824 | $100,829 | $194,311 | $110,327 | $1,115,680 |
| 1998 | $154,133 | $506,840 | $90,338 | $2,143 | $26,532 | $222,602 | $259,882 | $151,927 | $1,414,397 |
| 1997 | $227,543 | $547,651 | $127,536 | $966 | $59,342 | $131,534 | $318,528 | $129,354 | $1,542,454 |
| 1996 | $191,898 | $533,648 | $76,513 | $5,977 | $34,740 | $61,805 | $254,350 | $142,221 | $1,301,152 |
| 1995 | $267,275 | $345,649 | $36,105 | $10,994 | $57,038 | $98,887 | $253,384 | $134,123 | $1,203,455 |
| **Total** | **$968,713** | **$2,370,538** | **$388,193** | **$36,154** | **$249,476** | **$615,657** | **$1,280,455** | **$667,952** | **$6,577,138** |

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Ports and Domestic Shipping, U.S. Port Development Expenditure Reports, various years.

- The Port of Long Beach was the number one port in terms of capital expenditures in 2000, followed by the Port of New York and New Jersey.*
- Specialized general cargo expenditures accounted for 36 percent of 1995–2000 expenditures, the largest category.

*SOURCE: U.S. Department of Transportation, Office of Ports and Domestic Shipping, U.S. Port Development Expenditure Report, 2000.

Table 1-23
**U.S. Port Capital Expenditures for 2001 to 2005 (Thousands of dollars)**

| Region | Dollars | Percent |
|---|---|---|
| North Atlantic | 1,563,764 | 16.6 |
| South Atlantic | 1,772,685 | 18.8 |
| Gulf | 1,619,322 | 17.2 |
| South Pacific | 3,190,488 | 33.8 |
| North Pacific | 1,203,669 | 12.8 |
| Great Lakes | 38,575 | 0.4 |
| AK, HI, PR, & VI[a] | 45,032 | 0.5 |
| **Total** | **9,433,535** | **100.0** |

[a]Alaska, Hawaii, Puerto Rico, & Virgin Islands

NOTE: Numbers do not add to total due to rounding.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Ports and Domestic Shipping, *U.S. Port Development Report,* December 2001.

- U.S. public ports plan to invest an additional $9.4 billion in new facilities between 2001 and 2005.

Table 1-24
**U.S. Locks Annual Average Delay (hrs)—Top 20 Locations, 1998–1999**

| River | Lock | Chamber | 1998 | 1999 |
|---|---|---|---|---|
| Ohio | McAlpine | Aux 1 | NA | 36.4 |
| Tennessee | Guntersville | Aux | NA | 14.9 |
| Ohio | Greenup | Aux 1 | 10 | 8.6 |
| Mississippi | Melvin Price | Aux | NA | 7.7 |
| Ohio | Cannelton | Aux | NA | 7.7 |
| GIWW | Inner Harbor navigation channel | Main | 12 | 6.4 |
| Mississippi | 27 | Aux 1 | 2 | 5.5 |
| GIWW Port Allen-Morgan cty Alt. Rte | Bayou Sorrel | Main | 11 | 4.7 |
| Ohio | 52 | Main | 2 | 4.4 |
| GIWW Algiers Canal | Algiers | Main | 4 | 4.3 |
| Tennessee | Kentucky | Main | 5 | 4.3 |
| Mississippi | 14 | Main | 3 | 3.9 |
| Mississippi | 22 | Main | 3 | 3.8 |
| Mississippi | 25 | Main | 5 | 3.8 |
| Mississippi | 24 | Main | 5 | 2.9 |
| Illinois | LaGrange | Main | 2 | 2.8 |
| Ohio | 52 | Aux 1 | 3 | 2.7 |
| Mississippi | 15 | Main | 2 | 2.7 |
| GIWW Port Allen-Morgan cty Alt. Rte | Port Allen | MAIN | 2 | 2.7 |
| Ohio | Markland | Aux 1 | NA | 2.4 |

KEY: NA = less than 1 hour.

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center, Lock Performance Monitoring System, *Average Delay at Locks with Greater Than 1 Hour Average Delay,* 1998-1999, available at E:\ndc\lpms.htm as of Apr. 23, 2001.

Table 1-25
**U.S. Ferry Vessels by Service Type, 2000**

| Service | Number of vessels |
|---|---|
| Passenger only | 341 |
| Roll-on roll-off | 326 |
| Railroad carfloat | 10 |
| **Total** | **677** |

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Intermodal and Statewide Programs Division, datafile, December 2000.

- Each year over 113 million passengers and 32 million vehicles are carried by ferry.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Intermodal and Statewide Programs Division, *National Ferry Study Report to Congress*, January 2001.

Table 1-26
**Top 20 Ranking of U.S. Ferry Terminals by State, 2000**

| State | Number of terminals |
|---|---|
| New York | 51 |
| Washington | 46 |
| Alaska | 41 |
| California | 38 |
| Maine | 33 |
| Michigan | 31 |
| Louisiana | 30 |
| Massachusetts | 27 |
| North Carolina | 27 |
| Virginia | 20 |
| Florida | 19 |
| Kentucky | 16 |
| Wisconsin | 16 |
| New Jersey | 13 |
| Illinois | 11 |
| Ohio | 11 |
| Maryland | 10 |
| Rhode Island | 10 |
| South Carolina | 9 |
| Texas | 9 |
| **Total top 20** | **468** |
| **Total overall** | **578** |

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Intermodal and Statewide Programs Division, National Ferry Database, National Ferry Study, December 2000.

- Ferries serve 43 states and territories of the United States.
- Some services provide essential links to many islands along the U.S. coasts and links in rural areas of the United States.
- Some provide commuter services in metropolitan regions.
- Some provide long distance service.

SOURCE: Federal Highway Administration, National Ferry Study Report to Congress, January 2001.

Table 1-27
**Fiscal Year 2000 Dredging Costs**

| | Dredging expenditures (thousands of dollars) | | | Cubic yards dredged (thousands of cubic yards) | | |
|---|---|---|---|---|---|---|
| | Federal | Nonfederal | Work for others (reimburse) | Federal | Nonfederal | Work for others (reimburse) |
| **CONTRACT (O&M, CG, MR&T)** | | | | | | |
| ***Maintenance:*** | | | | | | |
| Hopper | 72,388.3 | 1,969.3 | 9,202.1 | 34,513.5 | 650.8 | 2,272.0 |
| Nonhopper | 352,868.4 | 7,628.7 | 8,430.3 | 141,208.2 | 547.7 | 2,624.8 |
| ***New work:*** | | | | | | |
| Hopper | 43,907.5 | 12,732.1 | 942.0 | 12,817.4 | 4,051.3 | 293.0 |
| Nonhopper | 139,159.8 | 64.964.2 | 18,983.4 | 26,801.5 | 13,312.5 | 1,354.9 |
| **GOVERNMENT PLANT (O&M, CG, MR&T)** | | | | | | |
| ***Maintenance:*** | | | | | | |
| Hopper | 47,085.3 | 0.0 | 0.0 | 15,514.7 | 0.0 | 0.0 |
| Nonhopper | 38,011.3 | 0.0 | 3,405.0 | 28,750.7 | 0.0 | 619.0 |
| ***New work:*** | | | | | | |
| Hopper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Nonhopper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ***PL-99 Work (emergency)*** | | | | | | |
| ***Contract:*** | | | | | | |
| Hopper | 0.0 | 0.0 | 0.0 | 204.0 | 0.0 | 0.0 |
| Nonhopper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ***Government plant:*** | | | | | | |
| Hopper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Nonhopper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **TOTAL Corpswide** | **Dollars = 821,677.7** | | | **Cubic yards = 285,332.0** | | |

KEY: CG = Coast Guard; O&M = Operation and Maintenance; MR&T = Mississippi River and tributaries.

NOTE: A hopper loads material dumped into it by a dredger and discharges the cargo through the bottom.

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center, available at http://www.wrsc.usace.army.mil/ndc/dd00cos1.htm, as of June 21, 2001.

Table 1-28
**U.S. Army Corps of Engineers Dredging Program, Costs and Yards Moved, FY 1993–2000**

| | Millions of dollars | | | Millions of cubic yards | | |
|---|---|---|---|---|---|---|
| Year | Maintenance | New work | Total | Maintenance | New work | Total |
| 1993 | 75.0 | 0.7 | 75.8 | 38.3 | 0.1 | 38.4 |
| 1994 | 84.3 | 0.0 | 84.3 | 52.5 | 0 | 52.5 |
| 1995 | 88.8 | 6.5 | 95.3 | 53.8 | 7.9 | 61.7 |
| 1996 | 85.4 | 0.0 | 85.4 | 52.5 | 0.0 | 52.5 |
| 1997 | 95.9 | 0.2 | 96.1 | 67.8 | 0.0 | 67.8 |
| 1998 | 76.6 | 0.0 | 76.6 | 42.4 | 0.0 | 42.4 |
| 1999 | 92.7 | 0.0 | 92.7 | 45.8 | 0.0 | 45.8 |
| 2000 | 88.5 | 0.0 | 88.5 | 44.9 | 0.0 | 44.9 |

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center, available at http://www.iwr.usace.army.mil/ndc/ddhiscoe.htm as of December 12, 2001.

- Dredging of sediments is carried out by the U.S. Army Corps of Engineers and U.S. port authorities. The U.S. Army Corps of Engineers dredged 45 million cubic yards of sediments in port and harbors in 2000.

Table 1-29
**U.S. Army Corps of Engineers Dredging Program, Summary of Industry Activities, 1993–2000**

| | Millions of dollars | | | Millions of cubic yards | | |
|---|---|---|---|---|---|---|
| Year | Maintenance | New work | Total | Maintenance | New work | Total |
| 1993 | 335.2 | 103.9 | 439.1 | 197.2 | 33.4 | 230.6 |
| 1994 | 342.4 | 100.8 | 443.2 | 212.2 | 37.0 | 249.2 |
| 1995 | 319.4 | 116.3 | 435.7 | 163.4 | 26.1 | 189.5 |
| 1996 | 339.6 | 89.7 | 429.4 | 181.8 | 24.4 | 206.1 |
| 1997 | 398.5 | 127.3 | 525.8 | 185.0 | 32.2 | 217.2 |
| 1998 | 455.9 | 178.0 | 633.9 | 168.9 | 27.3 | 196.3 |
| 1999 | 487.4 | 232.2 | 719.6 | 195.9 | 42.1 | 238.1 |
| 2000 | 452.5 | 280.7 | 733.2 | 181.8 | 42.8 | 240.4 |

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center, available at http://www.iwr.usace.army.mil/ndc/ddhisind.htm as of December 12, 2001.

- The maritime industry spent $733 million for maintenance dredging and new work in 2000 for removal of 240 million cubic yards of sediments.

Table 1-30
**Number of Contracts, Cubic Yards and Dollars by Type of Material Disposal, and Fiscal Year**

| | | Fiscal year | | | | | |
|---|---|---|---|---|---|---|---|
| **Disposal type** | **Data** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** |
| Beach nourishment | Number of contracts | 44 | 37 | 29 | 36 | 29 | 29 |
| | Cubic yards | 15,796,382 | 19,970,310 | 13,109,655 | 13,392,091 | 6,780,865 | 13,904,564 |
| | Dollars (bid) | $92,058,399 | $115,685,129 | $102,878,679 | $72,498,309 | $50,414,809 | $55,603,970 |
| Confined | Number of contracts | 31 | 21 | 33 | 23 | 41 | 22 |
| | Cubic yards | 20,520,152 | 17,922,383 | 32,294,086 | 19,217,160 | 39,195,307 | 29,577,783 |
| | Dollars (bid) | $55,432,614 | $44,666,726 | $68,221,829 | $59,465,998 | $114,048,915 | $78,329,347 |
| Underwater confined | Number of contracts | NA | NA | NA | NA | NA | 2 |
| | Cubic yards | NA | NA | NA | NA | NA | 422,000 |
| | Dollars (bid) | NA | NA | NA | NA | NA | $2,201,470 |
| Mixed methods | Number of contracts | 23 | 20 | 22 | 16 | 11 | 11 |
| | Cubic yards | 38,884,250 | 43,945,164 | 65,365,841 | 37,151,800 | 20,828,480 | 13,346,158 |
| | Dollars (bid) | $81,397,557 | $48,059,077 | $229,522,848 | $55,282,442 | $50,281,603 | $39,241,989 |
| Overboard/open water | Number of contracts | 67 | 63 | 75 | 64 | 72 | 44 |
| | Cubic yards | 84,027,315 | 70,029,850 | 84,990,343 | 103,571,627 | 147,808,404 | 53,608,368 |
| | Dollars (bid) | $122,096,664 | $118,204,208 | $143,217,048 | $180,309,894 | $415,409,964 | $151,378,712 |
| Open water/upland | Number of contracts | 15 | 9 | 9 | 10 | 6 | 13 |
| | Cubic yards | 12,685,754 | 6,501,808 | 5,412,336 | 6,850,202 | 6,855,000 | 13,923,050 |
| | Dollars (bid) | $27,309,835 | $21,434,092 | $19,519,970 | $12,253,679 | $11,933,950 | $35,068,425 |
| Upland/Beach | Number of contracts | 5 | 3 | 4 | 4 | 2 | 1 |
| | Cubic yards | 875,352 | 1,184,031 | 1,783,300 | 2,541,782 | 1,150,000 | 400,000 |
| | Dollars (bid) | $8,557,120 | $6,529,675 | $10,105,182 | $9,238,444 | $9,985,800 | $2,179,146 |
| Upland | Number of contracts | 19 | 26 | 24 | 24 | 21 | 17 |
| | Cubic yards | 13,988,710 | 14,667,496 | 15,308,625 | 15,576,992 | 17,771,200 | 11,796,720 |
| | Dollars (bid) | $34,663,375 | $35,656,772 | $86,250,297 | $49,243,858 | $54,310,632 | $52,708,103 |
| Wetlands nourishment | Number of contracts | 6 | 6 | 3 | 9 | 10 | 2 |
| | Cubic yards | 11,325,000 | 9,120,000 | 8,500,000 | 38,810,000 | 11,421,051 | 6,700,000 |
| | Dollars (bid) | $11,557,000 | $13,380,850 | $11,803,000 | $87,057,759 | $26,329,518 | $24,283,376 |
| Undefined | Number of contracts | 2 | 2 | 2 | 2 | 8 | 15 |
| | Cubic yards | 466,500 | 3,532,000 | 3,221,000 | 187,764 | 4,460,587 | 10,485,200 |
| | Dollars (bid) | $2,045,460 | $2,018,760 | $45,466,170 | $192,239 | $17,943,948 | $82,358,473 |
| **Total contracts** | | **212** | **187** | **201** | **188** | **200** | **156** |
| **Total cubic yards** | | **198,569,415** | **186,873,042** | **229,985,186** | **237,299,418** | **256,270,894** | **154,163,843** |
| **Total dollars (bid)** | | **$435,118,023** | **$405,635,288** | **$716,985,024** | **$525,542,622** | **$750,659,139** | **$523,353,011** |

KEY:
NA – not available
Material Disposal – manner in which dredge material is placed.
Beach Nourishment – beach restoration in which hydraulically pumped dredge material is directly placed onto an eroded beach.
Confined – placement of dredged material within diked nearshore or upland confined placement facilities that enclose and isolate the dredged material from adjacent waters.
Mixed – dredging operation that uses more than one dredged material placement alternative.
Overboard & Open Water – placement of dredged material in rivers, lakes, estuaries, or oceans via pipeline or surface release from hopper dredges.
Open Water & Upland – combination of open water and upland placement of dredged material.
Upland & Beach Nourishment – combination of upland placement and beach nourishment using dredged material.
Upland – placement of dredge material on land above adjacent water surface elevation.
Wetland Creation or Nourishment – wetland restoration in which hydraulically pumped dredge material is directly placed in a wetland area.
Undefined – undefined or unknown at the time of data entry

SOURCE: U.S. Army Corps of Engineers, Navigation Data Center, available at http//:www.wrsc.usace.army.mil/ndc/dredge.htm as of June 21, 2001.

