Impact of Overseas Troop Reductions on the U.S.-Flag Merchant Marine (1980)

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The Impact of Overseas Troop Reductions in the U.S.-Flag Merchant Marine

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Abstract: This report assesses the effects of postulated overseas troop reductions on the U.S.-flag merchant marine. It examines the effect that reductions of military general cargo will have on commercial liner vessel carriage on major trade routes with respect to (a) historical fluctuations of traffic and (b) the time required to regain the pre-reduction level of traffic. It also includes a limited treatment of the financial significance of military cargoes to individual liner companies. Cargo data are presented, by major theater and in the aggregate, for the years 1968-1975. This period not only spanned the peak years of Vietnam build-up and subsequent troop withdrawals, but also included major fluctuations in the fortunes of U.S.-flag shipping. (Author)

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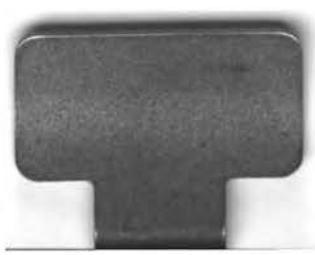

THE IMPACT OF OVERSEAS TROOP REDUCTIONS ON THE U.S.-FLAG MERCHANT MARINE

Prepared by the

Panel on Impact of Overseas Troop Reductions
on the U.S.-Flag Merchant Marine

of the

Maritime Transportation Research Board
Commission on Sociotechnical Systems
National Research Council

National Academy Press

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1980

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the Panel responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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FOREWORD

This study was made under the auspices of the Maritime Transportation Research Board (MTRB) of the National Research Council, as part of the continuing program of advice to the federal government, directed toward improving maritime and maritime-related transportation. The objective of this report is to assess the impact of postulated overseas troop reductions on the U.S.-flag merchant marine, focusing on the relationships of military general cargoes to the economic health of the U.S. liner shipping industry. The study was undertaken at the specific request of the Department of Defense, to support logistics planning decisions.

The small but distinguished interdisciplinary study panel was chaired by George Chernowitz. The Panel's areas of competence include military logistics planning, transportation economics, maritime transportation systems analysis, shipping management and vessel operations, and economic geography. Liaison representation was provided by the Military Sealift Command and the Maritime Administration.

A two-member panel, comprising E. Scott Dillon and Ted Przedpelski, reviewed this report on the Board's behalf.

I extend my thanks to the Panel, the liaison representatives, and the MTRB project manager for their fine work on this report. My thanks go also to the Board's review panel.

R. R. O'Neill
Chairman
Maritime Transportation Research Board

PREFACE

American defense forces deployed overseas are supported almost entirely by surface shipping. A substantial portion of such cargo is carried by the U.S.-flag merchant marine along with commercial cargo. As U.S. commitments and forces overseas change, it is important that both government and industry have a sound basis for assessing requirements and probable impacts of overseas troop reductions on the health of the merchant marine.

The period of time covered by this study was one of change. It encompassed active hostilities in Southeast Asia followed by a rapid withdrawal and drawdown, and a return to an overall posture of readiness. This era also saw major changes in the U.S. merchant marine, with fewer ships of higher productivity and a continuing growth in overseas trade. This condition of ongoing change made it logical to seek underlying relationships that could be used to orchestrate the future operations of defense and the merchant marine.

To support the Panel's findings, a very extensive volume of data from diverse sources was assembled and reconciled to a maximum degree. We have elected to present these data in the text that follows so that the report will more effectively provide industry and government with a rational basis for analysis. Findings, conclusions, and recommendations are provided.

The Panel wishes to express its gratitude to S. Lynn Walton, MTRB Project Manager, who both supervised and performed substantial portions of the extensive data collection, reduction, and analysis set forth in this study, and to the persons in government and the shipping industry (listed in Appendix F) who assisted the Panel in its data collection efforts; to Carl G. Schone, who was the principal

co-author of Chapter 3; and to R. Ernest Baumann, who provided valuable assistance in verifying and reconciling the data tables.

George Chernowitz
Chairman
Panel on Impact of Overseas
Troop Reductions on the
U.S.-Flag Merchant Marine

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Panel members serve as individuals, contributing their personal knowledge and judgment, and not as representatives of any organization with which they may be associated. Liaison representatives attend for their respective organizations to provide information or opinions on issues under discussion but have no vote on conclusions and recommendations.

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Chapter 1

INTRODUCTION AND SUMMARY

PURPOSE AND SCOPE

The purpose of this study, as stated by the sponsor, was to develop estimates of the effects on the U.S.-flag merchant marine of postulated troop reductions in major overseas theaters. Reductions in Europe and the Western Pacific were to be considered separately. Financial effects as well as traffic effects on both liner and charter markets were considered of interest.

It was early found that financial data on individual shipping companies, and, indeed, on the industry as a whole, were not available in the consistency and level of detail required for the financial analysis originally envisioned. It was concluded that the use of physical cargo volumes would prove adequate surrogates for financial impacts.[1]

Thus, this report focuses on the relationships of military cargoes to the total traffic carried by U.S.-flag liner shipping. It examines the impact of potential military cargo reductions on commercial liner vessel carriage on major trade routes with respect to historical fluctuations of traffic and the time required, following a postulated reduction in military cargo, to regain the pre-reduction level of traffic. It also includes a very limited treatment of the financial significance of military cargoes to individual liner companies.

A further objective of the report is to set forth a methodology and logic that can be followed when changes in troop deployment and troop support cargoes are contemplated, and to establish a statistical base for such analysis.

BASIC ASSUMPTIONS

During a series of Panel meetings, the following basic assumptions were agreed to.

- Troop reductions would be hypothesized by major theater: Far East, Northwest Europe, and

Mediterranean. (The postulated reductions are 10 percent and 50 percent.)

- Actual troop strengths and corresponding cargo volumes would be used as the base from which postulated troop reductions would be examined.

- The study would cover the time-frame 1968-1975.[2] (This spans the peak years of the Vietnam build-up and completion of the subsequent troop withdrawal. These years also included major fluctuations in the fortunes of U.S.-flag shipping.)

- Effects would be examined by individual theater, as well as in the aggregate.

- The analysis would be restricted to general (i.e., non-bulk) cargoes and would focus primarily upon liner operations.

- Military cargo shipment volumes would be assumed to decline with U.S. force strengths, without addressing the possible substitution of allied or host nation forces (with their concomitant supply requirements).

- Troop mix would not be separately distinguished among ground, air, and naval forces. (This implies proportionality of military cargo tonnages to total troop strengths.)

- One-time, non-recurring troop reductions (10 and 50 percent) would be postulated.

- The impact of the troop reduction would be assessed in terms of the new, post-drawdown equilibrium (rather than the transient logistics of the drawdown itself).[3] [Note: Throughout this report, "drawdown" refers to a reduction in troop strength and in the associated reduction in troop-support cargo.]

- The effect that reduced consumption of overseas stocks, following a troop reduction, would have on future military cargo shipment volumes would be ignored. Thus it was assumed that existing theater reserve stocks would be maintained at essentially their pre-drawdown levels, as in the REFORGER concept, currently implemented in Europe. (The alternative assumption, that reducing troop strengths would reduce the required reserve stock levels and that stocks would be reduced by immediate post-drawdown consumption, would produce a greater-than-proportional reduction in military

cargo shipments until the excess stocks had been consumed.)

- Cargo data on U.S. oceanborne foreign trade would be presented separately for (a) three major trade routes (defined below), one of which accounted for the greatest volume of military cargoes to each of the three major overseas theaters (Far East, Northwest Europe, and Mediterranean); (b) the aggregate of all other foreign trade routes; and (c) the total, over all foreign trade routes. The three "Essential U.S. Foreign Trade Routes" of specific interest are (as defined by the Maritime Administration):

  1) U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)--between U.S. North Atlantic ports (Maine-Virginia, inclusive) and ports in the United Kingdom, Republic of Ireland, and Continental Europe (from Germany, south of Denmark, to the northern border of Portugal);

  2) U.S. North Atlantic-Mediterranean (Trade Route 10)--between U.S. North Atlantic ports and ports in Portugal, Atlantic Spain, Atlantic Morocco, and the Mediterranean Sea (including the Adriatic Sea, Aegean Sea, Black Sea, and other seas that are arms of the Mediterranean); and

  3) U.S. Pacific-Far East (Trade Route 29)--between U.S. Pacific ports (Washington-California, inclusive, Alaska, Hawaii, and U.S. islands lying between the United States and the Far East) and ports in Japan, Taiwan, Philippines, Continental Asia from the USSR to Thailand, inclusive, and other Pacific Islands lying between the United States and Asia.

Collectively, the Panel's approach consisted of (a) defining initial data requirements, (b) requesting and collecting data, (c) analyzing these data, (d) assessing their adequacy, and, if necessary, (e) redefining and expanding data requirements. Given the sheer volume and inconsistency of available data, it was necessary for the Panel to go through several iterations of this process, in order to develop a data base sufficiently reliable for the purposes of this report.

INFORMATION SOURCES

The Panel obtained most of its data from primary sources: (a) military cargo volumes and related financial

data from the Military Sealift Command (MSC); (b) commercial cargo flow data from the Maritime Administration (MarAd); and (c) overseas troop strengths by theater from the Department of Defense (DOD). In addition, a limited amount of financial data (shipping revenues and net profit) was derived from corporate annual reports and, in some cases, from publicly available financial statements filed with the Interstate Commerce Commission.

Presentations were made to the Panel at two meetings. At the initial meeting, MSC and MarAd representatives provided briefings on the problem to be addressed and some of the major types of data available. At another meeting, the Panel members had the opportunity to discuss with representatives of a major U.S.-flag ship operator the practical options available to ship operators in reacting to reductions in available military cargo volumes.