# Shipbuilding


BTS

The ability to build and repair both military and commercial vessels is considered vital to U.S. national security (USDOC 2001). The shipbuilding industry in the United States supports both military and commercial interests.

The data in this chapter portray the world orderbook for merchant vessels and U.S. shipbuilding and repair activities, including the conversion and construction of barges and ships used in inland waterways and coastal waters.

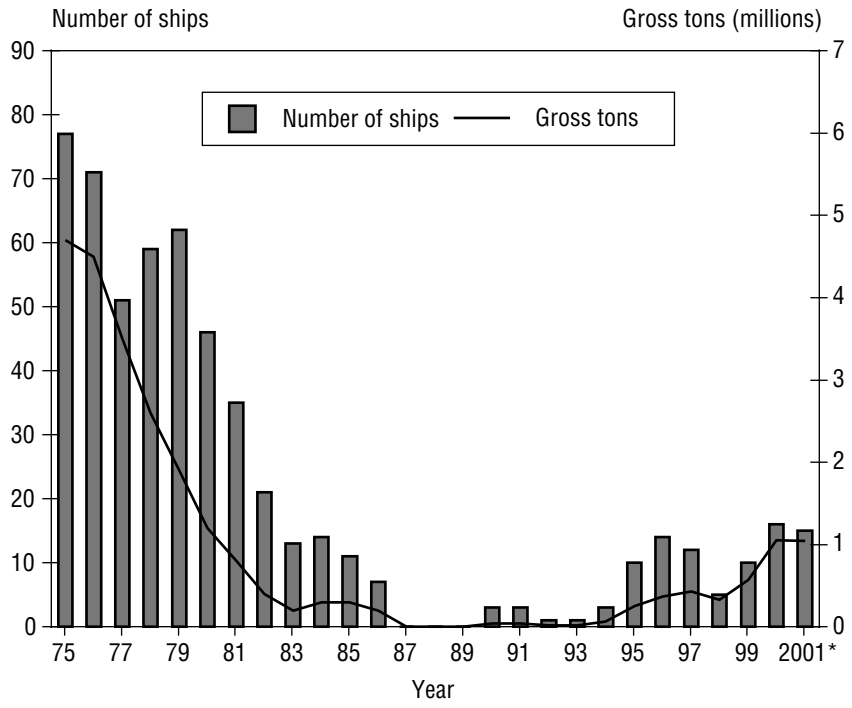
Table 2-1
**World Commercial Shipbuilding Orderbook, Gross Tonnage 1,000 and Above as of September 30, 2001 (Thousands)**

| Country of build | Ship rank | Number of ships | Gross tons | Gross rank |
|---|---|---|---|---|
| Korea (South) | 1 | 507 | 31,299 | 1 |
| Japan | 2 | 455 | 19,153 | 2 |
| China (People's Republic) | 3 | 307 | 5,433 | 3 |
| Poland | 5 | 132 | 2,806 | 4 |
| Germany | 7 | 100 | 2,253 | 5 |
| Italy | 10 | 65 | 2,221 | 6 |
| Croatia | 14 | 50 | 1,554 | 7 |
| United States | 15 | 46 | 1,038 | 8 |
| China (Republic of Taiwan) | 17 | 32 | 961 | 9 |
| Finland | 22 | 13 | 871 | 10 |
| Romania | 6 | 103 | 871 | 11 |
| Spain | 8 | 92 | 691 | 12 |
| France | 19 | 23 | 668 | 13 |
| Netherlands | 4 | 196 | 578 | 14 |
| Denmark | 23 | 13 | 529 | 15 |
| Ukraine | 18 | 30 | 436 | 16 |
| Russia | 9 | 79 | 356 | 17 |
| Philippines | 24 | 11 | 338 | 18 |
| Singapore | 11 | 54 | 328 | 19 |
| Turkey | 12 | 54 | 273 | 20 |
| **Total top 20 country of build** | | **2,362** | **72,667** | |
| **Percent of total world orderbook** | | **89.1** | **98.7** | |
| **Total world orderbook** | | **2,648** | **73,581** | |

SOURCE: Lloyd's Maritime Information Services, *World Shipbuilding Statistics* (London: July 2001).

- South Korea and Japan account for 69 percent of the gross tonnage of ships on order as of July 2001.
- Gross tonnage on order in 2001 was 37 percent higher than a year earlier.

Figure 2-1
**U.S. Commercial Shipbuilding Orderbook History as of June 2001 (Thousands of gross tons)**

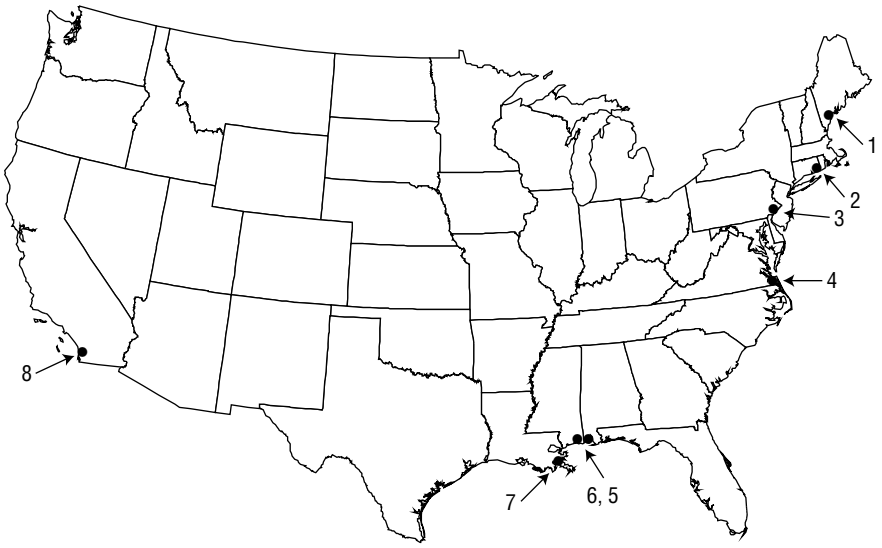



*2001 Data as of June 1, 2001.

SOURCE: U.S. Department of Transportation, Maritime Administration, *Shipyard Activity Reports, 1975-2001.*

- U.S. ranks 8th in world merchant shipbuilding orderbook in terms of coverage.
- U.S. ranked 8th in world merchant shipbuilding in 1975.
- The increase in U.S. shipbuilding activity since the low point in the 1980s was due to such occurrences as the increase in orders for offshore supply vessels, replacement of aging vessels, and the federal assistance programs.

Figure 2-2
**Major U.S. Shipbuilding Facilities Constructing Oceangoing Vessels as of October 2001**




1. Bath Iron Works Corp.
2. Electric Boat Corp.
3. Kvaerner Philadelphia Shipyard, Inc.
4. Newport News Shipbuilding
5. Halter Pascagoula
6. Northrup Grumman Ship Systems—Ingalls Operations
7. Northrup Grumman Ship Systems—Avondale Operations
8. National Steel Shipbuilding Co.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Shipbuilding and Marine Technology, October 2001.

- The U.S. shipbuilding industry has been affected by mergers and shipyard closings in recent years.
- The major U.S. shipbuilding yards employ approximately 45 percent of the U.S. shipbuilding and repair industry's total workforce.

Table 2-2
**Major U.S. Shipbuilding and Repair Facilities by Coast as of October 2001**

| | |
|---|---|
| East Coast | 30 |
| Gulf Coast | 35 |
| Great Lakes | 17 |
| West Coast | 7 |
| Other* | 3 |
| Total (by coast) | 92 |

*Non-contiguous and inland U.S.

SOURCE: U.S. Department of Transportation, Maritime Admin., Office of Shipbuilding and Repair Technology, as of October 2001, available at: http://www.marad.dot.gov/nmrec/links/usshipyardsr.html.

Table 2-3
**Military Ships Under Construction as of October 2001 (1,000 ldt or greater)**

| Symbol | Type | Number |
|---|---|---|
| CVN | Aircraft carrier (nuclear powered) | 2 |
| DDG | Guided missile destroyer | 17 |
| LPD | Amphibious transport ship | 4 |
| SSN-21 | Attack submarine (nuclear powered) | 1 |
| SSN-774 | Attack submarine (nuclear powered) | 4 |
| T-AKR | Military sealift ship | 3 |
| **Total** | | **31** |

KEY: ldt = light displacement ton.

SOURCE: U.S. Department of Transportation, Maritime Admin., Office of Shipbuilding and Repair Technology, as of October 2001, available at: http://www.marad.dot.gov/nmrec/links/usshipyardsr.html.

- Orders for U.S. warships have declined since the end of the Cold War.
- U.S. Navy procurement accounts for about 70 percent of the shipbuilding and repair industry's revenue.

SOURCE: U.S. Department of Commerce, Division of Export Administration, Office of Strategic Industries and Economic Security, Strategic Analysis Division, *National Security Assessment of the U.S. Shipbuilding and Repair Industry*, May 2001.

# Waterborne Transportation and the U.S. Economy

BTS

Demand for transportation-related goods and services represents about one-tenth of the U.S. economy and supports one in eight jobs. As the data in this chapter show, these goods and services include activities related to international and domestic waterborne trade. This chapter also provides data on employment in for hire water transportation industries, ship building and repairs and producer prices for transportation and water transportation industries.

Table 3-1
**Value Added by For-Hire Transportation to the U.S. Gross Domestic Product (Billions of current dollars)**

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| **For-hire transportation total** | **206** | **223.2** | **233.4** | **243.4** | **261.8** | **288.7** | **302.7** | **313.9** |
| Trucking and warehousing | 79.2 | 86.4 | 89 | 92.1 | 99.4 | 114.1 | 122.0 | 126.0 |
| Air | 56.4 | 62.5 | 67.7 | 70.8 | 78.6 | 85.8 | 90.2 | 93.0 |
| Rail | 22 | 23.3 | 23.6 | 23.4 | 23 | 24.3 | 23.2 | 22.9 |
| Local and interurban passenger transit | 11.3 | 11.6 | 12.4 | 13.4 | 14.9 | 16.8 | 17.6 | 18.7 |
| Water | 10.7 | 11.5 | 11.6 | 12.2 | 13.1 | 13.6 | 13.7 | 14.8 |
| Pipelines, except natural gas | 5.6 | 5.5 | 5.5 | 5.7 | 5.8 | 6.1 | 6.1 | 6.2 |

NOTE: Transportation industry includes transportation services.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Industry Accounts Data, Gross Domestic Product by Industry, available at http://www.bea.doc.gov/bea/dn2/gpoc.htm as of October 31, 2001.

- For-hire transportation firms contributed 3.2 percent of the value added to the U.S. Gross Domestic Product in 2001.
- Water transportation accounts for 4.7 percent of for-hire transportation's contribution to GDP.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Income and Product Accounts data, tables 1.1 and 1.3 as of September 2001 based on *Survey of Current Business*.

Table 3-2
**U.S. Net Stocks of Transportation Private Equipment by Type ($ current millions)**

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| Trucks, buses, and truck trailers | 181,402 | 206,706 | 234,066 | 260,750 | 283,010 | 321,822 | 370,869 | 404,838 |
| Autos | 126,418 | 142,301 | 149,983 | 158,951 | 159,904 | 157,837 | 161,193 | 162,758 |
| Aircraft | 133,484 | 137,356 | 143,610 | 147,119 | 149,596 | 158,461 | 177,838 | 203,087 |
| Railroad equipment | 68,949 | 71,806 | 76,909 | 77,053 | 77,129 | 79,116 | 82,338 | 84,390 |
| Ships and boats (U.S. registered) | 46,447 | 46,108 | 45,894 | 46,510 | 46,891 | 46,928 | 48,135 | 49,994 |
| **Total transportation equipment** | **556,700** | **604,276** | **650,462** | **690,383** | **716,529** | **764,164** | **840,373** | **905,068** |

NOTES: Net stock is the value of fixed assets adjusted for depreciation. Trucks includes pickups, panel trucks, vans, minivans, sport utility vehicles, jeeps, stationwagons built on truck chassis, and single-unit light and heavy trucks.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Fixed Assets and Consumer Durables,* available at: http://www.bea.doc.gov/bea/dn/facd/Index.html#jump as of September 5, 2001.

- The value of net stocks of U.S. registered ships and boats has grown very little since 1993, compared to the value of other kinds of transportation equipment.

Table 3-3
**Water Transportation: U.S. Balance of Payments ($ current millions)**

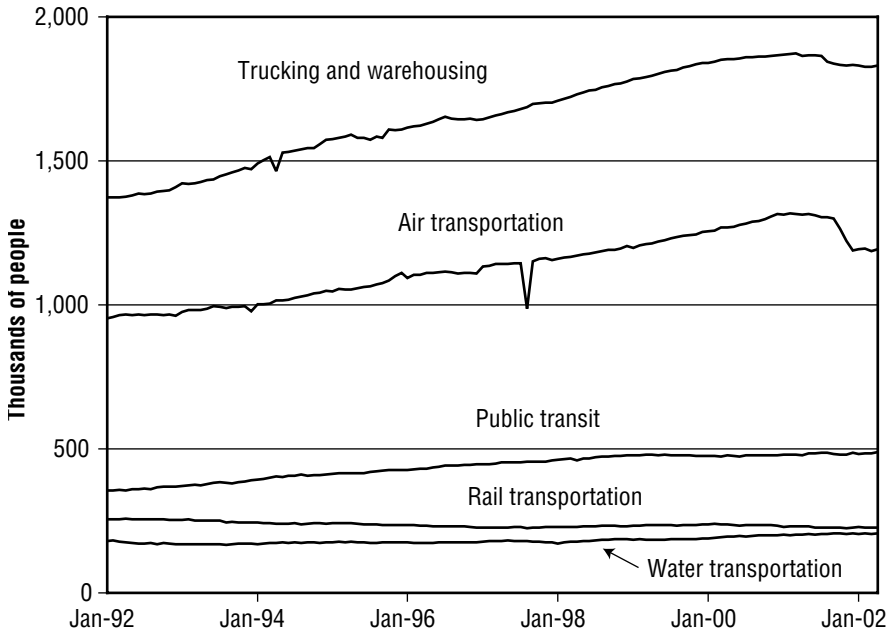
| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|
| **Receipts** | | | | | | | |
| Passenger fares | 237 | 287 | 285 | 338 | 296 | 394 | 360 |
| Export freight* | 4,056 | 4,506 | 5,282 | 4,703 | 4,571 | 3,786 | 3,929 |
| Port expenditures | 7,477 | 7,898 | 8,299 | 7,799 | 7,659 | 7,144 | 7,806 |
| **Total** | **11,770** | **12,691** | **13,866** | **12,840** | **12,526** | **11,324** | **12,095** |
| **Payments** | | | | | | | |
| Passenger fares | 341 | 353 | 353 | 444 | 358 | 399 | 369 |
| Import freight* | 10,462 | 11,369 | 11,514 | 11,259 | 11,907 | 13,652 | 15,727 |
| Port expenditures | 2,011 | 2,325 | 2,554 | 2,233 | 2,187 | 1,930 | 1,974 |
| **Total** | **12,814** | **14,047** | **14,421** | **13,936** | **14,452** | **15,981** | **18,070** |
| **Balance** | –1,044 | –1,356 | –555 | –1,096 | –1,926 | –4,657 | –5,975 |

*Includes charter hires.

SOURCE: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, *Statistical Abstract of the United States, The National Data Book, 120th Edition 2000,* December 2000, p. 658.

- The United States has had a persistent U.S. balance of payments deficit in water transportation. In 1999, foreign carriers, while paying $7.8 billion for U.S. port and handling services, received $15.7 billion for transporting foreign goods to U.S. ports.

Figure 3-1
**Employment in For-Hire Transportation Industries (Monthly data, seasonally adjusted)**




NOTE: These estimates are calculated with data collected from employers in all industry divisions in metropolitan and nonmetropolitan areas in every state and the District of Columbia.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Employment Status of Civilian Population by Sex and Age (A tables) and Employees on Nonfarm Payrolls by Industry (B tables), available at: http://www.bls.gov/cps/home.htm as of May 2002.

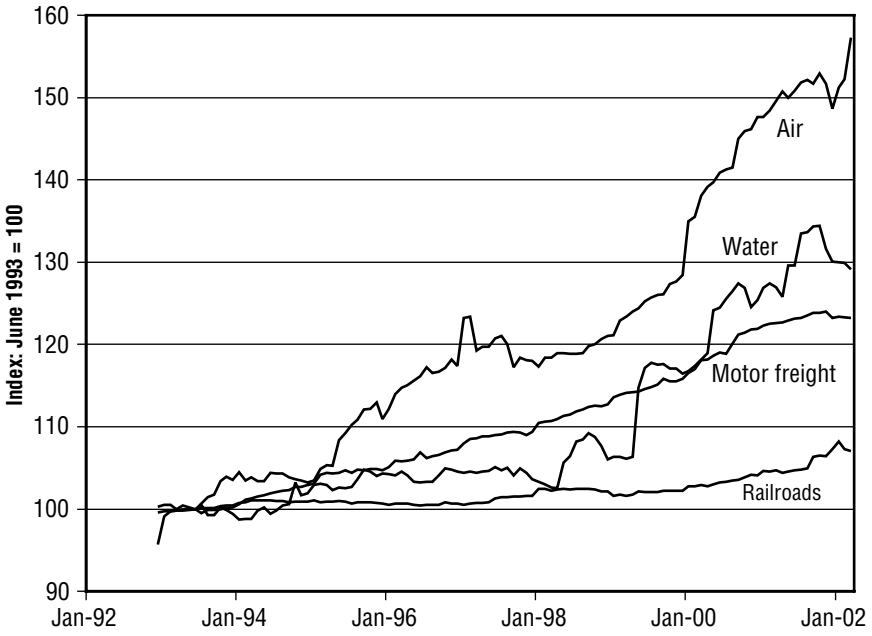
Table 3-4
**Employment in Water Transportation Occupations (Thousands)**

| | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Ship captains and mates, except fishing boats | 32 | 24 | 22 | 31 | 38 |
| Sailors and deckhands | 25 | 21 | 30 | 16 | 14 |
| Marine engineers | 8 | 2 | 3 | 5 | 2 |
| Bridge, lock, and lighthouse tenders | 5 | 5 | 8 | 5 | 3 |

NOTE: Beginning in January 1998, data are not comparable with data for 1997 and earlier years due to the new composite estimation procedures and revised population controls used in the household survey.

SOURCE: Source cited in U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2001,* in press, to appear on the BTS website in summer 2002.

Figure 3-2
**Producer Price Index: Transportation Services by Mode**
**(Monthly data, not seasonally adjusted)**

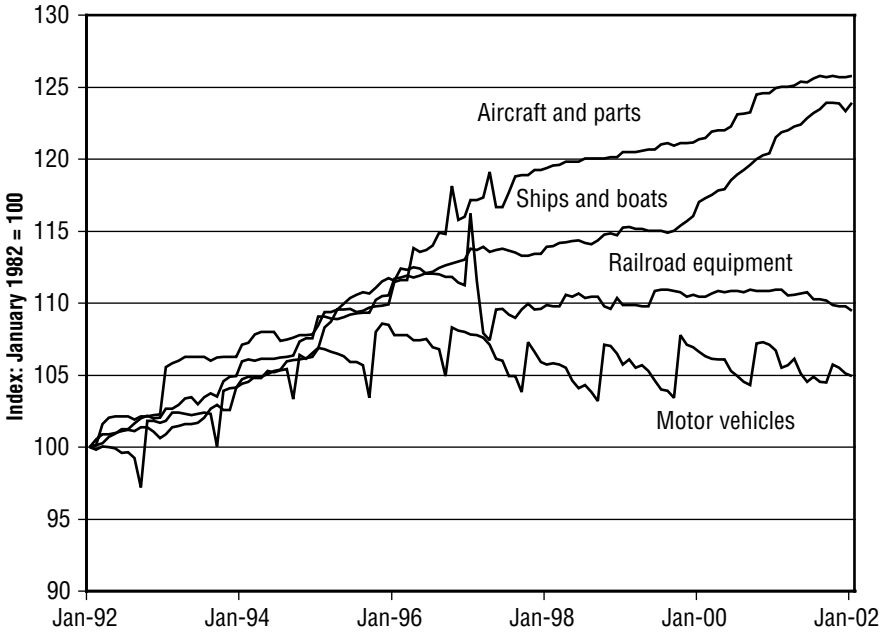



NOTE: Produce Price Index measures the average change over time in the selling prices received by domestic producers for their output.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, available at: http://www.bls.gov/ppi/ as of February 2002.

- Producers' price of water transportation service increased slowly during much of the 1990s. However, since early 1999, it has experienced dramatic increases, with a cumulative increase of 21 percent from March 1999 to March 2002.

Figure 3-3
**Producer Price Index: Equipment by Mode**
**(Monthly data, not seasonally adjusted)**

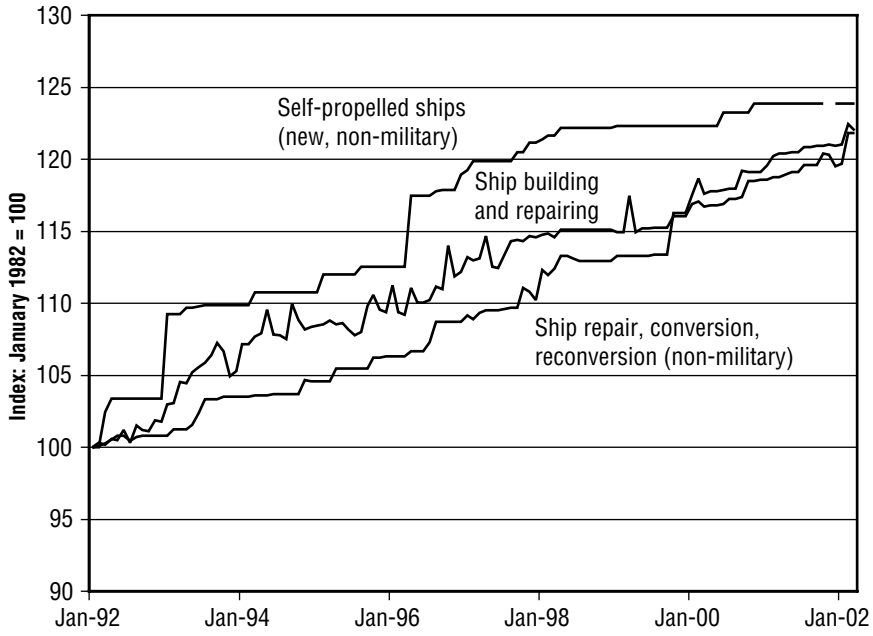



NOTE: Produce Price Index measures the average change over time in the selling prices received by domestic producers for their output.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, available at: http://www.bls.gov/ppi/ as of February 2002.

- In the 10 years from 1992 to 2002, producers' price of water transportation equipment, primarily ships and boats, increased 26.5 percent, the most in comparison to equipment increases of other modes.

Figure 3-4
**Producer Price Index: Ship and Repair Expenses**
**(Monthly data, not seasonally adjusted)**




NOTE: Produce Price Index measures the average change over time in the selling prices received by domestic producers for their output. Data for new, non-military self-propelled ships was not available for November 2001.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, available at: http://www.bls.gov/ppi/ as of May 2002.

- Within water transportation equipment, producers' price for self-propelled ship building increased faster than ship repair, conversion, reconversion, and ship building of other types of vessels.

Table 3-5
**Retail Sales of Top Selling Boats**

| | 1998[a] | 1999[a] | 2000 |
|---|---|---|---|
| **Outboard boats:** | | | |
| Total units sold | 213,700 | 230,200 | 241,200 |
| Retail value | $1,547,188,000 | $1,988,928,000 | $2,306,577,000 |
| Average unit cost | $7,240 | $8,640 | $9,563 |
| **Sterndrive boats** | | | |
| Total units sold | 77,700 | 79,600 | 78,400 |
| Retail value | $1,746,696,000 | $2,054,476,000 | $2,253,843,200 |
| Average unit cost | $22,480 | $25,810 | $28,748 |
| **Personal water craft:** | | | |
| Total units sold | 130,000 | 106,000 | 92,000 |
| Retail value | $868,530,000 | $771,044,000 | $720,176,000 |
| Average unit cost | $6,681 | $7,274 | $7,828 |
| **Sailboats** | | | |
| Total units sold | 18,200 | 21,200 | 22,200 |
| Retail value | NA | $589,360,000 | 740,900,000 |
| Average unit cost | NA | $27,800 | 33,374 |
| **Canoes** | | | |
| Total units sold | 107,800 | 121,000 | 111,800 |
| Retail value | $64,033,200 | $67,034,000 | $64,508,600 |
| Average unit cost | $594 | $554 | $577 |

[a]1998 and 1999 Market estimates revised in 2000. 2000 market estimates revised in 2001.

KEY: NA = not available.

NOTE: All industry figures are estimates. Ownership figures are based on actual Coast Guard registrations and estimates of nonregistered boats.

SOURCE: National Marine Manufacturers Association, Chicago, IL, available at http://www.nmma.org as of June 26, 2001.

- Sales of personal watercraft declined an estimated 13 percent between 1999 and 2000.
- Outboard boats lead recreational boat sales in 2000 in number of units, followed by canoes.

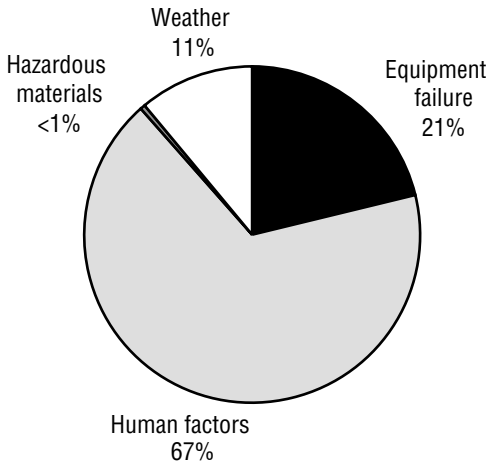
# Safety and Environment


USCG

Water transportation provides economic benefits, mobility, and recreational opportunities, but it also creates unintended consequences, such as fatalities, injuries and property damage due to accidents, and environmental damage. Hence, promoting safety and protecting the environment are key goals in the Department of Transportation's (DOT's) strategic plan.

This chapter offers data on the safety of commercial shipping and recreational boating and the environmental impacts associated with these activities. A special section on environmental issues associated with cruise ships appears at the end of this report.

Figure 4-1
**Causes Ascribed to Marine Transportation Accidents, 1996–2000**




NOTE: Only accidents involving a fatality, a missing person, an injury, or at least $25,000 in damages are included.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Marine Safety Information Management System database as of December 2001.

- Two-thirds of marine transportation accidents involve human factors, such as misunderstanding or ignoring hazard warnings, operating in adverse conditions without adequate weather monitoring, and navigational errors.
- Over one-fifth of accidents are caused by a failure of vessel equipment, such as deck machinery, generators, propulsion controls, and fuel systems.

Table 4-1
**Waterborne Transport Safety Data and Property Damage Resulting from Vessel Casualties**

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Deaths | 96 | 114 | 78 | 51 | 52 | 51 | 63 | 50 | 11 |
| Injuries | 163 | 167 | 176 | 145 | 223 | 120 | 130 | 128 | 44 |
| Accidents | 3,238 | 3,412 | 3,970 | 4,297 | 4,263 | 4,197 | 4,361 | 4,000 | 2,818 |
| Vessels involved | 4,789 | 5,137 | 6,204 | 6,722 | 6,693 | 6,463 | 6,382 | 5,682 | 3,937 |
| Property damage ($ millions) | 199.5 | 173.6 | 263.3 | 157.8 | 173.3 | 156.4 | 221.6 | 138.1 | 87.9 |

NOTES: Fatalities include the number of people who died or were declared missing as the result of a marine casualty. Data in this table include only vessel related marine casualties verified as reportable under 46 Code of Federal Regulations 4.05. Data include incidents involving both U.S. and foreign-flag vessels in U.S. waters, but only incidents involving U.S. flag vessels outside U.S. waters. Incidents involving only a pollution release or personal injury without vessel involvement are not included. More than one vessel may be involved in a single marine casualty.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Marine Safety Management System, Office of Information Resources, Data Administration Division as of December 2001.

- In addition to loss of life and injuries, marine accidents can result in appreciable property damage.

Table 4-2
**Recreational Boating Accidents, Fatalities, and Injuries, 2000**

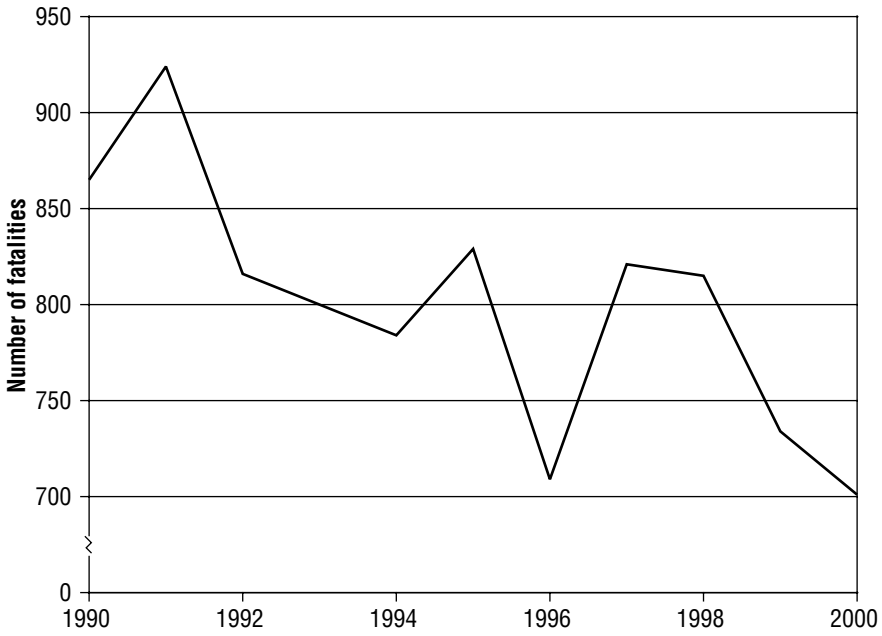
| Boat type | Boats in accidents | Number of injuries | Drownings | Other fatalities | Total fatalities |
|---|---|---|---|---|---|
| Airboat | 10 | 5 | 1 | 0 | 1 |
| Auxiliary sail | 432 | 51 | 12 | 0 | 12 |
| Cabin motorboat | 1,628 | 408 | 32 | 33 | 65 |
| Canoe/kayak | 159 | 70 | 93 | 11 | 104 |
| Houseboat | 164 | 33 | 7 | 2 | 9 |
| Inflatable | 40 | 20 | 15 | 1 | 16 |
| Jet boat | 20 | 11 | 1 | 0 | 1 |
| Open motorboat | 4,318 | 1,957 | 280 | 81 | 361 |
| Personal watercraft | 3,268 | 1,580 | 24 | 44 | 68 |
| Pontoon | 254 | 72 | 3 | 0 | 3 |
| Rowboat | 65 | 20 | 35 | 3 | 38 |
| Sail (only) | 110 | 22 | 4 | 3 | 7 |
| Other | 122 | 29 | 9 | 2 | 11 |
| Unknown | 394 | 77 | 4 | 2 | 6 |
| **Total** | **10,984** | **4,355** | **519** | **182** | **701** |

NOTE: These data do not include: 1) accidents involving only slight injury not requiring medical treatment beyond first-aid; 2) accidents involving property damage of $500 or less; 3) accidents not caused or contributed to by a vessel, its equipment, or its appendages; and 4) accidents in which the boat was used solely as a platform for other activities, such as swimming or skin diving. Such cases are not included because the victim freely left the safety of a boat. However, the data do include accidents involving people in the water who are struck by their boat or another boat.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, Boating Statistics – 2000, available at http://www.uscgboating.org/saf/pdf/boating_statistics_2000.pdf as of October 2001.