REPORT CONTENT AND ORGANIZATION

Chapter 2 describes the U.S.-flag general cargo shipping industry, the importance of military cargoes to the industry, and the ships carrying military general cargoes. It also comments on the post-Vietnam drawdown experience of the shipping industry in terms of cargo allocation and ship utilization.

Chapter 3 contains an analysis of military cargo movements during 1968-1975, stratified by type of cargo and origin-destination pairs, for inbound and outbound cargo movement between the Continental United States (CONUS) and Europe, and between CONUS and the Far East. Cargo planning factors (annual tons per person, outbound and inbound) are derived.

Chapter 4 contains the analysis of the impacts of postulated overseas troop reductions of 10 percent and 50 percent, by theater, on the U.S.-flag operators on the major U.S. foreign trade routes serving each theater, using an historical viewpoint for the period 1971-1975 and using projections for the more current, essentially readiness-posture, post-1975 period. The magnitudes of the postulated military cargo reductions are compared with commercial cargo trends and with year-to-year commercial cargo fluctuations. Recovery periods (the time required for commercial cargo growth to offset military cargo reductions) are estimated for the post-1975 period.

Supplementary data, a glossary, a selective bibliography, a discussion of data sources and limitations, and a list of principal contributors are given in Appendixes A through F, respectively.

FINDINGS USED IN DRAWING STUDY CONCLUSIONS

1. Military cargoes carried in U.S.-flag liner service (primarily containers) have continued to decline, both in absolute terms and as a share of total U.S.-flag liner carriage. Their declining share has resulted from the continued growth in commercial containerized cargo moving on U.S.-flag vessels, as well as from reductions in military cargo volumes.

   (a) From the Vietnam war peak in 1968, the total oceanborne military dry cargo (including dry bulk) decreased from 30.3 million measurement tons (MT) to 8.1 million MT in 1975--a reduction of about 73 percent. The total of non-bulk oceanborne military cargo shipments between CONUS and Europe and between CONUS and the Far East decreased similarly, from 16.3 million MT in 1968 to 5.6 MT in 1975--a reduction of about 66 percent.

   (b) Military cargo was a small fraction of total non-bulk cargo in U.S. oceanborne foreign trade during the period 1968-1975, with shares ranging from a maximum of 4.2 percent in 1968 to a low of 1.0 percent in 1975. Over this period, the commercial non-bulk cargoes in U.S. oceanborne foreign trade increased at a compound average annual rate of 4.8 percent. Thus, overall, military cargoes represented a declining market for U.S.-flag operators.

   (c) During 1968-1975, the military fraction of total liner vessel carriage in U.S. foreign trade ranged between a high of 11.2 percent (1969) and lows of 5.5 and 5.6 percent (1973, 1975). During this period, total liner vessel carriage of commercial cargoes in U.S. foreign trade increased at a compound average annual rate of 0.97 percent.

   (d) During 1968-1975, the military fraction of U.S.-flag liner vessel carriage ranged between a high of 34.8 percent (1969) and a low of 16.1 percent (1975). While the military fraction of U.S.-flag liner operators' total carriage thus declined by half, U.S.-flag liner carriage of commercial cargoes increased at a compound average annual rate of 3.98 percent over this period, or about 4 times the growth rate of total liner carriage of commercial cargoes by ships of all flags in U.S. foreign trade.

2. With further growth in commercial trade, military cargoes will represent an even smaller share of

total U.S. oceanborne foreign trade. This will further reduce the potential impact of future reductions in military cargo levels. However, there are differential effects, depending on trade route and individual operator, stemming from changes both in military cargo volumes and in military commodity categories.

(a) Because shipping requirements vary with cargo category, major changes in the mix of military cargo types moving over a given route will have different impacts on the commercial liner sector and the MSC Controlled Fleet serving (or available to serve) that route.

(b) Even where military cargo represents a small fraction of total revenues to an individual U.S.-flag shipping operator, it may, at a given time, make the difference between profit and loss. Thus the severity of the effect of a military cargo reduction on each individual carrier will depend not only on the magnitude of the reduction but also on its timing relative to the company's current financial circumstances.

3. The underlying rationale of proportionality--that cutting troop strength will proportionally reduce military cargo shipment volumes--has been examined and found valid for peacetime deployments overseas, but not for theaters undergoing rapid transitions (either build-up or reduction). Thus, during the period 1968-1975, between 4 and 5 MT of outbound cargo per year were required to support each person deployed in Europe. On the other hand, there was rapid decline from over 12 MT per person per year in the Far East during the period of active hostilities to about 7 MT during the drawdown years of 1974-1975. At the end of the 8-year timeframe studied, values for normalized support requirements (i.e., annual cargo tonnage per person) in the Far East theater were converging on the range of values typical of the European theater throughout the period.

4. Inbound cargo for U.S. personnel deployed in Europe ranged between 1.03 and 1.59 MT per person per year with high stability from 1968 through 1975. Here again, as peacetime conditions returned to the Far East, the inbound cargo-to-personnel ratio (which had ranged from 0.98 to a high of 4.58 MT per person per year) was converging on the values observed in the European theater. Small fluctuations in total personnel strength (on the order of, say, 2 to 5 percent) do not of themselves

produce an immediate impact on cargo movement requirements. Fluctuations of this magnitude are masked in the noise of detailed changes in logistic operations.

5. Through the 8-year period, 1968-1975, there was a high stability in the relative distribution, by category, of military cargo to Europe. For the Far East, fluctuations in distribution reflected the nature of demand during active hostilities (for example, a larger proportion of ammunition and a smaller proportion of privately owned vehicles (POV), as compared with Europe). Inbound cargoes from Europe were dominated by household goods (HHG) and POV during 1968-1975, again in contrast to the Far East where general cargo (other than HHG) and special (outsized or heavy-lift) cargoes were dominant. The shift to peacetime patterns, worldwide, emphasizes the categories of cargo that are predominantly carried by commercial liner shipping, in contrast to those categories requiring the special capabilities of the MSC Controlled Fleet (ammunition, aircraft, and special cargoes).

6. The distribution of cargo movements between MSC and commercial bottoms underwent a series of substantial changes during the period, 1968-1975. Most of the 175 Victory ships broken out from the National Defense Reserve Fleet for the demands of Vietnam were returned to lay-up after the drawdown and about 45 were scrapped; and a parallel reduction took place in the demand for general cargo non-liner (tramp) services because of the shift to peacetime, largely containerized, cargo.

7. Although this report's analysis proceeded from the conservative assumption that the liner sector would take the brunt of military cargo reductions,[4] the evidence is that, during 1968-1975, the share of total military non-bulk cargo carried by the MSC Nucleus Fleet declined more sharply than did the share carried by U.S.-flag liner vessels.[5]

CONCLUSIONS

1. Postulated 10-percent and 50-percent overseas troop reductions from 1975 levels of U.S.-flag commercial liner shipping, under conservative assumptions described in the report, would require the adjustment periods shown in Table 1-1 to recover the 1975 traffic levels.[6] (Tables 4-8 and 4-10 also contain corresponding tabulations of growth

Table 1-1

COMPOUND AVERAGE ANNUAL GROWTH RATES IN LINER VESSEL CARRIAGE OF COMMERCIAL CARGO, BY TRADE ROUTE, 1969-1974, AND ADJUSTMENT PERIODS FOR COMMERCIAL TRAFFIC GROWTH IN LINER CARRIAGE TO OFFSET POSTULATED REDUCTIONS IN TOTAL MILITARY NON-BULK CARGO FROM 1975 LEVELS

Trade Route	Growth Rate (Percent)		Adjustment Period (Years) for U.S.-Flag Liner Operators, Following Postulated 1975 Military Cargo Reduction of:	
	All Flags	U.S. Flag	10 Percent	50 Percent
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)				
Outbound Liner Carriage	4.51	5.91	1.84	7.72
Inbound Liner Carriage	2.55	3.78	0.22	1.09
Total Liner Carriage	3.38	4.61	1.12	5.12
U.S. North Atlantic-Mediterranean (Trade Route 10)				
Outbound Liner Carriage	6.87	20.08	0.12	0.56
Inbound Liner Carriage	2.68	8.41	0.10	0.49
Total Liner Carriage	4.82	14.40	0.12	0.57
U.S. Pacific-Far East (Trade Route 29)				
Outbound Liner Carriage	11.31	8.39	0.55	2.55
Inbound Liner Carriage	5.28	9.64	0.09	0.43
Total Liner Carriage	8.61	8.95	0.32	1.51

Sources: Growth rates from Table 4-8; adjustment periods from Tables 4-10(A) and (B).

rates and adjustment periods for "All Other" routes and for "All Trade Routes.")

Note that the industry recovery period for Trade Routes 5-7-8-9 for the worst-case 50-percent troop reduction--corresponding to the sudden removal of about 230,000 persons from Western Europe--is overstated. Even assuming that the conservative assumptions noted above are realistic, an expected recovery period exceeding 5 years is too large not to precipitate more rapid realignment of the trade. In such circumstances, it would be realistic to expect that capacity would be laid up, scrapped, or, in some cases, diverted to other trades; and that marketing activities aimed at generating additional commercial cargoes would be stepped up. However, there are practical limits to liner fleet rationalizaton, beyond which the company's service becomes non-competitive.

Although not analyzed in detail, the substantial impacts and lengthy recovery periods noted for 50-percent reductions underscore the significance of military cargo to the U.S.-flag liner sector. In the extreme case, reductions of 100 percent would clearly imply recovery periods so long as to require major realignment of the U.S.-flag liner fleet serving the respective trade routes.

2. In the aggregate, the degree of commercial cargo fluctuation and competitive flux overall is such that all except massive reductions in military cargo (i.e., on the order of 50 percent) fall within the 1968-1975 range of year-to-year commercial traffic variations, which are independent of military cargo volumes. The effect of military cargo reductions on an individual ship operator may, however, fall well outside the range of year-to-year fluctuations in that operator's commercial traffic. Moreover, if the timing of the military cargo reduction coincides with a low point in these fluctuations, its financial effect will be magnified.