- Recreational boating accidents in most years results in far more fatalities than accidents involving commercial waterborne transportation (see table 4-1).
- Most recreational boating accidents and fatalities occurred in open motor boats.

Figure 4-2
**Recreational Boating Fatalities (Annual data)**




SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, *Boating Statistics* (Washington DC: Annual issues).

- Recreational boating fatalities have declined overall since 1990.

Table 4-3
**Recreational Boating Safety, Alcohol Involvement, and Property Damage, 1995–2000**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| Fatalities | 829 | 709 | 821 | 815 | 734 | 701[a] |
| Injuries | 4,141 | 4,442 | 4,555 | 4,612 | 4,315 | 4,355 |
| Accident report cites alcohol involvement | 472 | 601 | 698 | 704 | 633 | 696 |
| Property damage (current $ millions) | 30.3 | 23.2 | 29.0 | 31 | 28.9 | 34.7 |
| Accidents | 8,019 | 8,026 | 8,047 | 8,061 | 7,931 | 7,740 |
| Vessels involved | 11,534 | 11,306 | 11,396 | 11,368 | 11,190 | 10,984 |
| Numbered boats (millions) | 11.7 | 11.9 | 12.3 | 12.6 | 12.7 | 12.8 |

[a] The numbers for recreational boating safety are raw numbers. The U.S. Coast Guard reports a 6 percent addition [as suggested by DOT Inspector General] because they found a discrepancy in a review of SARMIS and BARD data (see the discussion found in the DOT FY2003 Performance Plan on page 135 under details of recreational boating fatalities).

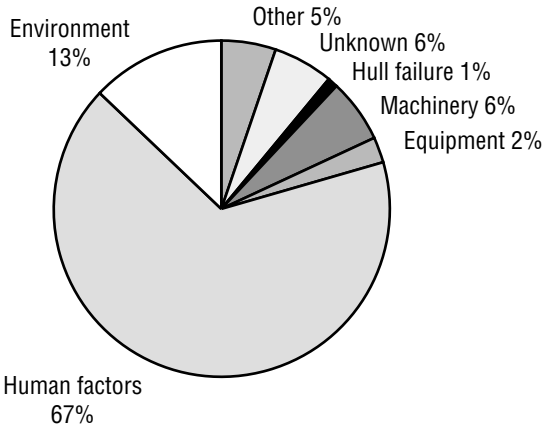
NOTE: Only a small fraction of property damages and nonfatal accidents are reported to the U.S. Coast Guard.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, *Boating Statistics* (Washington, DC: Annual issues).

- Alcohol involvement in reported accidents accounted for 31 percent of all boating fatalities in 2000.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, Boating Statistics – 2000, p. 7.

Figure 4-3
**Causes of Recreational Boating Accidents—1999**




| Causes | Accidents |
|---|---|
| Human factors | 5,276 |
| Environment | 1,025 |
| Machinery | 484 |
| Unknown | 460 |
| Other | 413 |
| Equipment | 194 |
| Hull failure | 79 |
| **Total** | **7,931** |

NOTES: Most boating accidents involved human factors. Human factors include accidents during loading of passengers or gear and operation of the vessel. Operator inattention and operator inexperience were the top 2 causes of accidents due to the operation of the vessel. Alcohol is a major factor in boating accidents.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, Boating Statistics – 2000, available at http://www.uscgboating.org/saf/pdf/boating_statistics_2000.pdf.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, *Boating Safety Statistics 2000*, available at http://www.uscgboating.org/saf/pdf/boating_statistics_2000.pdf.

- Nearly 70 percent of all reported accidents involve factors that are under the control of the boat operator.
- Primary causes of accidents are operator inattention, careless or reckless operation, operator inexperience, operating at an unsafe speed, and no proper lookout.
- Eighty-four percent of all boating fatalities occurred on boats where the operator had not completed a boating safety education course.

Table 4-4
**Type of Boating Accidents, 1995–2000**

| Accident type | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| Collison with another vessel | 2,687 | 2,639 | 2,581 | 2,837 | 2,729 | 2,706 |
| Collison with fixed object | 584 | 580 | 623 | 833 | 881 | 851 |
| Falls overboard | 660 | 648 | 669 | 662 | 624 | 610 |
| Capsizing | 520 | 471 | 496 | 569 | 549 | 502 |
| Grounding | 360 | 363 | 383 | 472 | 507 | 494 |
| Flooding/swamping | 236 | 295 | 323 | 439 | 460 | 419 |
| Skier mishap | 346 | 378 | 445 | 497 | 450 | 442 |
| Falls within boat | 219 | 316 | 319 | 343 | 352 | 316 |
| Fire/explosion (fuel) | 204 | 190 | 160 | 202 | 222 | 183 |
| Sinking | 210 | 202 | 177 | 243 | 220 | 187 |
| Collison with floating object | 201 | 203 | 206 | 172 | 172 | 151 |
| Struck submerged object | 100 | 110 | 135 | 165 | 161 | 199 |
| Fire/explosion (other than fuel) | 42 | 72 | 78 | 110 | 141 | 116 |
| Struck by boat | 185 | 147 | 133 | 142 | 132 | 157 |
| Struck by motor or propellor | 117 | 119 | 123 | 101 | 99 | 88 |
| Other/unknown | 1,348 | 1,293 | 1,196 | 274 | 232 | 260 |
| **Total** | **8,019** | **8,026** | **8,047** | **8,061** | **7,931** | **7,740** |

NOTES: Type of accident refers only to the first event that occurred. Some accidents involve more than one event. A grounding followed by a sinking is counted only as a grounding.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, Boating Statistics – 2000, available at http://www.uscgboating.org/saf/pdf/boating_statistics_2000.pdf as of October 2001.

- Of the 47,824 recreational boating accidents that occurred from 1995 through 2000, about 34 percent (16,179) involved collisions with another vessel. This is followed by collisons with fixed objects and falls overboard. The top three types of boating accidents have remained the top three for the last 6 years.

Table 4-5
**Personal Flotation Devices (PFDs) and Drownings in Recreational Boating Accidents, 2000**

| Boat type | Was PFD worn ? Yes | Was PFD worn ? No | Total drownings |
|---|---|---|---|
| Auxiliary sail | 0 | 12 | 12 |
| Cabin motorboat | 5 | 27 | 32 |
| Canoe/kayak | 28 | 65 | 93 |
| Houseboat | 0 | 7 | 7 |
| Inflatable | 7 | 8 | 15 |
| Open motorboat | 19 | 261 | 280 |
| Other | 0 | 9 | 9 |
| Personal watercraft | 13 | 11 | 24 |
| Pontoon | 0 | 3 | 3 |
| Rowboat | 1 | 34 | 35 |
| Sail (only) | 01 | 4 | 4 |
| **Total** | **74** | **445** | **519** |

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Boating Safety, Boating Statistics – 2000, available at http://www.uscgboating.org/saf/pdf/boating_statistics_2000.pdf as of October 2001.

- Life jackets and other PFDs can reduce loss of life in boating accidents.
- 86 percent of the people who drowned in recreational boating accidents in 2000 were not using PFDs.

Table 4-6
**Recreational Boats Owned in the United States**

| Year | Estimated number of boats |
|---|---|
| 1990 | 15,987,000 |
| 1991 | 16,262,000 |
| 1992 | 16,262,000 |
| 1993 | 16,212,000 |
| 1994 | 16,239,000 |
| 1995 | 15,375,000 |
| 1996 | 15,830,000 |
| 1997 | 16,230,000 |
| 1998 | 16,824,000 |
| 1999 | 16,790,500 |
| 2000 | 16,991,140 |
| 2001 | 16,999,400 |

SOURCE: National Marine Manufacturers Association, Chicago, IL, available at: http://www.nmma.org as of July 17, 2002.

- Figures are estimates. Ownership figures are based on actual U.S. Coast Guard registrations and estimates of nonregistered boats. Total registry of numbered boats as of December 2000 was 12,782,143.

Table 4-7
**Boating Use, Ownership, and Facilities (Estimated)**

| | 2001 |
|---|---|
| People participating in recreational boating | 69,486,000 |
| Water skiers | 5,921,000 |
| All boats in use | 16,999,400 |
| Registered (numbered) boats | 12,782,143 |
| Outboard boats owned | 8,342,300 |
| Inboard boats owned | 1,678,240 |
| Sterndrive boats owned | 1,742,800 |
| Personal watercraft | 1,053,560 |
| Sailboats owned | 1,631,100 |
| Misc. craft owned (Canoes, rowboats, dinghies, and other craft registered by the states) | 972,200 |
| Other (Estimated canoes, rowboats etc. not registered by the states) | 1,579,200 |
| Outboard motors owned | 8,759,400 |
| Inboard engines owned (Includes gasoline, diesel, and jet drive marine engines) | 2,202,400 |
| Boat trailers owned | 7,563,900 |
| Marina, boatyards, yacht clubs, dockominiums, parks, & other | 12,000 |

NOTES: All industry figures are estimates. Ownership figures are based on Coast Guard registrations and estimates of nonregistered boats.

SOURCE: National Marine Manufacturers Association, Chicago, IL, available at http://www.nmma.org as of June 26, 2001.

- The number of recreational boats exceeds the number of registered or numbered boats because some boats are not required to register with a government body.

Table 4-8
**U.S. Coast Guard Search and Rescue (SAR) Statistics, 1996–2000**

| | 1996[a] | 1997[a] | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Cases | 43,553 | 41,096 | 37,218 | 39,844 | 40,068 |
| Lives saved | 5,047 | 3,897 | 3,194 | 3,743 | 3,365 |
| Lives lost | | | | | |
| Before notification[b] | 611 | 454 | 418 | 353 | 773 |
| After notification | 367 | 290 | 188 | 180 | 236 |
| Persons otherwise assisted | 85,869 | 75,357 | 66,138 | 70,255 | 54,368 |
| Property loss prevented ($M)[c] | 3,087 | 1,353 | 997 | 1,019 | 84 |

[a]Data have changed since last publication because of revised database definitions initiated on Oct. 1, 1999.

[b]In 2000, Egypt Air flight (with 217 lives lost) and Alaska Air flight (with 88 lives lost) crashes into waters under USCG jurisdiction resulted in an appreciable increase in lives lost before notification.

[c]The decrease in property loss prevented in 2000 is partially due to revised database definitions initiated on Oct. 1, 1999.

KEY: M = millions.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, data file, Search and Rescue Management Information System incident reports, 1996–2000 as of June 13, 2001.

- Search and rescue is one of the USCG's oldest missions.
- The Coast Guard maintains SAR facilities on the East, West, and Gulf coasts; in Alaska, Hawaii, Guam, and Puerto Rico, as well as on the Great Lakes and U.S. inland waterways.

Table 4-9
**Reported Oil Releases into Waters in and Around the United States, 1996–2000**

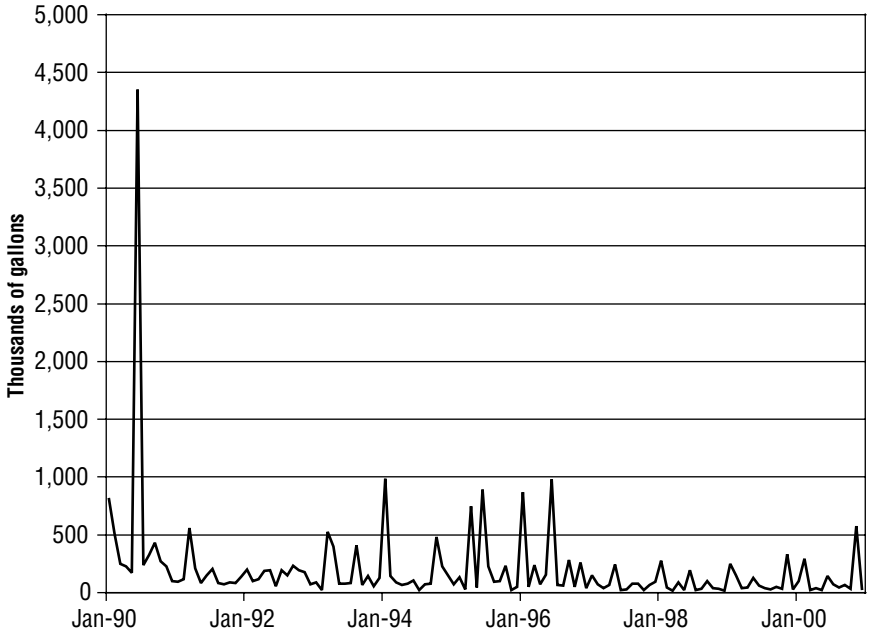
| Medium and major oil spills | Volume | Percent | Number of releases | Percent |
|---|---|---|---|---|
| Barges | 1,663,649 | 48 | 17 | 31 |
| Freight ships | 165,302 | 5 | 5 | 9 |
| Tank ships | 298,522 | 9 | 5 | 9 |
| Other vessels | 477,647 | 14 | 14 | 25 |
| Waterfront facilities | 302,280 | 9 | 7 | 13 |
| Other facilities | 565,676 | 16 | 7 | 13 |

NOTE: Average annual volume figures include all spills of oil into the navigable waters of the United States. from the Coast Guard's Marine Safety Information System. Medium and major spill figures include all oil spills of more than 10,000 gallons into U.S. navigable waters during a single incident.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Marine Safety Information Management System database as of December 2001.

- All cases in the Marine Safety Management System (MSMS) fall within U.S. Coast Guard jurisdiction, as provided for in the National Contingency Plan (Title 40, Code of Federal Regulations, Part 300). Included in the file are all reported discharges into U.S. navigable waters, including territorial waters (extending to 3 miles from the coastline), tributaries, the contiguous zone (extending from 3 to 12 miles from the coastline), onto shorelines, or into other waters that threaten the marine environment of the United States.

Figure 4-4
**Reported Spills of Petroleum and Petroleum Products into U.S. Waters (Monthly data, not seasonally adjusted)**




SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Annual Data and Graphics for Oil Spills, available at: http://www.uscg.mil.hq/g-m as of December 2001.