3. Approximately 4.5 (± 0.5) MT of outbound cargo per year per person and 1.25 (± 0.25) MT of inbound cargo per year per person are realistic and stable planning factors for peacetime theaters in a readiness status. This conclusion appears likely to be valid so long as present policies with regard to dependents and troop rotation prevail.

In active theaters, build-up and drawdown are heavily dependent on military and national policy considerations. The experience of Southeast Asia should be regarded as indicative of only one of a large number of potential scenarios.

RECOMMENDATIONS

1. In light of the above-noted differential impact of military cargo reductions on individual trade routes and individual operators, MarAd should give advance consideration to mechanisms or requirements for facilitating the rapid shifting of subsidized tonnage capacity from one trade route to another.

2. Accordingly, MarAd, MSC, and DOD should maintain informal but continuing liaison for exchange of information, to provide a continuing basis for effective planning.

   (a) A major focus of effort should be on providing a data base of consistent and compatible commercial and military cargo movement data, supported by shipping financial performance information.

   (b) Macro considerations must be supplemented by micro analysis that is heavily time-dependent in order to determine the extent to which the removal of military cargo at a given time will either reduce growth or accelerate decline (or, conversely, the extent to which the addition of military cargo will either increase growth or offset decline).

NOTES

1 Continuing efforts were made to acquire financial data. The Maritime Administration (which has extensive data on companies receiving operating-differential subsidy) was unable to provide financial data, even on an aggregated basis, because of the requirement for administrative confidentiality. Moreover, had MarAd data on subsidized carriers been available in detail, it would have been insufficient; during the period studied (1968-1975), a large fraction of military cargo was carried by unsubsidized operators, on whom MarAd data is less extensive. From Table 2-13, it can be seen that three unsubsidized operators (Sea-Land Service, United States Lines, and Seatrain Lines) collectively received 49 percent of total MSC payments and accruals to U.S.-flag liner operators in 1973; 59 percent in 1974; and 51 percent in 1975.

Corporate reports provided only aggregate financial data that could not be translated into terms such as average revenue per ton of cargo by trade route.

Publicly available Military Sealift Command data on cargo tonnages and payments to carriers could not be translated into potential revenue losses to individual carriers, which would result from the postulated reductions in military cargo carriage.

2 Data availability and the extensive processing requirements governed the choice of 1975 as the cut-off year. When data processing commenced, this was the last full calendar year for which both military and commercial cargo data were available.

3 There are two basic reasons for this. First, unless a particular location were completely evacuated, then the resources in place would tend to be largely retained in theater and used as reserves to obviate the cost of first moving the material to the United States and then reshipping it piecemeal to the remaining forces. Troop withdrawals would be primarily effected by air and only heavy equipment moved by sea. A further consideration (evident to a major degree, for example, in Vietnam) is

the release to allies of much reserve, resupply, and unit equipment.

Second, it would be necessary to develop a very wide variety of scenarios involving political, policy, and timing considerations, each of which would in fact apply only to a particular point in time and place. Once these were developed, the question of weighting and combining them would remain. The probability of a correct assessment would be small. A major point of this report is that timing is of the essence in managing government impacts on shipping.

4 Priorities for utilization of merchant ships were established by the "Wilson-Weeks Agreement." See "Memorandum of Agreement Between the Department of Defense and the Department of Commerce, Dealing with the Utilization, Transfer and Allocation of Merchant Ships - 1 July 1954," signed by Secretary of Defense Charles E. Wilson and Secretary of Commerce Sinclair Weeks; implemented by DOD Instruction No. 5030.3, signed by T. P. Pike, Assistant Secretary of Defense (Supply & Logistics), Oct. 20, 1954.

Under "Wilson-Weeks", paragraph 4, the size and composition of the MSC Nucleus Fleet depend on requirements, and the numbers and types of ships are kept adjusted in response to changes in the military situation. The Nucleus Fleet comprises ships of the types and numbers necessary to meet those current logistic needs of the military departments which cannot be met by commercial interests; to provide immediate capability in an emergency; and to provide an adequate base for necessary expansion to meet emergency or mobilization requirements.

As a matter of policy, the MSC continually reviews the size of its Controlled Fleet (which includes both the MSC Nucleus Fleet and vessels under time and voyage charters) and makes adjustments as required to reflect the most economical size needed to fulfill its sealift requirements, giving due consideration to existing capability.

Under "Wilson-Weeks", paragraph 4, ship requirements of the Department of Defense under conditions short of full mobilization would be met in the following order of priority: (a) MSC Nucleus Fleet; (b) "maximum utilization of available U.S.-flag berth space"; (c) "time or voyage charter of suitable privately owned U.S.-flag merchant ships ... voluntarily made available", which "will be kept to the minimum necessary to meet requirements which foresight indicates cannot be met by U.S.-flag berth operators";

(d) "shipping provided by National Shipping Authority under General Agency Agreement or other arrangement"; (e) if "suitable U.S.-flag shipping is not available ..., foreign-flag shipping only to the extent necessary to meet urgent military requirements."

5 Of the military non-bulk cargo carried by these two fleets combined, the MSC share declined from about 34 percent in 1968 to 6 percent in 1975; and the tonnage carried by MSC declined by about 94 percent, compared with a decline of about 52 percent in the military tonnage carried by U.S.-flag liners over the same period. (See Table 2-7, lines 5 and 7.)

6 Under these assumptions, the postulated 10-percent and 50-percent overseas troop reductions imply reductions of about 87,000 and 433,000 persons, respectively, from the 1975 levels. Among the principal underlying assumptions are the following:

(a) The MSC Nucleus Fleet would carry the same tonnage of military cargo as previously. (Thus, the commercial sector would bear the entire burden of the military cargo reduction.) To the extent that practice does not follow this assumption, the commercial fleet would fare better than the calculations indicate.

(b) The baseline year from which the postulated reductions are computed is 1975. Since there was a sharp shipping recession from late 1974 to late 1975, the calculated growth rates of commercial cargoes may be understated. If so, the calculated industry recovery periods indicated are overstated.

Chapter 2

THE ROLE OF MILITARY CARGOES

The Panel has as its main concern the competitive impact of overseas troop withdrawals on the U.S.-flag merchant marine and, particularly, on its liner sector. To provide a foundation for specific analysis, some general remarks may be of value.

The U.S.-flag oceangoing merchant marine can be divided into two major categories: bulk vessels (dry and liquid) and general cargo ships. The latter include break-bulk ships, containerships, barge carriers, and roll-on, roll-off ships; combinations of these types; and a few combination cargo-passenger ships.

Historically, U.S.-flag bulk ships have been dependent upon their spheres of protected trades: domestic traffic, barred to foreign-flag ships by cabotage laws; P.L. 480 grain sales to developing countries;[1] and other forms of cargo preference. Only in rare instances, when freight rates on the world market have risen sufficiently to cover full U.S. costs and provide a profit to U.S. owners, have U.S.-flag bulk ships been chartered on the world market.

The U.S.-flag general cargo fleet finds most of its business in the carriage of commercial cargoes in the foreign trade of the United States. Most U.S.-flag general cargo vessels operate in regularly scheduled common-carrier (liner) service, with relatively few remaining in non-liner (tramp) service. Liner service is characterized by greater stability. On almost all major ocean trade routes, freight rates are set by shipping conferences; and, in many trades, the major liner operators are members of conference revenue-pooling agreements or are subject to bilateral or multilateral cargo-sharing agreements negotiated by governments of the trading nations.

THE U.S.-FLAG FLEET, 1950-1975

The size and composition of the U.S.-flag fleet for selected years during the period 1950-1975 are given in Table 2-1 and portrayed graphically in Figure 2-1. Several

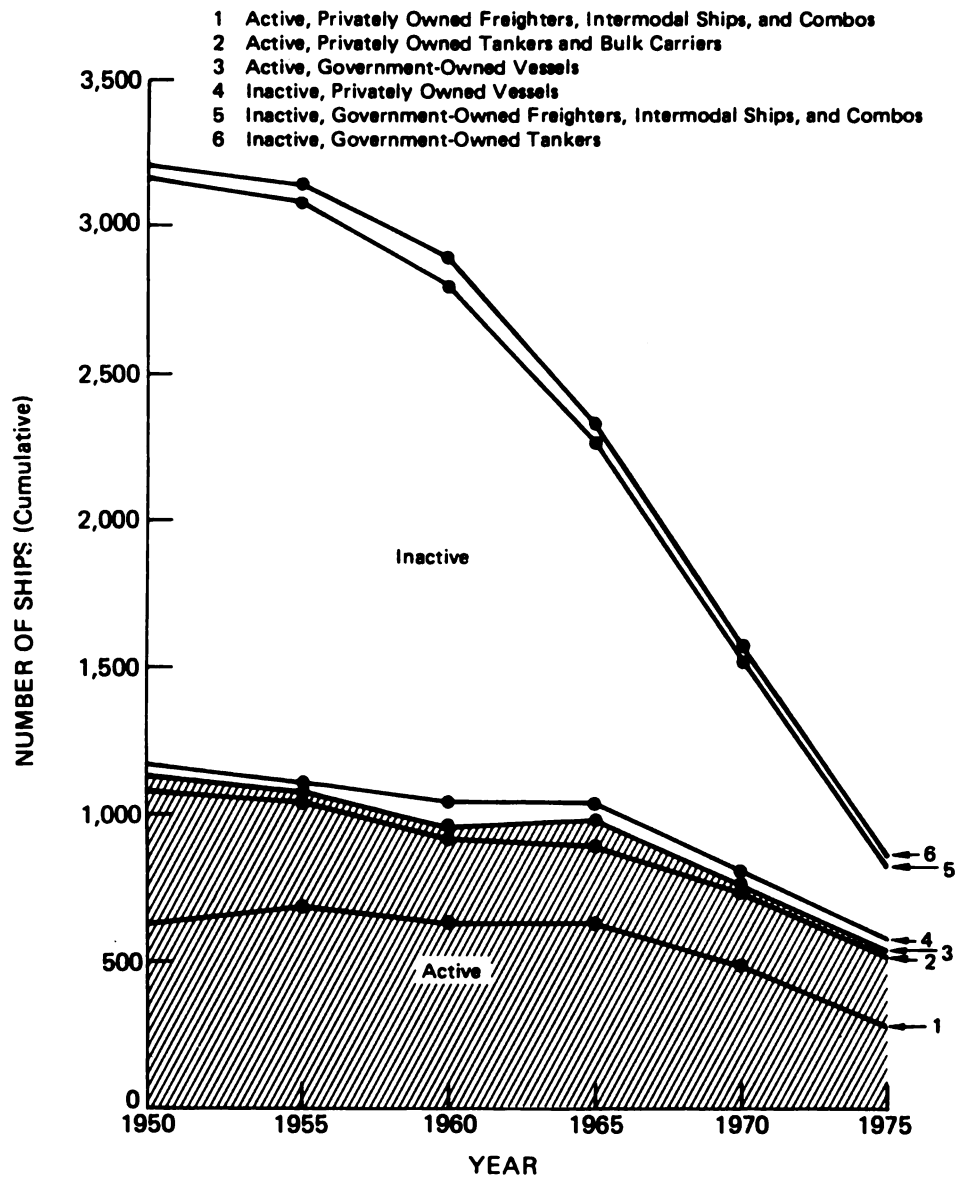
Table 2-1

NUMBERS OF U.S.-FLAG OCEANGOING VESSELS BY TYPE, ACTIVE AND INACTIVE, SELECTED YEARS, 1950-1975 [a/]

	1950	1955	1960	1965	1968	1969	1970	1971	1972	1973	1974	1975
Active												
Privately Owned												
Freighter b/	600	659	600	613	574	560	480	375	359	175	166	133
Intermodal c/	0	0	f/	f/	f/	f/	f/	f/	f/	132	140	140
Combo d/	35	34	30	27	22	18	13	11	8	6	6	6
Tanker	443	354	293	264	266	256	251	226	227	235	228	226
Bulk Carrier e/	f/	f/	f/	f/	f/	f/	f/	f/	f/	25	19	16
Subtotal	1,078	1,047	923	904	862	834	744	612	594	573	559	521
Government-Owned												
Freighter	39	20	32	94	168	95	17	18	23	18	15	12
Combo	10	5	2	0	1	1	0	0	0	0	0	0
Tanker	0	0	0	0	2	3	3	3	5	6	4	1
Subtotal	49	25	34	94	171	99	20	21	28	24	19	13
Total Active	1,127	1,072	957	998	1,033	933	764	633	622	597	578	534
Inactive												
Privately Owned												
Freighter	17	20	33	32	91	74	32	59	34	10	4	26
Intermodal	0	0	f/	f/	f/	f/	f/	f/	f/	3	3	6
Combo	9	0	7	0	3	6	6	7	4	3	0	0
Tanker	11	8	45	12	11	17	11	33	19	6	17	24
Bulk Carrier	f/	f/	f/	f/	f/	f/	f/	f/	f/	1	0	3
Subtotal	37	28	85	44	105	97	49	99	57	23	24	59
Government-Owned												
Freighter	1,983	1,805	1,508	1,049	731	717	585	463	301	255	215	190
Intermodal	0	0	f/	f/	f/	f/	f/	f/	f/	3	2	4
Combo	25	200	269	198	169	161	152	147	141	111	74	54
Tanker	24	49	81	63	33	29	29	30	29	27	29	16
Subtotal	2,032	2,054	1,858	1,310	933	907	766	640	471	396	320	264
Total Inactive	2,069	2,082	1,943	1,354	1,038	1,004	815	739	528	419	344	323
Total Fleet	3,196	3,154	2,900	2,352	2,071	1,937	1,579	1,372	1,150	1,016	922	857

a/ Excludes Great Lakes fleet and all vessels under 1,000 gross register tons. Data for all years are as of December 31.
b/ Includes break-bulk ships and partial containerships.
c/ Includes full containerships, barge carriers, and roll-on, roll-off ships.
d/ Includes combination cargo-passenger ships and passenger ships.
e/ Includes ore-bulk-oil carriers (OBOs), of which one entered service in 1973 and a second in 1974.
f/ For years prior to 1973, MarAd tabulations group both Intermodal ships and Bulk Carriers under Freighters.

Source: Maritime Administration, Office of Trade Studies and Statistics, Division of Statistics, Employment of United States Flag Merchant Fleet: Oceangoing Vessels of 1,000 Gross Tons and Over, Report MAR-560-13 (Washington: Maritime Administration, quarterly).



SOURCE: Table 2-1.

FIGURE 2-1 Number of U.S.-Flag Vessels, by Type and Ownership, Active and Inactive, Selected Years, 1950-1975

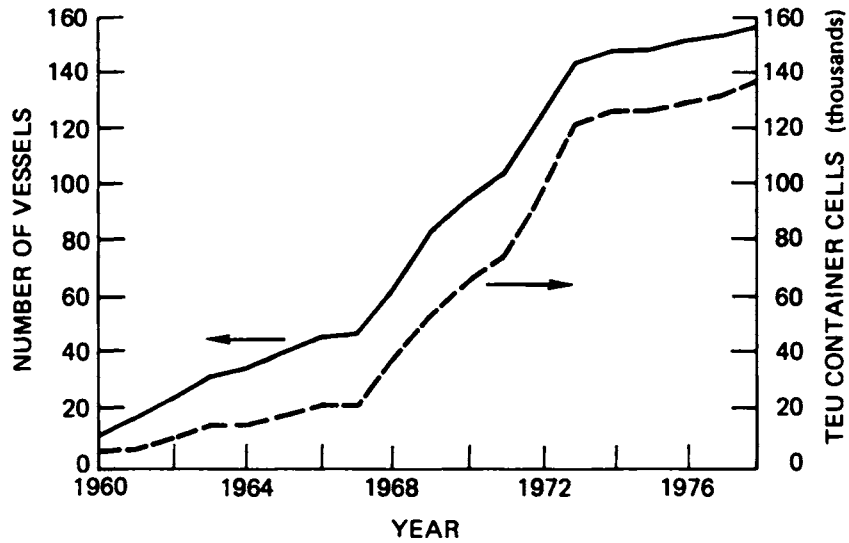
major trends are apparent: (a) a drastic decline in total fleet size from the Korean War peak of 1950-1955, as many World War II-vintage vessels (mostly inactive) were transferred to foreign registry or scrapped; (b) the less steep, but nonetheless steady, decline in the size of the active fleet, as the U.S.-flag share of total U.S. oceanborne foreign trade declined over the same period; and (c) a sharp rise in the intermodal ship sector, starting about 1967 (see Figures 2-2 and 2-3, below). The intermodal category includes containerships, barge carriers (LASH and SeaBee), and roll-on, roll-off (RORO) vessels, and combinations of these types.

The impact of the introduction of the intermodal ships--most are containerships--is less obvious. The conversion of break-bulk ships to full and partial containerships began in the late 1950's. Between 1960 and 1976--through conversion and, increasingly, new construction--the U.S.-flag container-carrying fleet increased from 11 vessels with a total capacity of about 4,600 20-ft equivalent units (TEU) to 151 vessels with a capacity of some 130,000 TEU (see Figure 2-2). In the transition from smaller or partial conversions, average container capacity per vessel doubled as the larger, new-built full containerships came into service during the late 1960's and early 1970's (see Figure 2-3).[2] Thus, despite the decrease in the total number of U.S.-flag general cargo ships, their annual cargo delivery capability has increased during the past decade.

The intermodal vessels of the 1970's have replaced either (a) smaller and slower first-generation containerhips or (b) break-bulk or partial container vessels, which not only were smaller and slower but also were characterized by much greater port turnaround time. An indication of the higher productivity of the intermodal vessels is given in Figure 2-4, which contrasts numbers of vessels and annual capability, by vessel type, for the U.S.-flag active fleet as of mid-1975. The intermodal ships constitute 48 percent of the total number of ships, but represent some 70 percent of annual capability. Thus, fewer than half the vessels can out-perform the remainder by a ratio exceeding two to one.