Table 4-10
**U.S. Port State Control Report, 2000**

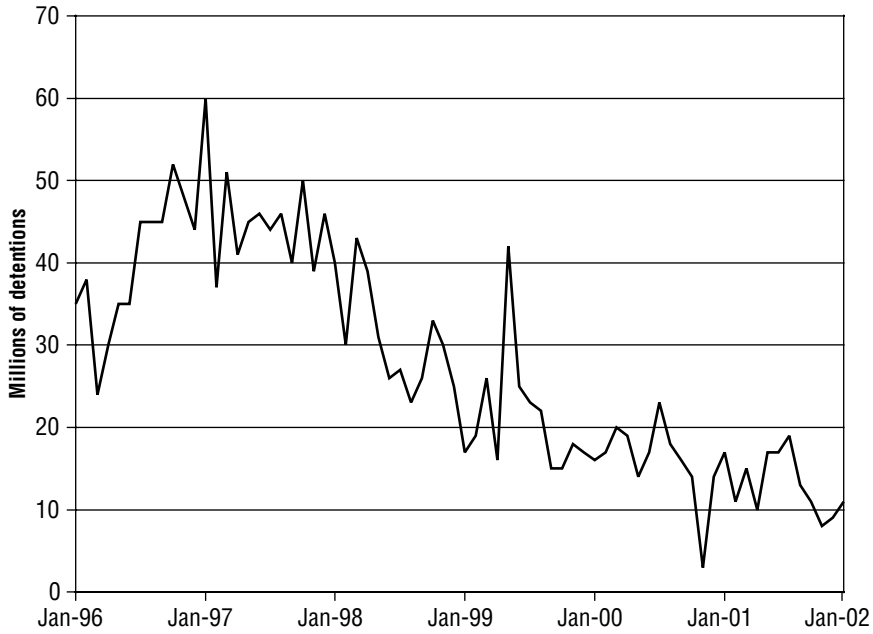
| | Vessel detention statistics | | |
|---|---|---|---|
| Year | Vessel detentions | Distinct vessels visiting U.S. ports | Percent |
| 1995 | 514 | 7,846 | 6.55 |
| 1996 | 476 | 7,608 | 6.26 |
| 1997 | 547 | 7,686 | 7.12 |
| 1998 | 373 | 7,880 | 4.73 |
| 1999 | 257 | 7,617 | 3.37 |
| 2000 | 193 | 7,657 | 2.52 |
| 2001 | 173 | 7,842 | 2.21 |

NOTE: Distinct Vessel Arrivals are the number of ships (300 GT or greater) that make at least one visit to a U.S. port in 2000. For example: A vessel that makes 12 U.S. port calls in 2000 would be counted as 1 distinct vessel arrival.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Port State Control, 2000 Port State Control Report, December 2001, available at: http://www.uscg.mil/hq/g-m/psc/miscpages/annualrpt00.doc.

- The number of different vessels visiting U.S. ports rose slightly from 1999 to 2000, and the number of detained vessels declined. Of the 51,871 port calls made by 7,657 individual vessels from 95 different Flag States, 11,767 exams were conducted and 193 vessels were detained.
- Vessels are detained when deficiencies are identified that present a significant risk to the vessel, its crew, or the marine environment.

Figure 4-5
**Detained Vessels (Monthly data)**




NOTES: Data was obtained from the U.S. Coast Guard Port State Control database and may differ from Marine Safety Management System data. Vessels are detained when deficiencies are identified that present a significant risk to the vessel, its crew, or the marine environment.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, available at: http://www.uscg.mil/hq-m/pscweb/list-of-detained-vessels.htm as of March 2002.

Table 4-11
**U.S. Coast Guard Examinations by Registry Flag—Top 20 Ranked by Examinations (Descending), 2001**

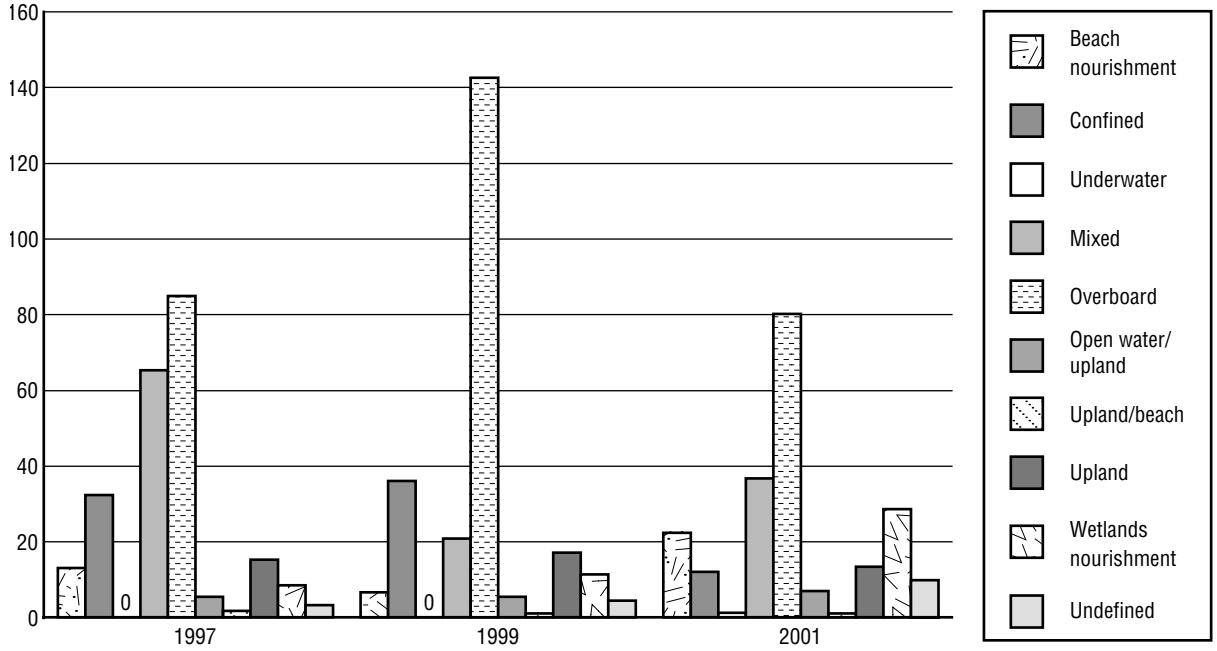
| Flag | Examinations | Distinct vessel arrivals[a] | Detentions | Detentions ratio (%) | 1999-2001 detention ratio (%) |
|---|---|---|---|---|---|
| **Total** | **10,711** | **7,842** | **173** | **2.21** | **2.70** |
| Panama | 2,741 | 1,717 | 40 | 2.33 | 3.78 |
| Liberia | 1,220 | 959 | 12 | 1.25 | 1.60 |
| Cyprus | 783 | 516 | 13 | 2.52 | 3.21 |
| Bahamas | 727 | 567 | 16 | 2.82 | 2.07 |
| Malta | 644 | 437 | 13 | 2.97 | 3.63 |
| Norway | 503 | 376 | 2 | 0.53 | 0.73 |
| Greece | 412 | 361 | 4 | 1.11 | 1.32 |
| Antigua and Barbuda | 333 | 185 | 6 | 3.24 | 3.05 |
| Singapore | 310 | 235 | 2 | 0.85 | 2.52 |
| Netherlands | 228 | 175 | 1 | 0.57 | 0.20 |
| Hong Kong | 201 | 170 | 3 | 1.76 | 1.61 |
| Germany | 193 | 162 | 1 | 0.62 | 0.80 |
| Saint Vincent and the Grenadines | 192 | 124 | 7 | 5.65 | 6.11 |
| Philippines | 172 | 113 | 1 | 0.88 | 2.28 |
| Marshall Islands | 160 | 147 | 5 | 3.40 | 1.60 |
| Denmark | 133 | 142 | 1 | 0.70 | 0.45 |
| Turkey | 127 | 75 | 6 | 8.00 | 6.77 |
| Russia | 106 | 70 | 0 | 0 | 3.27 |
| Cayman Islands | 105 | 63 | 2 | 3.17 | 3.03 |
| Italy | 92 | 79 | 0 | 0 | 0.92 |

[a]Numbers represent unique vessels. Each ship is counted only once, regardless of the number of times it visits U.S. ports.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Port State Control, 2000 Port State Control Report, December 2001, available at: http://www.uscg.mil/hq/g-m/psc/miscpages/annualrpt00.doc.

- The three-year rolling ratio of detentions to individual vessels dropped from 3.55 percent for the 1998 to 2000 period to 2.7 percent for the 1999 through 2001 period, suggesting that the quality of vessels visiting U.S. ports is improving. Panama, which represents a growing percentage of visiting vessels (22 percent), accounted for 26 percent of all detained vessels.

Figure 4-6
**Disposal/Use of Material Dredged by the U.S. Army Corps of Engineers**




Key to terms used:
*Beach nourishment*—beach restoration in which hydraulically pumped dredge material is directly placed onto an eroded beach.
*Confined*—placement of dredged material within diked nearshore or upland confined placement facilities that enclose and isolate the dredged material from adjacent waters.
*Mixed*—dredging operation that uses more than one dredged material placement alternative.
*Overboard*—placement of dredged material in rivers, lakes, estuaries, or oceans via pipeline or surface release from hopper dredges.
*Open water/upland*—combination of open water and upland placement of dredged material.
*Upland/beach nourishment*—combination of upland placement and beach nourishment using dredged material.
*Upland*—placement of dredge material on land above adjacent water surface elevation.
*Wetlands nourishment*—wetland restoration in which hydraulically pumped dredge material is directly placed in a wetland area.
*Undefined*—undefined or unknown at the time of data entry.

SOURCE: U.S. Army Corps of Engineers National Data Center, available at http://www.wrsc.usace.army.mil/ndc, as of May 17, 2001.

# Homeland and National Security


USCG

The September 11, 2001, terrorist attacks on the United States focused attention on the security of the U.S. transportation system—including ports and waterway facilities. In fact, the United States has had a longtime interest in maintaining a U.S.-flag merchant fleet that can support economic and homeland security needs in times of political or economic turmoil. This chapter provides data on major U.S. homeland and national security programs and operations administered by the Maritime Administration (MARAD) and the U.S. Coast Guard of the U.S. Department of Transportation. It also includes data on worldwide attacks on transportation and piracy against ships.

Table 5-1
**U.S. Coast Guard Migrant Interdictions at Sea, Calendar Years 1991–2001 as of June 5, 2002**

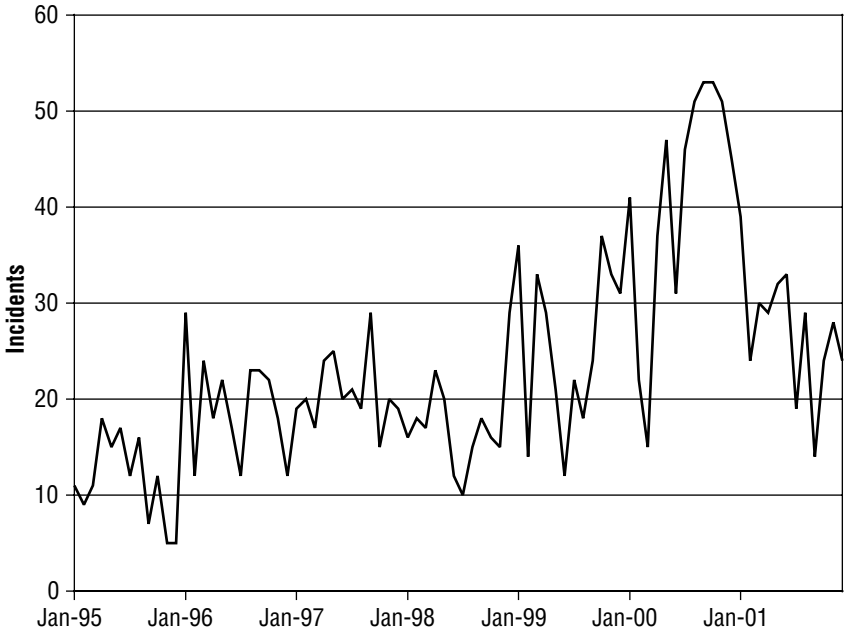
| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Haiti | 10,087 | 31,438 | 2,404 | 25,069 | 2,336 | 733 | 774 | 1,437 | 480 | 1,394 | 1,956 |
| Dominican Republic | 1,455 | 436 | 600 | 810 | 4,047 | 5,430 | 1,143 | 831 | 531 | 781 | 279 |
| Cuba | 1,936 | 2,336 | 3,687 | 37,191 | 617 | 391 | 394 | 1,118 | 1,463 | 928 | 777 |
| People's Republic of China | 138 | 181 | 2,511 | 353 | 447 | 189 | 112 | 212 | 1,351 | 2 | 64 |
| Mexico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 166 | 37 | 7 |
| Ecuador | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 513 | 1,029 | 1,020 |
| Other | 174 | 48 | 58 | 3 | 51 | 37 | 28 | 42 | 19 | 46 | 33 |
| **Total** | **13,790** | **34,439** | **9,260** | **63,426** | **7,500** | **6,780** | **2,451** | **3,697** | **4,523** | **4,217** | **3,974** |

NOTE: Interdiction data is based on individual interdictions reported by Coast Guard units. These interdictions mainly take place at sea, but also include rare instances where migrants are found ashore on remote islands/keys or pursued ashore from the sea.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Law Enforcement, December 2001, available at: http://www.uscg.mil/hq/g-o/g-opl/mle/amiostats1.htm#cy.

- As the primary maritime law enforcement agency, the USCG enforces immigration law at sea. The USCG conducts patrols and coordinates with other federal agencies and foreign countries to interdict undocumented migrants at sea, denying them entry via maritime routes to the United States, its territories, and possessions. Undocumented migrants interdicted at sea often can be returned to their countries of origin more quickly and at less cost than if they successfully enter the United States.
- The USCG maintains its humanitarian responsibility to prevent the loss of life at sea, since many migrant vessels are dangerously overloaded, unseaworthy, or otherwise unsafe.

Figure 5-1
**International Piracy**
**International Piracy and Armed Robbery Against Ships (monthly data)**




NOTE: Data for 2001 is preliminary.

**Piracy and Armed Robbery Against Ships (Monthly incidents)**

| | Dec-00 | Dec-01 |
|---|---|---|
| Number of Incidents | 45 | 24 |
| Percentage change from same month previous year | 45.16 | –46.67 |

NOTE: The current value is compared to the value from the same period in the previous year to account for seasonality.

SOURCE: United Nations International Maritime Organization, Monthly Circulars and Annual Reports 1995-2001, available at http://www.imo.org.

- Piracy includes illegal acts of violence or detention, or any act of depredation committed for private ends against a ship on the high seas or outside of the jurisdiction of a state. The data also include incidents of armed robbery against ships and similar acts while a ship is within the territorial waters of a state.
- Piracy affects the commercial shipping industry by increasing security costs, delaying shipments, and endangering the crew and cargo. In rare cases, entire ships are stolen, lost at sea, or intentionally destroyed.