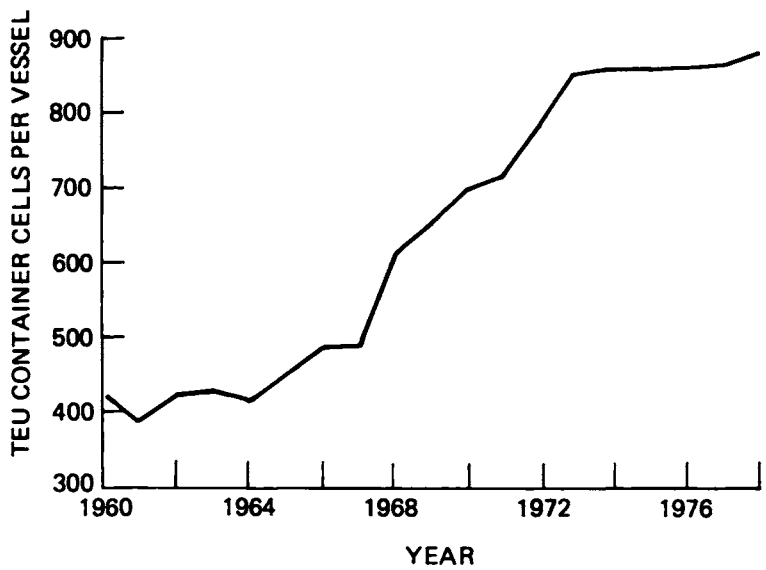
Annual ton-miles for a given ship will vary with voyage length, number of ports of call, and other factors. Nevertheless, some general estimates have been published. One such calculation showns that the fastest containership (Sea-Land's SL-7), operating at its 33-knot design speed, has an annual capability about 6 times that of a modern break-bulk ship (the C4-S-66a, built in 1966) and over 10 times that of a World War II-built C-2 (see Table 2-2).[3]

A summary of the U.S.-flag oceangoing merchant marine, as of June 1, 1976, is given in Table 2-3. Comparisons of the U.S. and world fleets in terms of numbers of ships and



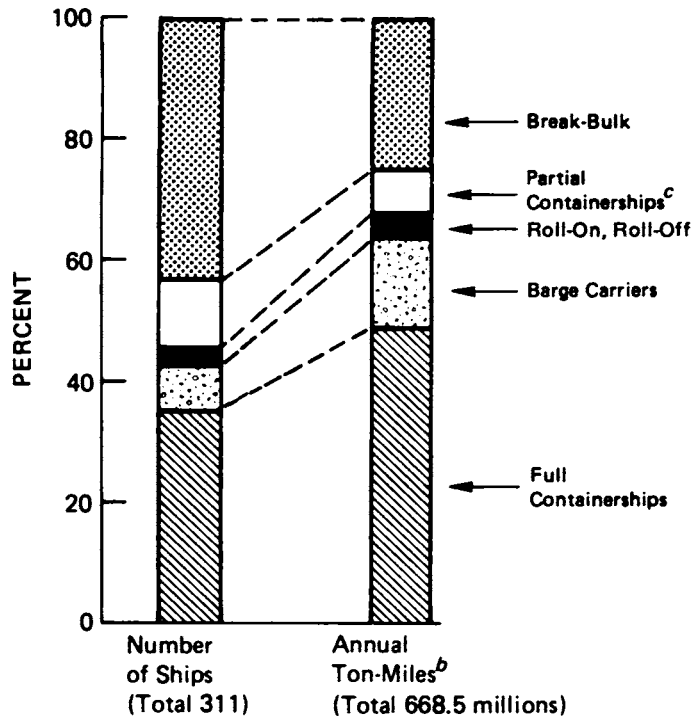
SOURCE: See Note 2, end of Chapter 2.

FIGURE 2-2 Number and Total Capacity of U.S.-Flag Container-Carrying Vessels, 1960-1978



SOURCE: See Note 2, end of Chapter 2.

FIGURE 2-3 Average Capacity of U.S.-Flag Container-Carrying Vessels, 1960-1978



SOURCES: (1) Number of ships by type from Maritime Administration, Office of Subsidy Administration, *A Statistical Analysis of the World's Merchant Fleets, December 31, 1975* (Washington: U.S. Government Printing Office, 1976), pp. vi, 3-5. (2) Ship speed and capacity for individual ships from Military Sealift Command, *Ship Register* (Washington: quarterly).

FIGURE 2-4 Number and Maximum Annual Ton-Mile Capability of Active U.S.-Flag General Cargo Ships, by Type, as of 1975[a]

[a]Excludes government-owned ships and vessels under 1,000 gross register tons.
[b]Maximum annual ton-mile capability is computed as the product of bale cubic capacity (or, for containerships, the internal capacity of the containers), expressed in measurement tons of 40 cu ft, and nautical miles per year. The latter is the product of ship speed in knots, 24 hr per day, and sea-days per year. For break-bulk ships and partial containerships, 165 sea-days per year are assumed; for the three types of intermodal ships, 230 sea-days per year.
[c]Includes 6 combination cargo-passenger ships.

Table 2-2

ESTIMATED TRENDS IN ANNUAL TON-MILE CAPABILITY PER SHIP, INTERMODAL VERSUS BREAK-BULK SHIPS

	Year Entered Service	Vessel Capacity (Measurement Tons)[a/]	Daily Mileage Capability (Nautical Miles)	Assumed Days at Sea per Year	Annual Production Capability (Billions of Ton-Miles per Year)[b/]
	(1)	(2)	(3)	(4)	(5)
Break-Bulk Ships					
C2	1939-42	12,000	372	200	0.89
C3 (old)	1939-42	16,300	396	190	1.23
C4-S-66a	1966	17,780	480	185	1.58
Converted Containerships					
Sea-Land Service	1955	15,800	384	265	1.61
American Export Lines	1966	23,200	504	259	3.03
United States Lines	1968	23,200	480	259	2.88
New Containerships					
Atlantic Container Line	1969	21,200	588	261	3.25
Seatrain Lines	1971	48,000	600	239	6.88
Canadian Pacific	1971	17,500	480	264	2.22
Dart Containerline	1971	38,900	552	246	5.28
Sea-Land Service	1972	48,600	792	238	9.16
Barge Carriers					
Lighter-Aboard-Ship (LASH)	1970	25,600	540	278	3.84
Sea-Barge (SeaBee)	1971	30,200	485	275	4.03

a/ Allowing for broken stowage, and assuming 25 measurement tons per 20-ft container.
b/ Product of columns (2), (3), and (4).

Source: McCaul, James R., Robert S. Zubaly, and Edward V. Lewis, "Increasing the Productivity of U.S. Shipping," paper before Spring Meeting, Society of Naval Architects and Marine Engineers, Williamsburg, VA, May 24, 1972, p. 2, Table 1.

Table 2-3

U.S. OCEANGOING MERCHANT MARINE, JUNE 1, 1976

Vessels of 1,000 gross tons and over, excluding privately owned tugs, barges, etc.
(Tonnage in Thousands)*

	PRIVATELY OWNED			GOVERNMENT OWNED			TOTAL		
	Number of Ships	Gross Tons	Deadweight Tons	Number of Ships	Gross Tons	Deadweight Tons	Number of Ships	Gross Tons	Deadweight Tons
ACTIVE FLEET:									
Combo Pass/Cargo	6	74	50	0	0	0	6	74	50
Freighters	145	1,587	1,988	11	85	104	156	1,671	2,091
Bulk Carriers	17	252	447	0	0	0	17	252	447
Tankers	222	4,696	8,427	1	3	4	223	4,699	8,431
Intermodal	140	2,705	2,770	0	0	0	140	2,705	2,770
Total Active Fleet	530	9,314	13,682	12	88	108	542	9,402	13,790*
INACTIVE FLEET:									
Combo Pass/Cargo	0	0	0	53	520	333	53	520	333
Freighter	12	103	148	187	1,379	1,894	199	1,482	2,042
Bulk Carriers	2	49	97	0	0	0	2	49	97
Tankers	26	738	1,408	13	117	1,834	39	855	1,592
Intermodal	6	55	52	4	34	47	10	89	99
Total Inactive Fleet	46	945	1,705	257	2,050	2,457*	303	2,995	4,163
TOTAL:									
Combo Pass/Cargo	6	74	50	53	520	333	59	595	384
Freighters	157	1,690	2,136	198	1,463	1,998	355	3,153	4,133
Bulk Carriers	19	302	544	0	0	0	19	302	544
Tankers	248	5,433	9,835	14	120	187	262	5,554	10,023
Intermodal	146	2,761	2,822	4	34	47	150	2,795	2,869
Total American Flag	576	10,259	15,387	269	2,138	2,565	845	12,397	17,953

*NOTES: 1) All tonnage figures are preliminary and may not be additive due to rounding.
2) Includes 3 vessels in bareboat charter and 12 vessels in custody of other agencies.
3) National Defense Reserve Fleet consists of 253 vessels of which 63 are scrap candidates.

Source: Kiss, Ronald K. & Eugene L. Coffman, "Ships of the U.S. Merchant Marine", *Naval Engineers Journal*, Oct. 1976, pp. 15-33, at p. 16.

Table 2-4

NUMBER OF OCEANGOING MERCHANT-TYPE VESSELS, 1,000 GROSS REGISTER TONS AND OVER, AS OF DECEMBER 31, 1975

Country of Registry	Number of Vessels, by Type, and Percentage of World Totals								Total Number of Vessels and Percentage of World Total	
	Combo		Freighter		Bulk		Tanker			
U.S.-Flag:										
Privately Owned	6	(0.8%)	305	(2.4%)	19	(0.4%)	250	(4.7%)	580	(2.5%)
Government-Owned	54	(7.6)	206	(1.6)	-	-	17	(0.3)	277	(1.2)
Total	60	(8.4)	511	(4.1)	19	(0.4)	267	(5.0)	857	(3.7)
Foreign-Flag	654	(91.6)	12,064	(95.9)	4,253	(99.6)	5,044	(95.0)	22,015	(96.3)
World Total	714	(100.0%)	12,575	(100.0%)	4,272	(100.0%)	5,311	(100.0%)	22,872	(100.0%)

Source: Maritime Administration, A Statistical Analysis of the World's Merchant Fleets, December 31, 1975 (Washington: U.S. Government Printing Office, 1976), p. vi.

deadweight, as of December 31, 1975, are shown in Tables 2-4 and 2-5, respectively.

Comparison with Table 2-3 shows that the latter two tables include a number of inactive U.S.-flag ships. Thus, in terms of the active fleets, the U.S. percentages of the world totals in Tables 2-4 and 2-5 are somewhat overstated in the Freighter and Combo categories, especially the latter. On the other hand, the U.S. percentages in the Tanker and Bulk categories may be understated, in view of the large numbers of foreign-flag vessels of these types that had been placed in lay-up by the end of 1975.

One further point of contrast is that, in Table 2-3, only general cargo ships are classed as "Freighters"; container, RORO, and barge-carrying vessels and combinations of these are classified as "Intermodal". In Tables 2-4 and 2-5, all are lumped under the "Freighter" category. A breakdown of freighters by deadweight (again, as of December 31, 1975) is given in Table 2-6.