Table 5-2
**International Piracy by Region**

| Date | Malacca Straits | South China Sea | Other Far East | Indian Ocean | East Africa | West Africa | South America and Caribbean | Mediterranean | Other | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 6 |
| 1995 | 11 | 70 | 0 | 17 | 11 | 5 | 19 | 5 | 0 | 138 |
| 1996 | 13 | 124 | 0 | 30 | 7 | 22 | 33 | 3 | 0 | 232 |
| 1997 | 7 | 101 | 0 | 42 | 12 | 30 | 40 | 11 | 5 | 248 |
| 1998 | 6 | 94 | 0 | 25 | 17 | 24 | 37 | 2 | 4 | 209 |
| 1999 | 43 | 130 | 0 | 50 | 17 | 37 | 29 | 4 | 0 | 310 |
| 2000 | 118 | 145 | 5 | 113 | 29 | 37 | 42 | 3 | 0 | 492 |
| 2001 | 49 | 104 | 1 | 75 | 20 | 54 | 16 | 1 | 5 | 325 |

SOURCE: United Nations International Maritime Organization, Annual reports 1994-2001, Available at http://www.imo.org.

- South China Sea, Indian Ocean, Malacca Straits, and East and West Africa are regions most affected by acts of piracy.

Table 5-3
**Maritime Security Program Participants, 2001**

| Participants | Number of vessels |
|---|---|
| American Ship Management, LLC | 9 containerships |
| Automar International Car Carrier, Inc. | 3 roll-on/roll-off vessels |
| Central Gulf Lines, Inc. | 3 roll-on/roll-off vessels |
| E-Ships, Inc. | 3 containerships |
| First American Bulk Carrier Corp. | 2 containerships |
| First Ocean Bulk Carrier-I, II, III, LLC | 3 containerships |
| Maersk Line, Ltd. | 4 containerships |
| OSG Car Carriers, Inc. | 1 roll-on/roll-off vessel |
| U.S. Ship Management, Inc. | 15 containerships |
| Waterman Steamship Corp. | 3 LASH (barge-carrying ship) & 1 roll-on/roll-off vessel |
| **Total** | **47 vessels** |

NOTE: Liner regularly scheduled service provider.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Sealift Support, 2001.

- The Maritime Security Act of 1996 (MSA) established the Maritime Security Program (MSP) under Title VI, Merchant Marine Act, 1936, as amended. The MSP replaced the operating-differential subsidy (ODS) program for liner operators.
- The MSP has been authorized through fiscal year 2005, and provides for $100 million annually, subject to annual congressional appropriations.
- The MSP supports 47 ships in international trade at a cap of $2.1 million per ship per year, which is less than half the cost of the ODS program. As of May 1, 2001, 12 U.S.-flag carriers were receiving MSP payments.
- The MSP fleet's average ship age is less than 14 years old. Fourteen foreign-flag vessels, all less than 10 years old, have been changed to U.S. registry and entered in the MSP. One newly built vessel was substituted for a 25-year old MSP vessel in 1999.

Table 5-4
**Voluntary Intermodal Sealift Agreement—Fiscal Year 2001 Participants**

| | |
|---|---|
| Alaska Cargo Transport, Inc. | Maybank Navigation Co., LLC |
| American Automar, Inc. | McAllister Towing and Transportation Co., Inc. |
| American President Lines, Ltd. | Moby Marine Corp. |
| American Roll-On Roll-Off Carrier, LLC | Moran Towing Corp. |
| American Ship Management, LLC[a] | NPR, Inc. |
| Automar International Car Carrier, Inc.[a] | Ocean Marine Shipping, Inc. |
| Beyel Brothers Inc. | Odyssea Shipping Line LLC |
| Central Gulf Lines, Inc.[a] | OSG Car Carriers, Inc.[a] |
| Cook Inlet Marine | Resolve Towing & Salvage, Inc. |
| Crowley Liner Services, Inc. | Samson Tug & Barge Co., Inc. |
| Crowley Marine Services, Inc. | Sea Star Line, LLC |
| CSX Lines, LLC | Seacor Marine International Inc. |
| Donjon Marine Co., Inc. | Sealift Inc. |
| Double Eagle Marine, LLC | Signet Maritime Corp. |
| E-Ships, Inc.[a] | Smith Maritime |
| Farrell Lines Inc. | STEA Corp. |
| First American Bulk Carrier Corp.[a] | Stevens Towing Co., Inc. |
| First Ocean Bulk Carrier-I, LLC[a] | Superior Marine Services, Inc. |
| First Ocean Bulk Carrier-II, LLC[a] | Totem Ocean Trailer Express, Inc. |
| First Ocean Bulk Carrier-III, LLC[a] | Trailer Bridge, Inc. |
| Foss Maritime Co. | TransAtlantic Lines LLC |
| Gimrock Maritime, Inc. | Trico Marine Operators, Inc. |
| Liberty Shipping Group Limited Partnership | Troika International, Ltd. |
| Lockwood Brothers, Inc. | U.S. Ship Management, Inc.[a] |
| Lykes Lines Limited, LLC | Van Ommeren Shipping (USA) LLC |
| Lynden Inc. | Waterman Steamship Corp.[a] |
| Maersk Line, Ltd.[a] | Weeks Marine, Inc. |
| Matson Navigation Co., Inc. | |

[a]Denotes Maritime Security Program operators.

SOURCE: U.S. Department of Transportation, Maritime Administration, Office of Sealift Support, 2001.

- The Voluntary Intermodal Sealift Agreement (VISA) is the Department of Defense's (DOD's) principal commercial sealift readiness program. VISA was jointly developed by the Maritime Administration (MARAD) and the U.S. Transportation Command (USTRANSCOM).
- As of May 1, 2001, 55 U.S.-flag carriers, 114 oceangoing vessels, and 397 miscellaneous vessels (including tugs, barges, and offshore supply vessels) were enrolled in the VISA program. The VISA program provides DOD with sealift capacity and other transportation resources. DOD has estimated that it would cost over $9 billion to duplicate the current VISA fleet.
- Maritime Security Program (MSP) (see table 5-2) vessels represent approximately 70 percent of the VISA fleet capacity. MSP operators are required to commit their MSP vessels to VISA. Non-MSP U.S.-flag carriers volunteer for VISA participation in exchange for priority carriage of DOD peacetime cargoes.
- VISA provides for a Joint Planning Advisory Group (JPAG) chaired by MARAD and USTRANSCOM. JPAG meetings generally convene on a semiannual basis during peacetime, and as necessary during war or national emergency. During JPAG meetings, MARAD, USTRANSCOM, and maritime industry representatives identify and discuss DOD requirements, concepts of operations, and test program arrangements.

Table 5-5
**National Defense Reserve Fleet (NDRF), 1945–2000**

| Fiscal year | NDRF | Reimbursable | Total ships | Fiscal year | NDRF | Reimbursable | Total ships |
|---|---|---|---|---|---|---|---|
| 1945 | 5 | NA | 5 | 1973 | 533 | 8 | 541 |
| 1946 | 1421 | NA | 1421 | 1974 | 473 | 14 | 487 |
| 1947 | 1204 | NA | 1204 | 1975 | 407 | 12 | 419 |
| 1948 | 1675 | NA | 1675 | 1976 | 339 | 9 | 348 |
| 1949 | 1934 | NA | 1934 | 1977 | 271 | 71 | 342 |
| 1950 | 2277 | NA | 2277 | 1978 | 236 | 70 | 306 |
| 1951 | 1767 | NA | 1767 | 1979 | 245 | 77 | 322 |
| 1952 | 1853 | NA | 1853 | 1980 | 261 | 65 | 326 |
| 1953 | 1932 | NA | 1932 | 1981 | 262 | 61 | 323 |
| 1954 | 2067 | NA | 2067 | 1982 | 254 | 49 | 303 |
| 1955 | 2068 | NA | 2068 | 1983 | 247 | 46 | 293 |
| 1956 | 2061 | NA | 2061 | 1984 | 248 | 135 | 383 |
| 1957 | 1889 | NA | 1889 | 1985 | 272 | 178 | 450 |
| 1958 | 2074 | NA | 2074 | 1986 | 280 | 20 | 300 |
| 1959 | 2060 | NA | 2060 | 1987 | 270 | 54 | 324 |
| 1960 | 2000 | NA | 2000 | 1988 | 253 | 67 | 320 |
| 1961 | 1923 | NA | 1923 | 1989 | 258 | 54 | 312 |
| 1962 | 1862 | NA | 1862 | 1990 | 236 | 93 | 329 |
| 1963 | 1819 | NA | 1819 | 1991 | 234 | 82 | 316 |
| 1964 | 1739 | NA | 1739 | 1992 | 230 | 76 | 306 |
| 1965 | 1594 | NA | 1594 | 1993 | 227 | 75 | 302 |
| 1966 | 1327 | NA | 1327 | 1994 | 208 | 78 | 286 |
| 1967 | 1087 | 65 | 1152 | 1995 | 220 | 76 | 296 |
| 1968 | 1045 | 17 | 1062 | 1996 | 219 | 84 | 303 |
| 1969 | 981 | 36 | 1017 | 1997 | 217 | 90 | 307 |
| 1970 | 947 | 80 | 1027 | 1998 | 220 | 87 | 307 |
| 1971 | 851 | 9 | 860 | 1999 | 255 | 57 | 312 |
| 1972 | 669 | 4 | 673 | 2000 | 258 | 67 | 325 |

SOURCE: U.S. Department of Transportation, Maritime Administration, Division of Reserve Fleet, personal communication, August 2001.

- The NDRF was established to serve as a reserve that could be activated to meet shipping requirements during national emergencies.
- The NDRF consists of dry cargo vessels, tankers, military auxiliaries, and other ship types. Vessels are either owned by the Maritime Administration or held for other government agencies on a reimbursable basis.
- NDRF vessels have supported emerging shipping requirements in several wars and crises.

Table 5-6
**National Defense Reserve Fleet Custody Locations as of Sept. 30, 2000**

| | NDRF retention | NDRF nonretention | Reimbursable custody | Totals |
|---|---|---|---|---|
| James River, VA | 26 | 63 | 21 | 110 |
| Beaumont, TX | 33 | 9 | 3 | 45 |
| Suisun Bay, CA | 18 | 41 | 43 | 102 |
| Other Locations | 66 | 2 | 0 | 68 |
| **Total** | **143** | **115** | **67** | **325** |

SOURCE: U.S. Department of Transportation, Maritime Administration, Division of Reserve Fleet, personal communication, August 2001.

- **NDRF retention:** Vessels being maintained for emergency activations, for historic display, or for spare equipment. Number includes 90 Ready Reserve Force (RRF) ships.
- **NDRF nonretention:** Vessels pending disposal.
- **Reimbursable custody:** Vessels not in the NDRF program, and owned by other government agencies or by MARAD's Title XI Federal Ship Financing Program of the Merchant Marine Act of 1936 (46 U.S.C. 1271-1280).

Table 5-7
**U.S. Coast Guard Drug Seizures**

| Fiscal year | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|
| Cocaine (lb) | 47,333 | 33,629 | 28,585 | 103,617 | 82,623 | 111,689 | 132,480 |
| Marijuana products (lb) | 33,895 | 40,164 | 31,000 | 102,538 | 31,390 | 61,506 | 50,463 |
| Cases | 67 | 44 | 36 | 122 | 129 | 118 | 92 |
| Vessels seized | 28 | 34 | 41 | 64 | 75 | 74 | 56 |
| Arrests | 73 | 56 | 23 | 233 | 297 | 302 | 201 |
| Value seized | $1.8 billion | $1.3 billion | $1.1 billion | $4.0 billion | $3.0 billion | $3.7 billion | $4.4 billion |

KEY: lb = pound.

SOURCE: U.S. Department of Transportation, U.S. Coast Guard, Office of Law Enforcement, Feb. 13, 2001.

- Approximately 52,000 deaths occur annually in the United States from drug abuse and drug-related crimes, accidents, and incidents.
- The Office of National Drug Control Policy sets the interdiction target for all interdiction agencies. The USCG is the lead federal agency for maritime drug interdiction.

SOURCE: U.S. Department of Transportation *Performance Report, FY 2000* and *Performance Plan Fiscal Year 2002*, April 2001.

# Environmental Issues: Cruise Ships Special Section

SLSDC

## CRUISE SHIPS: NEWLY RECOGNIZED ENVIRONMENTAL ISSUES

### Introduction

The anticipated rise in U.S. maritime traffic could increase the incidence of ships discharging wastewater and air pollutants at sea and in ports and increase the number of shipping accidents that result in spills of bunker fuel and oil. In the last few years, the impact of such occurrences on the environment and concern about their future frequency have brought the maritime industry under increased scrutiny.

To reduce the potential for oil spills, members of the International Maritime Organization (IMO) agreed in April 2001 to a 2015 deadline on the worldwide phaseout of most single-hulled oil tankers in favor of the added protection provided by double-hulled vessels.[1] Other international actions underway include a ban on

[1] The U.S. Oil Pollution Act of 1990 set a phase out schedule (by ship size, age) of oil shipments in U.S. waters in single-hulled ships from 1995 to 2015. From January 2015 onward, single-hulled oil shipments are banned in U.S. waters.

the use of ship hull paints that contain toxic tributyltin (TBT)[2] and establishment of guidelines for dismantling obsolete ships.[3] In addition, the IMO is working within the United Nations Framework Convention on Climate Change to reduce ship greenhouse gas (GHG) emissions, which contribute to global warming.

In the United States, pressure on shipping is coming from several directions. Ports are being assessed by state and regional officials, who are having difficulty meeting their commitments under the Clean Air Act. The Port of Los Angeles has, for instance, developed a program for the reduction of diesel particulate and smog-forming emissions, and the Port of Houston has conducted a comprehensive study of vessel air emissions. In July 2000, an environmental group published a report, *A Stacked Deck: Air Pollution from Large Ships,* reporting data on emissions of nitrogen oxide, sulfur, and GHGs from Category 3 ships.[4] The report contained data estimated by the Sea Emissions Assessment project at Carnegie Melon University. This ongoing project has produced a globally mapped inventory of emissions from commercial ship engines operating internationally and estimates these emissions at more than 14 percent of all nitrogen emissions from global fuel combustion and more than 16 percent of sulfur emissions from world petroleum use. The project has estimated that 747 thousand metric tons of nitrogen oxides (NOx) are annually emitted from foreign and domestic ships in U.S. waters.[5] The EPA National Emissions Trends database, which takes a different approach in estimating emissions, attributed 1,008 thousand short tons (916 thousand metric tons) of NOx to commercial marine vessels in 1998. Bluewater Network sued EPA for not regulating ship emissions, and in January 2001 the agency agreed in a settlement to establish air emission standards for Category 3 ships.

### Cruise Ships

Public attention on the environmental impacts of shipping has been especially focused on the cruise industry. The Bluewater Network initiated a Cruise Ship Campaign in early 2000 with a petition to the EPA detailing various water discharges (see table 1). The petition suggested that not only was enforcement of existing laws weak but that these laws did not adequately address the problems. In response to the 2000 petition, EPA established a multiyear Cruise Ship Discharges Assessment study.

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[2] TBT is an antifouling agent, a biocide, that prevents the growth of algae, barnacles, and other marine organisms on ship hulls. It leaches from the paint, thereby entering the marine environment and accumulates in sediments, especially in harbors and ports.

[3] This action was taken under the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal.

[4] Category 3 is an EPA classification for large, ocean-going vessels.

[5] Ship Emissions Assessment at http://www.andrew.cmu.edu/~jcorbett/SEA.html

Previously, the U.S. General Accounting Office (GAO) had conducted a limited study on cruise ship marine pollution.[6] The report found that between 1993 and 1998, foreign-flag cruise ships were involved in 87 confirmed illegal discharge cases in U.S. waters. A few of the cases included multiple illegal discharge incidents occurring over the 6-year period. Eighty-three percent of the cases involved discharges of oil or oil-based products, the volume of which ranged from a few drops to hundreds of gallons. The balance of the cases were discharges of plastic or garbage. GAO judged that 72 percent of the illegal discharges were accidental. The 87 cruise ship cases represented 4 percent of the 2,400 foreign-flag commercial ship illegal discharge cases confirmed during the 6 years studied.