U.S. Merchant Fleet Posture

A recent (June 1978) projection of the active U.S.-flag commercial merchant marine for the period 1978-1984 (including vessels of 1,000 gross register tons and over, and excluding some 165 Great Lakes vessels) ranges between a maximum of 586 and a low of 552.[4]

The MSC Controlled Fleet comprises two segments. As of June 1978, the MSC Nucleus Fleet consisted of 69 government-owned and bareboat-chartered ships; of these, only 27 were general cargo ships, and this number is projected to decrease to 19 by 1984. The balance of this segment comprised 3 tankers, 24 special project ships, and 18 fleet support ships. The second segment consisted of 26 time- and voyage-chartered ships (3 general cargo ships and 23 tankers).[4]

Within the MSC Controlled Fleet, only the general cargo ships are relevant in the context of this report. In January 1980, following year-end redeliveries of vessels whose charters were not renewed, this total stood at 23 ships (6 government-owned, and 17 time-chartered).

As of June 1978, there were 140 ships in the National Defense Reserve Fleet (NDRF), whose activation schedule calls for the first of these to be ready on berth 21 days after notification and the last ship to be activated by the 52nd day of call-up.[4]

In addition, the Navy Reserve Fleet (NRF)--which is not a component of the NDRF--consisted of 33 inactive vessels

Table 2-5

DEADWEIGHT TONNAGE OF OCEANGOING MERCHANT-TYPE VESSELS, 1,000 GROSS REGISTER TONS AND OVER, AS OF DECEMBER 31, 1975

Vessel Type	Deadweight Tonnage		Privately Owned U.S.-Flag Share	
	U.S. Privately Owned	World Total	Percentage	Rank
Combo	50,000	3,027,000	1.7	Not in top 13 a/
Freighter	4,959,000	101,968,000	5.0	7th b/
Bulk	544,000	150,080,000	0.4	Not in top 18 c/
Tanker	9,475,000	302,217,000	3.1	8th d/
All Types	15,028,000	557,292,000	2.7	10th e/

a/ USSR leads with 88 combos of 238,000 dwt.; Singapore, ranked 13th, has 20 (vs. 6 privately owned U.S.-flag) of 96,000 dwt.

b/ USSR leads with 1,706 freighters (vs. 305 privately owned U.S.-flag) of 10,499,000 dwt. but see "Freighter" breakdown, Table 2-6.

c/ Liberia leads with 925 bulk carriers of 37,243,000 dwt.; British Colonies, ranked 18th, have 31 (vs. 19 U.S.-flag) of 1,027,000 dwt.

d/ Liberia leads with 1,014 tankers (vs. 250 privately owned U.S.-flag) of 89,470,000 dwt.

e/ Liberia leads with 2,546 ships (vs. 580 privately owned U.S.-flag) of 132,694,000 dwt.

Source: Maritime Administration, Merchant Fleets of the World: Oceangoing Steam and Motor Ships of 1,000 Gross Tons and Over as of December 31, 1975 (Washington: Sept. 1976), pp. 10-14, 35.

Table 2-6

DEADWEIGHT TONNAGE OF OCEANGOING FREIGHTERS, 1,000 GROSS REGISTER TONS AND OVER, AS OF DECEMBER 31, 1975

Vessel Sub-Type	Deadweight		Privately Owned U.S.-Flag Share	
	U.S. Privately Owned	World Total	Percentage	Rank
General Cargo	1,871,000	87,598,000	2.1	Not in top 10[a/]
Container	1,751,000	6,657,000	26.3	1st
Partial Container	400,000	5,081,000	7.9	3rd
RORO	128,000	917,000	13.8	1st
Barge Carrier	809,000	995,000	81.2	1st
All Freighters	4,959,000	101,968,000	5.0	7th

a/ USSR leads with 1,602 general cargo carriers of 9,602,000 dwt. However, the corresponding figures for privately owned U.S.-flag vessels (38 ships of 1,871,000 dwt) indicate that the USSR total includes many vessels that are smaller than the average U.S.-flag vessel.

Source: Maritime Administration, Merchant Fleets of the World: Oceangoing Steam and Motor Ships of 1,000 Gross Tons and Over as of December 31, 1975 (Washington: Sept. 1976), pp. 11, 15.

owned by DOD but held in MarAd custody. These included 6 dry cargo ships, 7 tankers, 6 amphibious landing ships, and 14 troopships. Time required for activation ranges from 30 to 90 days.[4]

A Note on the Vietnam Experience

During the Vietnam conflict, numbers of World War II-built Victory ships were broken out of the NDRF. At the height of the logistical build-up (1968), 175 of these were engaged in carrying military cargoes. Most were operated under General Agency Agreement by U.S. commercial shipping companies. Over the next several years, they were phased out; by 1971, none was still in service. Most were returned to lay-up in the NDRF; about 45 were scrapped.

This experience suggests two important points. First, the availability for rapid activation of a large number of NDRF general cargo vessels is an obvious military asset. A less obvious but nonetheless important point is that their availability outside the active commercial fleet not only provided a surge capability for a rapid build-up but also, on the downside, served to cushion the effects of the drawdown on the commercial sector.

In this context, it also can be noted that the introduction of high-productivity intermodal ships has made commercial liner shipping more vulnerable to sudden or large changes in traffic requirements than was the case during the break-bulk shipping era.[5] Intermodalism requires fewer ships but far greater investment in the shipping system, which includes the ships; the containers, trailers, or barges they carry; shoreside handling equipment; and computerized administrative and control systems. Amortizing the larger investment requires high ship, equipment, and facility utilization. Consequently, intermodal ships are more tightly scheduled and their normal turnaround time in port (typically, 8 to 16 hr; rarely exceeding 24 hr) approximates the absolute minimum.

Thus, because there remains so little slack in sailing schedules and because fewer vessels are required to serve a given trade, diversion of an individual modern liner vessel for the carriage of military cargo has a greater impact on the operator's ability to provide a frequency of sailings sufficient to maintain his commercial market share.

U.S. OCEANBORNE FOREIGN TRADE AND U.S.-FLAG LINER CARRIAGE: BACKGROUND

The major market for U.S.-flag carriers is U.S. oceanborne foreign trade, which, for our purposes, is usefully segmented into two submarkets, military cargo and commercial cargo.

Table 2-7 summarizes (a) liner vessel carriage in U.S. oceanborne foreign trade by ships of all flags and U.S.-flag; (b) military general (non-bulk) cargo movements by U.S.-flag liners and MSC Nucleus Fleet vessels; (c) military cargo percentages of liner carriage by all flags and U.S.-flag; and (d) U.S.-flag percentages of commercial cargo and of total cargo (including military cargo) carried by liner vessels, for all U.S. foreign trade routes for the period 1968-1975. Outbound and inbound tonnages and percentages are given in Tables 4-1 through 4-3 (Chapter 4); and the corresponding data for the three U.S. trade routes of major interest and for the aggregate of all other U.S. foreign trade routes are given in Tables B-1 through B-3 (Appendix B).

Over the period 1968-1975, total oceanborne military dry cargo (including dry bulk) decreased by 73.3 percent (see Table 2-11); however, throughout this period, it represented only a small fraction of total U.S. oceanborne dry cargo. Of the combined tonnages carried by vessels of all flags in liner and non-liner dry cargo service in U.S. foreign trade (Table 2-8), military shipments accounted for 10.2 percent in 1968; and, by 1975, had declined to 2.3 percent.

Military cargo was a small fraction of total non-bulk cargo in U.S. oceanborne foreign trade during the period 1968-1975, with shares ranging from a maximum of 4.2 percent in 1968 to a low of 1.0 percent in 1975. Over this period, the commercial non-bulk cargoes in U.S. oceanborne foreign trade increased at a compound average annual rate of 4.8 percent. Thus, overall, military cargoes represented a declining market for U.S.-flag operators.

During 1968-1975, the military fraction of total liner vessel carriage in U.S. foreign trade ranged between a high of 11.2 percent (1969) and lows of 5.5 and 5.6 percent (1973, 1975). During this period, total liner vessel carriage of commercial cargoes in U.S. foreign trade increased at a compound average annual rate of 0.97 percent.

During 1968-1975, the military fraction of U.S.-flag liner vessel carriage ranged between a high of 34.8 percent (1969) and a low of 16.1 percent (1975). While the military fraction of U.S.-flag liner operators' total carriage thus declined by half, U.S.-flag liner carriage of commercial cargoes increased at a compound average annual rate of 3.98

Table 2-7

SUMMARY OF LINER VESSEL CARRIAGE AND MSC NUCLEUS FLEET NON-BULK CARRIAGE
IN U.S. OCEANBORNE FOREIGN TRADE, ALL TRADE ROUTES, 1968-1975
(Thousands of Measurement Tons)

		1968	1969	1970	1971	1972	1973	1974	1975
	Liner Vessel Carriage, All Flags:								
1)	Commercial Cargo	87,558	79,633	96,254	83,985	84,815	97,465	97,706	84,273
2)	Military Cargo	10,457	10,044	9,647	10,113	7,546	5,668	7,805	4,979
3)	Total	98,015	89,677	105,901	94,098	92,361	103,133	105,511	89,252
	U.S.-Flag Liner Vessel Carriage:								
4)	Commercial Cargo	24,259	18,824	22,851	19,219	18,603	25,181	29,205	25,898
5)	Military Cargo	10,457	10,044	9,647	10,113	7,546	5,668	7,805	4,979
6)	Subtotal	34,716	28,868	32,498	29,332	26,149	30,849	37,010	30,877
7)	MSC Nucleus Fleet Carriage	5,279	3,227	785	771	769	474	442	325
8)	Total	39,995	32,095	33,283	30,103	26,918	31,322	37,452	31,202
9)	Military Cargo Percentage of Liner Vessel Carriage, All Flags	10.7	11.2	9.1	10.7	8.2	5.5	7.4	5.6
10)	Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage	30.1	34.8	29.7	34.5	28.8	18.4	21.1	16.1
11)	U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo	27.7	23.6	23.7	22.9	21.9	25.7	29.9	30.7
12)	U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)	35.4	32.2	30.7	31.2	28.3	29.6	35.1	36.6

Sources: Lines (1) through (6) from Table 4-1 (Chapter 4). Lines (7) and (8) from Table 4-2. Line (9) computed from Lines (2) and (3). Lines (10) through (12) from Table 4-3.