Concerned about the growth of cruise ship activity in their coastal waters, but recognizing the lack of comprehensive data on ship discharges, California and Alaska set up task forces to collect data on ship effluents and air emissions. California's Cruise Ship Environmental Task Force began its work in 2001 and is required to report to the state legislature in June 2003. Alaska collected data during the 2000 summer cruise season and released a draft final report in May 2001. The data collected showed that no ship tested was in full compliance with all standards. For instance, treated blackwater (sewage) exceeded federal standards for fecal coliform in 75 percent of the samples and exceeded standards for total dissolved solids in 86 percent of the samples. In addition, gray water (which is not regulated by federal standards) showed high concentrations of fecal coliform[7] which should not be present at all. The air emissions data was less definitive because only ambient monitoring was conducted. In June 2001, the Alaska state legislature passed new legislation regulating cruise ship discharges and emissions. It requires a program of sampling, testing, and reporting of wastewater and air discharges and enforceable standards for anything cruise ships may discharge in Alaska waters.

In the midst of state activity on cruise ships, the U.S. Congress passed a law (Public Law 106-554), in December 2000, that placed new requirements on ships in waters off Alaska. The U.S. Coast Guard took its first penalty action under this new law against the cruise ship Norwegian Sky on May 4, 2001. Lab results of samples of treated effluent discharges showed fecal coliform counts of 700,000 per 100 milliliters and total suspended solids (TSS) of 27,000 milligrams per liter. Federal standards are 200 fecal coliform per 100 milliliters and 150 milligrams per liter of TSS. A third citation was issued in June 2001. These and other data collected in Alaska suggest that the current marine sanitary devices (MSDs) that ships use to treat

[6] U.S. General Accounting Office, *Marine Pollution: Progress Made to Reduce Marine Pollution by Cruise Ships, but Important Issues Remain,* GAO/RCED-00-48, February 2000.
[7] Fecal coliform indicates the possible presence of human or warm-blooded animal waste.

Table 1
**Summary of Cruise Ship Waste Streams**

| Type of waste | Estimated amount generated (typical one-week voyage) | Content/type | Notes |
|---|---|---|---|
| Sewage (blackwater) | 210,000 gallons | Wasterwater and solids from toilets. | Can introduce disease-causing microorganisms and excessive nutrients to waterways. |
| Graywater | 1 million gallons* | Wastewater from sinks, showers, galleys, laundrys. Contains detergents, cleaners, oil and grease, metals, pesticides, medical and dental wastes. | Has potential to cause adverse effects due concentration of nutrients and oxygen-demanding substances in waste stream |
| Hazardous wastes | 110 gallons | Photo chemicals. | Can contain silver, a toxic metal |
| | 5 gallons | Drycleaning waste (perchloroethylene and other chlorinated solvents). | Perchloroethylene is a chemical that can cause neurotoxicity and kidney effects in humans. |
| | 10 gallons | Used paint. | |
| | 5 gallons | Expired chemicals, including pharmaceuticals. | |
| | Unknown | Other wastes, such as print shop wastes. | Can contain hydrocarbons, chlorinated hydrocarbons, and heavy metals that can be harmful to humans and aquatic species. |
| | | Used fluorescent and light bulbs. | Contain small amounts of mercury, a toxic metal. |
| | | Used batteries. | Contain heavy metals and acids. |
| Solid waste | 8 tons | Plastic*, paper, wood, cardboard, food, cans, glass. *Under international regulations, the discharge of plastics is prohibited. | May be incinerated with ash discharged at sea; some solid wastes disposed or recycled on shore. Ash can contain hazardous wastes. |
| Oily bilge water | 25,000 gallons | Liquid collected in the lowest point in the boat when the boat is in its static floating position. | Under international and U.S. regulations, ships are only allowed to discharge bilge waters containing less then 15 ppm of oil. |

*NOTE: The interim Alaska report states that average cruise ship discharge is 200,000 gallons per day and that a large cruise ship may discharge as much as 350,000 gallons per day of treated blackwater and graywater.

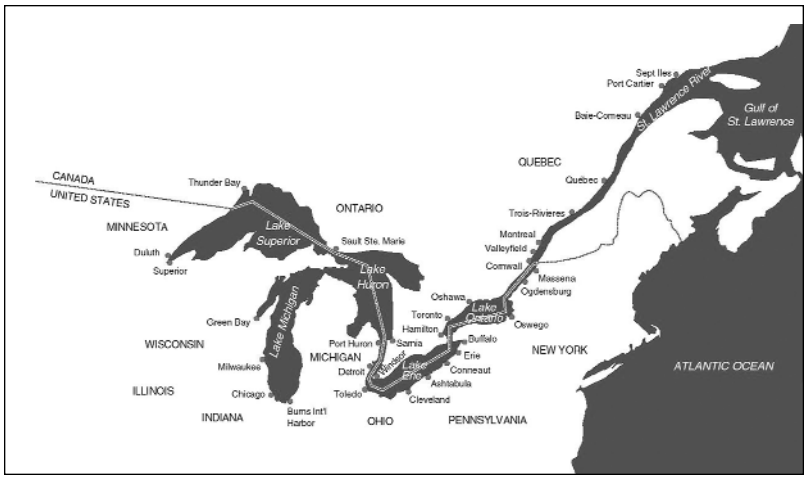
SOURCES: Bluewater Network, Petition to U.S. EPA, Mar. 17, 2000; International Council of Cruise Lines, *Cruise Industry Waste Management Practices and Procedures,* May 14, 2001; U.S. Environmental Protection Agency, *Cruise Ship White Paper,* August 22, 2000, Code of Federal Regulations, Title 33, Volume 2, Parts 120 to 199, revised as of July 1, 2000, Sec. 183.11. Definitions pp. 751-752.

blackwater may not always be effective, especially as MSDs age.[8] The discharge standards were adopted in 1976, based on the technology in use at the time.

On the industry side, a year after the Florida-Caribbean Cruise Association signed a Memorandum of Understanding regarding environmental practices and policies with Florida, the International Council of Cruise Lines (ICCL) announced in June 2001 that its members had adopted mandatory environmental standards for all association cruise ships. The standards, which specify acceptable waste management methods, cover graywater and blackwater discharges; hazardous chemical waste such as photo processing fluid and dry-cleaning chemicals; unused and outdated pharmaceuticals; and used batteries and fluorescent and mercury vapor lightbulbs.

8 U.S. EPA, Cruise Ship White Paper, Aug. 22, 2000.

# Seaway System Special Section




Great Lakes St. Lawrence Seaway System.

Since 1959, the Great Lakes St. Lawrence Seaway System (Seaway System) has been a vital waterborne transportation link for moving goods between the heartland of North America and international markets. The Seaway System is a binational waterway operated jointly by the United States and Canada. The System encompasses the St. Lawrence River and the five Great Lakes, and extends 2,300 miles from the Gulf of the St. Lawrence at the Atlantic Ocean to the western end of Lake Superior at the twin ports of Duluth, Minnesota, and Superior, Wisconsin. The region is made up of eight U.S. states and two Canadian provinces, which account for one-third of North America's population.

The U.S. Saint Lawrence Seaway Development Corporation (SLSDC), an operating administration of the U.S. Department of Transportation and a wholly owned government corporation, is responsible for the operation and maintenance of the U.S. portion of the St. Lawrence Seaway between Montreal and Lake Erie. This responsibility includes maintaining and operating the two U.S. Seaway System locks in Massena, New York, and vessel traffic control areas of the St. Lawrence River and Lake Ontario. In addition, the SLSDC performs trade development functions designed to enhance Seaway System utilization.

Aerial view of the U.S. Eisenhower Lock, Massena, N.Y.

The SLSDC coordinates activities with its Canadian counterpart, The St. Lawrence Seaway Management Corp. (SLSMC), particularly with respect to rules and regulations, overall day-to-day operations, traffic management, navigation aids, safety, environmental programs, operating dates, and trade development programs. The unique binational nature of the Seaway System requires 24-hour, year-round coordination between the two corporations.

This special section discusses many of the activities and programs of the SLSDC and reviews recent studies and analyses. Additional information on the Great Lakes St. Lawrence Seaway System can be found at http://www.greatlakes-seaway.com.

## ECONOMIC IMPACT STUDY

In 2001, an economic impact study for the SLSDC was completed that analyzed the economic benefits to the eight Great Lakes Seaway System states resulting from domestic and international maritime commerce on the system.

The results of the study, which measured 2000 economic data, are compared to the previous U.S. Great Lakes Seaway System economic impact study conducted for the SLSDC in 1991, which measured 1990 economic data. Interviews were conducted with more than 200 terminal operators, shippers, and consignees. A less comprehensive economic benefits update was completed in the mid-1990s that measured 1994 Great Lakes Seaway System navigation season benefits. However, results of that study could not be used for comparative purposes in this report because it did not include the same scope and methodology as the Martin Associates study in determining benefits.

Key study findings:

- A total of 152,508 jobs are in some way related to the 192.0 million tons of cargo moving on the U.S. Great Lakes Seaway System in 2000. Of the 152,508 jobs, 43,968 jobs are *direct* jobs created by Great Lakes Seaway System activity. These direct-employment jobs represent an increase of 30 percent from the 1991 results. The majority of these direct-employment workers are with shippers/consignees and terminal operators directly dependent on the Great Lakes Seaway

Table 1
**Summary of U.S. Seaway System Economic Benefits, 1991 and 2000**

| Impacts | 2000 | 1991 | Change | Percent change |
|---|---|---|---|---|
| **Jobs generated** | | | | |
| Direct | 43,968 | 33,716 | 10,252 | 30 |
| Induced | 27,392 | 10,912 | 16,480 | 151 |
| **Total** | **71,360** | **44,628** | **26,732** | **60** |
| Indirect | 26,757 | NA | NA | |
| **Total jobs generated** | **98,117** | **44,628** | **26,732** | |
| **Related shipper jobs generated** | **54,391** | **NA** | **NA** | |
| | (All dollar values in $000s) | | | |
| **Personal income generated** | | | | |
| Direct | $1,623,014 | $1,050,128 | $572,886 | 55 |
| Induced | 1,889,837 | 854,180 | 233,379 | 121 |
| Indirect | 820,736 | NA | NA | |
| **Total personal income** | **$4,333,586** | **$1,904,308** | **$2,429,278** | |
| **Revenue generated** | **$3,385,243** | **$1,724,883** | **$1,660,360** | **96** |
| **Federal, state, local taxes generated** | **$1,336,290** | **NA** | **NA** | |

KEY: NA = not available.

SOURCE: U.S. Department of Transportation, Saint Lawrence Seaway Development Corp., *Economic Impact Study*, Aug. 1, 2001, p. 25.

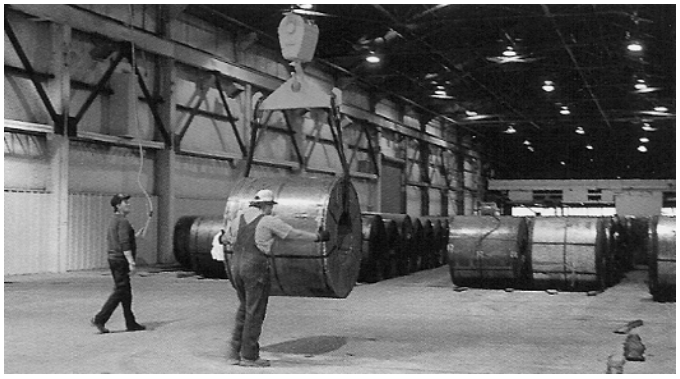
System for the receipt and shipment of raw materials (iron ore, limestone, sand and gravel, salt, etc.) and finished products (primarily steel). (USDOT SLSDC *Economic Impact Study*)

Firms providing transportation services and cargo handling services made $1.3 billion of purchases in the Great Lakes region, which supported 26,757 *indirect* jobs.[1] Finally, 54,391 jobs are with shippers and consignees using the Great Lakes Seaway System. These jobs do not have the same degree of dependency as do the direct, induced, and indirect jobs, because the shippers and consignees using the Great Lakes Seaway System can and do use other ports for shipment and receipt of cargo. (USDOT SLSDC *Economic Impact Study*)

- The movement of iron ore on the Great Lakes Seaway System creates the largest impact in terms of absolute number of jobs, followed by the shipment and receipt of coal, iron and steel products, and sand and gravel/aggregates. (USDOT SLSDC *Economic Impact Study*)

- Iron and steel products generate the greatest job impact on a per-1,000-ton basis. For every 1,000 tons of steel moving on the Great Lakes Seaway System, one job

[1] Direct jobs are jobs directly generated by port activity; Induced jobs are jobs created due to the purchases of goods and services by those individuals directly dependent on port activity; Indirect jobs are created due to the purchases of goods and services by *firms*, not *individuals*.



Port workers unload steel shipments in Great Lakes terminal.

is directly generated.[2] Overall, general cargo commodities, such as iron and steel products and project cargo, create greater job impacts per 1,000 tons than do dry-bulk and liquid-bulk cargoes. These impacts are due to the relatively greater labor involved in storing and handling general cargoes, particularly in the vessel loading and discharge process. (USDOT SLSDC *Economic Impact Study*)

- Maritime activity on the U.S. Great Lakes Seaway System generated $3.4 billion of business revenue for firms providing transportation and cargo handling services. This excludes the value of the commodities moving on the Great Lakes Seaway System. (USDOT SLSDC *Economic Impact Study*)

  —The movement of iron ore created $982 million of transportation and cargo handling business revenue, followed by iron and steel products ($786 million) and coal ($635 million).

  —On a per-ton basis, for every 1 ton of steel, $250 of business revenue is created. For every 1 ton of other general cargo commodities, $156 of business revenue is generated. Bulk commodities generate significantly less revenue per ton than do general cargo commodities.

- The 43,968 directly employed residents of the U.S. Great Lakes region received $1.6 billion in direct wages and salaries. As the result of purchases by these directly employed workers, an additional $1.9 million of local purchases and consumption expenditures were created, supporting the 27,392 induced jobs. (USDOT SLSDC *Economic Impact Study*)

- Firms providing the cargo handling and transportation services spent $1.3 billion on purchases for supplies, business and maintenance and repair services, utilities, etc. These local purchases supported the 26,757 indirect jobs. (USDOT SLSDC *Economic Impact Study*)

- Maritime activity on the U.S. Great Lakes Seaway System created $1.3 billion of federal, state, and local tax revenue in 2000. (USDOT SLSDC *Economic Impact Study*)

[2] It is to be emphasized that the jobs-per-ton measure is a static measure. The jobs-per-ton ratio should not be used to estimate impacts for an increase in steel tonnage, since a large percentage of steel-generated jobs (i.e., forwarders, agents, chandlers (those who supply vessels with ship supplies), etc.) are fixed over the short term. To estimate incremental impacts of changes in tonnage, the individual port impact models should be used, which are designed for that purpose.