Table 2-8

U.S. OCEANBORNE FOREIGN TRADE, COMMERCIAL CARGO ONLY:
TOTAL AND U.S.-FLAG SHARE BY TYPE OF SERVICE, SELECTED YEARS, 1950-1975 [a/]

Type of Service [b/]	Millions of Measurement Tons [c/]											
	1950	1955	1960	1965	1968	1969	1970	1971	1972	1973	1974	1975
Liner:												
Total Tons	N.A.	N.A.	96.3	93.5	87.6	79.6	95.8	84.0	84.7	97.5	97.7	84.2
U.S.-Flag Tons	N.A.	N.A.	27.6	21.3	21.1	18.4	22.4	19.2	18.6	25.1	29.1	25.8
U.S.-Flag Percent	N.A.	N.A.	28.6%	22.8%	24.0%	23.1%	23.5%	22.9%	21.9%	25.8%	29.8%	30.7%
Non-Liner:												
Total Tons	N.A.	N.A.	109.0	171.6	209.5	212.1	240.7	220.7	242.6	281.9	282.7	275.3
U.S.-Flag Tons	N.A.	N.A.	8.4	8.2	6.4	4.6	5.4	4.8	3.8	4.5	5.0	3.8
U.S.-Flag Percent	N.A.	N.A.	7.7	4.8	3.0	2.2	2.2	2.1	1.6	1.6	1.8	1.4
Tanker:												
Total Tons	51.1	74.2	118.2	150.5	163.1	173.5	182.1	192.5	226.4	298.4	294.8	296.0
U.S.-Flag Tons	27.4	17.8	8.1	8.2	7.5	5.5	8.0	9.5	10.2	22.2	20.5	14.0
U.S.-Flag Percent	53.6	23.1	6.9	5.5	4.6	3.2	4.4	4.9	4.5	7.4	7.0	4.7
Total: [d/]												
Total Tons	-	-	323.5	415.6	460.1	465.2	518.6	497.2	553.7	677.8	675.2	655.5
U.S.-Flag Tons	-	-	44.1	37.7	35.0	28.5	35.8	33.5	32.6	51.8	54.6	43.7
U.S.-Flag Percent	e/	e/	11.1%	7.5%	6.0	4.6	5.3	5.3	4.6	6.3	6.5	5.1

a/ Includes government-sponsored cargo; excludes Department of Defense cargo and U.S.-Canada trans-Great Lakes cargo.
b/ Note that tonnages are by type of service, not type of cargo. E.g., dry or liquid bulk cargoes carried in the holds or tanks of liner vessels are included under "liner;" bulk grain shipped on tank vessels is included under "tanker;" etc. "Non-liner" dry cargo service includes both dry bulk carriers and non-liner general cargo ships.
c/ Original data were in long tons (LT) of 2,240 lb. These were converted to measurement tons (MT) of 40 cu ft, assuming stowage factors of 76 cu ft per LT for cargoes carried by liner vessels and 40 cu ft per LT for cargoes carried by tankers and non-liner dry cargo vessels.
d/ Totals may not add, due to rounding.
e/ The MarAd-published U.S.-flag shares of total U.S. oceanborne foreign trade, on a long-ton basis, for 1950 and 1955 are 42.3 percent and 23.5 percent, respectively. In the absence of the dry cargo tonnage breakdown between the liner and non-liner categories, the respective stowage factors (note c, above) could not be applied to compute the U.S.-flag percentages on a measurement-ton basis.

Sources: Derived from Maritime Administration annual reports for Fiscal Years 1971 and 1977. Data for 1950-1965 are from MarAd 1971 (Washington: 1971), Appendix XI, p. 75; data for 1968-1975, from MarAd '77 (Washington: May 1978), Table 13, p. 30.

percent over this period, or about 4 times the growth rate of total liner carriage of commercial cargoes by ships of all flags in U.S. foreign trade.

Total U.S.-flag liner carriage fluctuated somewhat over the period 1968-1975, as shown in Table 2-7, with a general net decline. This stemmed from the substantial decrease in military cargo from Vietnam era peaks, coupled with the U.S.-flag operators' relatively constant share of liner carriage of commercial cargoes. (Commercial liner cargoes, on average, showed no significant increase during the period).

The substantial reductions in liner carriage of military cargoes from the peak Vietnam era years of 1968 and 1969 are evident from Table 2-7.

Because both military cargo volumes and U.S.-flag shares of commercial cargoes vary by trade route, each of the three trade routes of principal interest--U.S. North Atlantic-Western Europe, U.S. North Atlantic-Mediterranean, and U.S. Pacific-Far East--presents a pattern that differs from the others and from that just described for the total of all routes. Summaries of these three routes, and of the aggregate of all remaining trade routes, follow.

On the U.S. North Atlantic-Western Europe route (Trade Routes 5-7-8-9), liner carriage during the period 1968-1975 was characterized by sizeable year-to-year fluctuations and a moderate underlying growth trend. Military tonnages remained essentially stable over the period; year-to-year variations in the military cargo percentages of total liner carriage and of U.S.-flag liner carriage were due mainly to the fluctuations in commercial cargo volumes (see Table B-1(A)). While total liner carriage of commercial cargoes by ships of all flags grew at a compound average annual rate of 3.38 percent, U.S.-flag liner carriage of commercial cargoes grew at a rate of 4.61 percent (see Table 1-1).

From 1969 through 1975, U.S.-flag shares of liner vessel carriage over the route were nearly constant, ranging between 29.6 and 32.8 percent of commercial cargo, and between 39.1 and 41.1 percent of total liner vessel carriage (see Table B-3(A)).

Overall, military cargoes comprised about a third of the total tonnage carried by U.S.-flag liners on this route during the 8-year period. The military share peaked at 37.0 percent in 1972, a recession year for commercial cargoes; declined to a low of 25.9 percent in 1973, a year of recovery and expansion in trade; and, in 1975, stood at 34.4 percent--about the same as the military shares during the Vietnam Era peak years of 1968 and 1969 (32.7 and 34.6 percent, respectively).

On the U.S. North Atlantic-Mediterranean route (Trade Route 10), both total and U.S.-flag liner carriage fluctuated considerably during 1968-1975, with substantial growth evident during the last three years of this period. Military tonnages varied from year to year, with an overall decline; the 1975 tonnage was about 31 percent below the 1968 and 1969 levels (see Table B-1(B)). For the U.S.-flag liner operators, this was more than offset by commercial traffic growth. While total liner carriage of commercial cargoes by ships of all flags grew at a compound average annual rate of 4.82 percent over the 8-year period, growth in U.S.-flag liner carriage of commercial cargoes was 14.40 percent, almost triple the overall rate on this trade route (see Table 1-1).

The U.S.-flag shares of liner vessel carriage fluctuated throughout the period, showing sharp growth during 1973-1975. As a fraction of commercial cargo, U.S.-flag shares ranged between 27.7 and 34.2 percent during 1968-1972, rising to 52.8 percent over the last three years of the period. The corresponding U.S.-flag shares of total liner vessel carriage ranged from 37.1 to 43.0 percent during 1968-1972, rising to 56.4 percent in 1975 (see Table B-3(B)).

Military cargo percentages of U.S.-flag liner carriage showed an opposite trend, ranging between 26.4 and 35.3 percent during 1968-1972 and declining over the last three years to a low of 13.7 percent in 1975.

On the U.S. Pacific-Far East route (Trade Route 29), total liner carriage during 1968-1975 fluctuated but remained stable, while U.S.-flag liner carriage was characterized not only by considerable year-to-year variation but also a strong downward trend. This last reflects the sharp (81-percent) decline in military tonnages from 6.132 million MT in 1968 to 1.152 million MT in 1975 (see Table B-1(C)). Total liner carriage of commercial cargoes by ships of all flags grew at a compound average annual rate of 8.61 percent. U.S.-flag liner carriage of commercial cargoes grew at a slightly greater rate, 8.95 percent (see Table 1-1). This strong growth in commercial traffic was, however, insufficient to offset the major decline in military cargo offerings for the U.S.-flag liner operators on the route.

The U.S.-flag share of liner vessel carriage of commercial cargo fluctuated throughout the 8-year period, with lows of 34.5 percent (1968) and 34.7 percent (1975) and a peak of 50.6 percent (1970). The U.S.-flag share of total liner vessel carriage not only showed considerable year-to-year variation but also declined sharply, parallelling the major reductions in military cargoes. From its peak of 68.4

percent (1970), the U.S.-flag share of total liner carriage dropped to 40.5 percent in 1975 (see Table B-3(C)).

The military cargo share of total U.S.-flag liner carriage declined steadily from 68.9 percent in 1968 to 22.0 and 21.8 percent in 1974 and 1975, respectively.

On the aggregate of all other trade routes, liner carriage during 1968-1975 fluctuated but remained essentially stable over the period. Military tonnages varied considerably, often increasing or decreasing by a factor of two in successive years, with a slight decreasing trend overall (see Table B-1(D)). Total liner carriage of commercial cargoes declined, with a compound annual average rate of -0.83 percent, but U.S.-flag liner carriage of commercial cargoes grew at a rate of 2.01 percent (see Table 1-1).