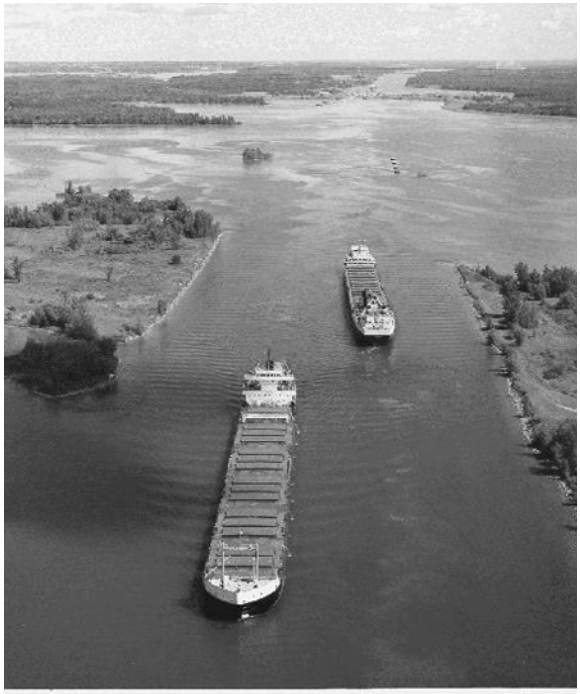
- Between 1991 and 2000, tonnage on the U.S. Great Lakes Seaway System increased from 123.8 million tons to 192.0 million tons per year. As a result of this growth in tonnage, direct jobs increased by more than 10,000 jobs, while induced jobs grew by nearly 16,500 jobs, reflecting higher earnings per direct job as well as a greater consumption multiplier effect. Direct personal income grew by 54.5 percent while induced income and consumption expenditures grew by 121.3 percent over the 1991-2000 period, far outstripping the 27.1 percent inflation rate for this time span. Similarly, business revenue of companies providing transportation as well as the cargo handling services nearly doubled, growing by 96.3 percent over the 1991-2000 period, again, far outstripping the 2.1 percent inflation increase over the same period (USDOT SLSDC *Economic Impact Study*):

  —The greatest growth in jobs was with truckers serving the Great Lakes Seaway System (4,490 jobs), followed by a 4,188 increase with terminal operators and dependent shippers/consignees.

  —With respect to job growth by commodity, the largest job growth was created by the movement of coal (a 4,121 job increase), followed by growth in jobs created by stone and aggregates (a 2,204 direct-job increase), and growth in jobs created by iron and steel products (1,367 direct jobs).

## VESSEL FLEET STUDY

In 2001, the SLSDC released a vessel fleet analysis, conducted by Lloyd's Maritime Information Services of London, that looked at the size, characteristics, ownership, age, and deployment of the St. Lawrence Seaway capable and potential world fleet. The study concluded that although the Seaway is capable of handling a large percentage of the world's fleet, infrastructure improvements would allow larger and newer vessels to transit the system.



Two vessels transiting the St. Lawrence Seaway.

The study identified those vessels that meet current seaway size criteria and those that potentially could use the waterway following infrastructure improvements within the Seaway System. The basis of the fleet study is an analysis of merchant vessels over 300 gross tons (gt) and over meeting the following criteria:

- *Seaway capable:* Vessels with maximum dimensions of 740-foot length; 78-foot beam (width); and 26-foot, 3-inch draft.

Table 2
**World Fleet that is Seaway Capable, 2001**

| Vessel type | Number of vessels | Gross tons | Percent of world fleet vessels | Percent of world fleet gross tons |
|---|---|---|---|---|
| Bulk | 1,028 | 2,778,325 | 15 | 2 |
| Container | 663 | 3,593,327 | 22 | 5 |
| Gas | 722 | 1,793,053 | 61 | 8 |
| General cargo | 12,048 | 26,506,134 | 81 | 45 |
| Miscellaneous | 16,496 | 18,346,314 | 93 | 61 |
| Passenger | 3,405 | 9,762,675 | 83 | 33 |
| Refrigerated | 959 | 3,153,159 | 71 | 45 |
| Roll on/Roll off | 1,093 | 5,796,004 | 61 | 20 |
| Tanker | 5,495 | 10,821,003 | 59 | 5 |
| **Total** | **41,909** | **82,549,994** | **69.72** | **12.93** |

SOURCE: U.S. Department of Transportation, Saint Lawrence Seaway Development Corp., *Saint Lawrence Seaway Vessel Fleet Analysis, 2001.*

- *Seaway potential:* Vessels with maximum dimesions of 1,000-foot length; 110-foot beam (width); and 35-foot draft.

The seaway capable fleet of 300 gt and over embodies 41,909 vessels representing 69.7 percent of the world fleet. The study also found that the majority of vessels in the seaway capable fleet are smaller vessels, mainly 2,500 deadweight tons (dwt). In addition, the average age of the seaway capable fleet is around 21 years.

Improvement of the navigational infrastructure within the Great Lakes Seaway System to accommodate potential fleet dimensions would allow an additional 19 percent of the world fleet to use the waterway. Infrastructure improvements would significantly increase the potential number of the seaway capable bulk fleet by 200 percent while encompassing 46 percent of the world dry bulk fleet. Bulk vessels are the Seaway's mainstay with dry bulk cargoes accounting for the majority of its trade. The Seaway's potential fleet has a relatively younger profile than the current Seaway capable fleet, with an average age of 17 years. (USDOT SLSDC *Vessel Fleet Analysis*)

Table 3
**Total Seaway Capable and Potential Fleet, 2001**

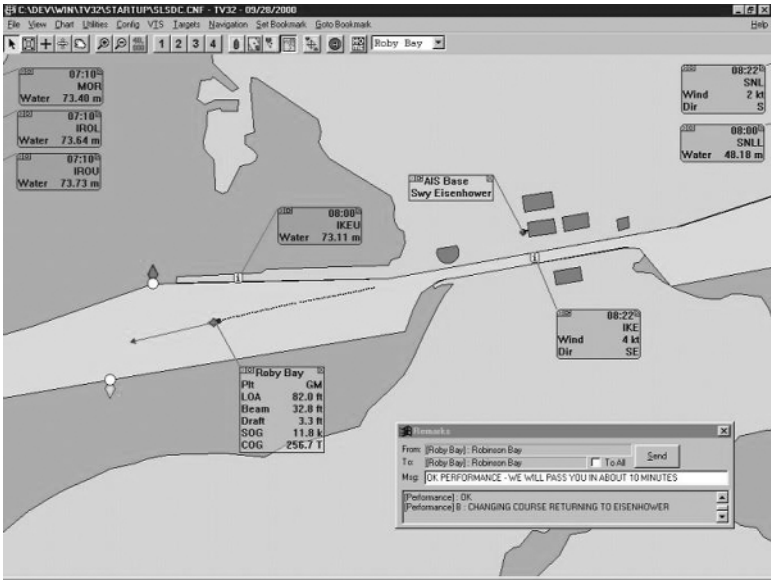
| Vessel type | Number of vessels | Gross tons | Percent of world fleet |
|---|---|---|---|
| Bulk | 3,082 | 35,466,371 | 46 |
| Container | 1,719 | 20,535,843 | 56 |
| Gas | 867 | 3,657,938 | 73 |
| General cargo | 14,104 | 50,088,989 | 95 |
| Miscellaneous | 16,839 | 23,095,232 | 95 |
| Passenger | 3,960 | 25,572,431 | 97 |
| Reefer | 1,332 | 6,993,496 | 99 |
| Roll on/Roll off | 1,695 | 26,238,017 | 94 |
| Tanker | 6,406 | 23,415,632 | 68 |
| **Total** | **50,004** | **215,063,949** | **83** |

SOURCE: U.S. Department of Transportation, Saint Lawrence Seaway Development Corp., *Saint Lawrence Seaway Vessel Fleet Analysis, 2001.*

## SEAWAY AIS/GPS PROJECT

Since 1992, the SLSDC has worked with the U.S. Department of Transpotation's Volpe National Transportation System Center and Canadian partners to design and implement state-of-the-art Automatic Identification System (AIS)/ Global Positioning System (GPS) navigation technology. The AIS/GPS project

could be an important advance in marine navigation technology, and also contribute to development of shoreside applications for AIS/GPS.



Computerized Seaway AIS/GPS system will allow vessel traffic controllers to efficiently manage Seaway transits.

When testing and implementation of the AIS system is completed, during the 2002 navigation season, SLSDC vessel traffic controllers will have accurate, real-time access to the position of commercial vessels in their vicinity. This could enhance safety and improve the efficient transit of vessels through the system. During the 2003 season, the SLSDC, the Canadian SLSMC and the U.S. and Canadian Coast Guards, will work to make the program operational throughout the Great Lakes. In addition, commercial vessels transiting the Seaway traffic sector from Montreal to mid Lake Erie are to have AIS equipment on-board by the summer of 2002. In 2000, industry partners agreed to contribute 50 percent of the final cost of this program, or approximately $600,000, over the 2000, 2001 and 2002 navigation seasons.

## 2001 CARGO AND TONNAGE STATISTICS

Total tonnage through the Montreal-Lake Ontario section of the St. Lawrence Seaway in calendar year CY 2001 was 30.3 million metric tons—5.1 million metric tons or 14 percent below the 2000 navigation season total. The decrease can be attributed, in large part, to significant reductions in imported processed iron and steel (2.0 million metric ton reduction, or 44 percent) and iron ore (1.8 million metric ton reduction, or 18 percent). The reduction in steel shipments was caused by decreased demand for finished steel products both in North America and overseas based on weak global economic conditions. As a result of a recessed North American steel industry, iron ore imports were also significantly below 2000 levels. The reduction in steel imports had a secondary effect on lower grain exports. Approximately 20 to 30 percent of ocean-going vessels exporting grain from the Great Lakes Seaway System enter the waterway carrying steel. Total grain movements through the Seaway in CY 2001 were 11.1 million metric tons—a 1.4 million metric ton reduction or 11 percent.

Low water levels, especially in the Upper Lakes, also impacted overall tonnage reductions for the season. A one-inch drop in sailing draft results in a reduction of

Commercial vessel calls on Great Lakes Seaway System port facilities.

approximately 100 metric tons of cargo for Seaway-sized ships. Many major Great Lakes Seaway System carrier companies reported that vessels could only carry approximately 90 percent of a normal shipment due to the reduced water levels.

Several commodities were ahead of CY 2000 levels including petroleum products (up 40 percent at 1.6 million metric tons), salt (up 38 percent at 907,000 metric tons), coal (up 35 percent at 452,000 metric tons), gypsum (up 9 percent at 444,000 metric tons), and steel slabs (up 6 percent at 384,000 metric tons). In addition to cargo movements, total commercial vessel transits posted a 13 percent decline. The Seaway opened its 43rd navigation season on March 23, 2000 and remained open for 277 days, closing on December 24, 2000.

During the 2001 navigation season, the SLSDC reported a 98.3 percent system availability rate in the U.S. sectors of the St. Lawrence Seaway, including the two U.S. locks. Of the delay time, only 6.9 hours (1/10 of 1 percent of the entire season) were due to lock equipment malfunction.

## TRADE DEVELOPMENT INITIATIVES

Since 1985, the SLSDC has performed trade development and promotional activities geared at generating trade to and from North America via the Great Lakes Seaway System. Program-wide activities include hosting overseas trade missions that promote the entire Seaway System at maritime and trade-related exhibitions, developing commodity-specific marketing plans, and working directly with ports, carriers, terminal operators, labor, and importers/exporters in the development of promotional materials and initiatives. Overseas trade missions, which include U.S. and Canadian maritime, government, industry, and labor delegates, have led to the development of new international cargo movements into the system. Since 1985, the SLSDC has sponsored 24 trade missions to 56 cities in 37 countries.

In addition to overseas trade missions, the SLSDC is working with various Great Lakes Seaway System port authorities, the Great Lakes Cruising Coalition, the Great Lakes Waterways Management Forum, state and local governments, and tourism

Table 4
**St. Lawrence Seaway/Montreal-Lake Ontario Section Traffic (2001 v. 2000—metric tons in thousands)**

| Cargo | 1999 | 2000 | Tons change | Percent change |
|---|---|---|---|---|
| **Bulk** | | | | |
| Grain | 12,504 | 11,123 | –1,381 | –11 |
| Government aid | 10 | 0 | –10 | –100 |
| Iron ore | 10,168 | 8,356 | –1,812 | –18 |
| Coal | 334 | 452 | 118 | 35 |
| Other bulk | 7,306 | 7,300 | –6 | 0 |
| **Total** | **30,322** | **27,231** | **–3,091** | **–10** |
| **General** | | | | |
| Iron and steel | 4,515 | 2,522 | –1,993 | –44 |
| Steel slabs | 362 | 384 | 22 | 6 |
| Containerized cargoes | 20 | 16 | –4 | –18 |
| Other general | 168 | 123 | –45 | –27 |
| **Total** | **5,065** | **3,045** | **–2,020** | **–40** |
| **Total for all cargo** | **35,387** | **30,276** | **–5,111** | **–14** |
| **Commercial vessel transits** | **2,975** | **2,588** | **–387** | **–13** |

SOURCE: U.S. Department of Transportation, Saint Lawrence Seaway Development Corp., personal communication, April 2002.

associations to attract cruise vessels into the Great Lakes. An expected 7,500 cruise passengers will likely travel the Great Lakes during the 2002 season, compared to 1,500 passengers during the 1997 season.

## FOREIGN-FLAG VESSEL INSPECTION PROGRAM

The SLSDC and the U.S. Coast Guard, in conjunction with Transport Canada and the SLSMC, signed a memorandum of understanding in March 1997 to develop a program of coordinated vessel inspection and enforcement activities to expedite the safe transit of shipping through the Great Lakes Seaway System. The principal goal of the program is to inspect all ocean vessels related to safety and environmental protection issues in Montreal, Quebec, before they enter U.S. waters.

The goal was achieved in 2001, with 252 Enhanced Seaway Inspections—233 performed by SLSDC inspectors and 19 performed by USCG marine inspectors. This improved inspection regime has saved vessels, on average, four hours per transit and ensured that any safety or environmental issues are addressed prior to entering U.S. waters. As a result, ocean carriers using the Seaway System saved nearly $500,000 in operating costs during the 2001 season.

SLSDC's vessel traffic control center in Massena, New York.

## LOCK OPERATIONS

Since the waterway's opening in 1959, the SLSDC has maintained a strong safety and availability record for the U.S. sectors of the St. Lawrence Seaway, including the two U.S. locks in Massena, New York. During the 2001 navigation season, the availability of the U.S. seaway sectors and locks maintained and operated by the SLSDC was 98.3 percent. The availability rate includes delays caused by human error, mechanical failure, and weather conditions (poor visibility, high wind, or ice formation). During the season, only 6.9 hours (1/10 of 1 percent of the entire season) were due to malfunctioning lock equipment. (USDOT *FY 2001 Performance Report*)

Table 5
**St. Lawrence Seaway U.S. Sectors Availability (including locks)**

| Calendar year | Availability rate in percent |
|---|---|
| 1995 | 99.0 |
| 1996 | 97.0 |
| 1997 | 97.0 |
| 1998 | 98.5 |
| 1999 | 99.2 |
| 2000 | 98.7 |

SOURCE: U.S. Department of Transportation, *Performance Plan FY 2003* and *Performance Report FY 2001*, April 2002, available at http://ostpxweb.dot.gov/budget.perfplan02/contents.html, p. 81.

## IN MEMORIAM

This special Seaway section is dedicated to the memory of Robert J. Lewis who died January 6, 2001, of cardiac arrest. Lewis joined the SLSDC in 1971 as director of the Office of Systems and Economic Analysis and later became director of the Office of Trade and Traffic Development. When he retired in 1999, Lewis was director of the Office of Development and Logistics.

Lewis's specialty was Seaway System trade and economic statistics, and he was the project manager for all trade and traffic-related studies conducted by the SLSDC for more than 25 years. He was highly regarding by the Department and Seaway stakeholders for his expertise in the area of maritime statistics and economics.

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