U.S.-flag shares of liner vessel carriage over the route varied throughout the period, ranging between 17.1 percent (1972) and 28.1 percent (1975) of commercial cargo, and between 20.5 percent (1972) and 30.3 percent (1975) of total liner vessel carriage (see Table B-3(D)).

Reflecting the erratic year-to-year fluctuations in military tonnages, the military cargo percentages of U.S.-flag liner vessel carriage varied widely, with lows of 10.3 percent (1975) and 12.4 percent (1968) and a high of 29.3 percent (1971).

The aggregate of all three major trade routes discussed above (i.e., Trade Routes 5-7-8-9, 10, and 29) represented 33.1 percent of total liner vessel carriage and 42.5 percent of U.S.-flag liner vessel carriage in U.S. oceanborne foreign trade in 1975.

The combined military tonnages carried by liner vessels over the three routes in 1975 were 61.0 percent below the 1968 levels. As a consequence, the combined military share of total liner vessel carriage had declined to 10.5 percent, compared with 26.8 percent in 1968; and, in U.S.-flag liner vessel carriage (which included virtually all the military liner cargo), the combined military share had declined to 24.3 percent, compared with 54.6 percent in 1968.

THE COMMERCIAL IMPORTANCE OF MILITARY CARGOES

As noted above, the number of U.S.-flag vessels has declined sharply, reflecting the disposal of over-aged vessels from both the National Defense Reserve Fleet and the commercial sector, and the higher productivity of the intermodal ships, dry bulk carriers, and tankers built during the past decade.

Table 2-8 shows that the U.S.-flag liner fleet has maintained a relatively high share of liner carriage in U.S. foreign trade. In tankers and in non-liner dry cargo service (i.e., tramp general cargo ships and dry bulk carriers), U.S. participation has dropped to very low levels.

As shown in Table 1-1, the growth of trade on different trade routes varies distinctly. Historically, new trades have emerged or growth has accelerated in one or another region, while imbalances between inbound and outbound freight have occurred. Hence, adjustments in the carrying capacity on individual trade routes are a not uncommon feature of the business as shipowners try to adjust their operations to market dynamics.

Also, as noted above, one of the more significant changes over the past decade has been the introduction of new, more productive vessels in the liner trades. Perhaps the most obvious example, the most significant in the long run, has been the large-scale introduction of new-built container-carrying vessels and the conversion of existing tonnage for the full or partial carriage of unitized (containerized and palletized) cargo.

The U.S.-flag ship operators, who have been most prominent in the development of containerized traffic, have been able to gain a high share of U.S. containerized foreign trade. Thus, in 1974, U.S.-flag ships carried 45 percent of all container cargoes in U.S. oceanborne foreign trade.[5]

Because container systems are characterized by highly capital-intensive vessels and shoreside facilities, some trade routes have been better able to adapt to containerization than have others. In the U.S. North Atlantic--Northwest Europe trade, conditions were ripe for early introduction of containerships. Later, the U.S.-Far East trade, notably including Japan, also adapted readily to containerships. The adoption of containerization in other major trades, although growing, has been slower. The process is now far advanced on many trade routes, and the container trades have become a vital sector of international shipping.

Defense containerization has increased as the U.S. armed services have become more committed to unitized cargo movement. The military now containerize more than two thirds of MSC general cargo shipments. Nevertheless, the relative growth of the commercial sector has been such that, by 1974, military container shipments constituted only about one eighth of U.S.-flag container carriage and about one fifteenth of total containerized cargoes moving in U.S. oceanborne foreign trade.[6]

Table 2-9

PERCENTAGE DISTRIBUTION OF MILITARY NON-BULK CARGO BY COMMODITY, CALENDAR YEARS 1968, 1971, AND 1975

Commodity Category [a]	1968	1971	1975
General			
Household Goods	1.7	4.5	5.5
Other General	54.7	53.7	53.4
Aircraft	1.4	0.6	0.0 [b]
Ammunition	12.6	10.2	5.5
Cargo Carrying Trailers	2.8	2.3	0.0 [b]
Privately Owned Vehicles	4.9	6.8	13.7
Refrigerated	3.6	4.0	5.5
Special	18.3	18.1	16.4
Total [c]	100.0	100.0	100.0

---

a/ Excludes bulk cargo.
b/ Less than 50,000 measurement tons.
c/ Totals may not add, due to rounding.

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 1, Fiscal Years 1968-1969, 1971-1972, and 1975-1976.

MILITARY CARGO AND SHIPPING CHARACTERISTICS

To assess the impact of troop withdrawals on the merchant fleet, data were developed on the types, as well as the quantities, of military cargoes carried.

From the Vietnam War peak in 1968, the total volume of military cargo declined from 30.3 million measurement tons (MT) to 8.1 million MT in 1975, a decrease of 73.2 percent (see Table 2-11). Table 2-9 gives the percentage distribution of military non-bulk cargo by commodity class.

During the 1968-1975 period, there was considerable change in the composition of the general cargo fleet used to carry military cargoes. Between 1968 and 1975, the share of military dry cargoes carried by the MSC-Controlled Fleet declined substantially (as shown in Table 2-10), reflecting mainly the impact of Vietnam withdrawal. Meanwhile, the military tonnage carried by "Other Commercial" ships also dropped sharply (although their percentage share of military cargo nearly doubled) while the character of military shipping arrangements also was changing, as shown in Table 2-10.

The contraction of military general cargo shipments was not uniform by trade route, with the largest declines occurring in movements from the U.S. West Coast and in foreign-to-foreign (intra-area and inter-area) shipments, as shown in Table 2-11.

COMMERCIAL SIGNIFICANCE OF MILITARY CARGOES, BY TRADE ROUTE

While the volume of military liner cargoes has dropped sharply over time, the concentration of cargo in a particular trade route may persist, having important implications for the future impact of further military cargo cutbacks on the stability of the U.S.-flag operators.

As shown in Table 2-12, with the sole exception of the North Atlantic-Western Europe route (Trade Routes 5-7-8-9), the significance of military cargoes decreased markedly or remained at modest levels during 1968-1975. The relative stability of the military cargo percentages on Trade Routes 5-7-8-9 reflects the force concentration in NATO.

SIGNIFICANCE OF MILITARY CARGOES TO INDIVIDUAL LINER COMPANIES

Over the period 1968-1975, military cargoes represented a significant but declining market overall for the U.S.-flag liner industry. Table 2-13 indicates the contribution of military business to individual liner operators during 1973-1975.

Table 2-10

PERCENTAGE DISTRIBUTION OF MILITARY DRY CARGO BY CARRIER CLASS, CALENDAR YEARS 1968, 1971 AND 1975 [a]

Carrier Class	1968	1971	1975
MSC-Controlled Ships:			
MSC Nucleus Fleet	14.8	16.8	6.3
General Agency Agreement	17.8	-	-
Time Charter	31.6	43.2	26.2
Subtotal	64.2	60.0	32.5
Other Commercial Ships:			
Voyage Charter	0.3	0.5	2.5
Berth Terms	3.0	2.2	11.2
Shipping Contract	3.9	3.2	-
Shipping Agreement	28.6	34.1	-
Break-Bulk Agreement	-	-	8.8
Container Agreement	-	-	45.0
Subtotal	35.8	40.0	67.5
Total	100.0	100.0	100.0

---

a/ Includes dry bulk cargo, which represented about 5 percent of total military cargo in 1968, 19 percent in 1971, and 10 percent in 1975, on a measurement-tonnage basis. (Petroleum shipments are excluded from all tables.)

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 1, Fiscal Years 1968-1969, 1971-1972, and 1975-1976.

Table 2-11

DISTRIBUTION OF MILITARY CARGO BY TRAFFIC AREA,
CALENDAR YEARS 1968 AND 1975

Traffic Area	Measurement Tons[a] (Millions) 1968	1975	Change (Percent)
Outbound, U.S.:			
East Coast	7.8	3.5	-55.1
Gulf Coast	2.2	0.5	-77.3
West Coast	11.2	1.9	-83.0
Subtotal	21.2	5.9	-71.2
Inbound, U.S.:			
East Coast	0.9	0.6	-33.3
Gulf Coast	0.3	0.2	-33.3
West Coast	1.2	0.5	-58.3
Subtotal	2.3	1.3	-43.5
Other Areas:			
Intra-Area	3.1	0.9	-86.8
Inter-Area	3.7		
U.S. Coastal and Intercoastal	0.1	0.1	-
Subtotal[b]	6.8	0.9	-86.8
Total	30.3	8.1	-73.3

a/ Includes dry bulk cargo, which represented about 5 percent of total military cargo in 1968, 19 percent in 1971, and 10 percent in 1975, on a measurement-tonnage basis. (Petroleum shipments are excluded from all tables.)

b/ Subtotals do not add, due to rounding of components.

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 1, Fiscal Years 1968-1969 and 1975-1976.

Table 2-12

MILITARY CARGO PERCENTAGE OF TOTAL U.S.-FLAG
LINER CARRIAGE, BY TRADE ROUTE, 1968-1975

Trade Route	1968	1969	1970	1971	1972	1973	1974	1975
T.R. 5-7-8-9:								
U.S. North Atlantic --Western Europe	32.7	34.6	28.2	30.6	37.0	25.9	29.3	34.4
T.R. 10:								
U.S. North Atlantic --Mediterranean	31.1	35.3	26.4	30.6	35.1	22.1	17.5	13.7
T.R. 29:								
U.S. Pacific --Far East	68.9	46.0	52.8	50.1	38.0	23.8	22.0	21.8
All Other Trade Routes	12.4	30.8	17.9	29.3	20.3	13.3	19.1	10.3
Total, All Trade Routes	30.1	34.8	29.7	34.5	28.8	18.4	21.1	16.1

Sources: Tables B-3(A) through B-3(D) and Table 4-3, respectively; line 3.

Table 2-13

MSC PAYMENTS AND ACCRUALS TO U.S.-FLAG LINER OPERATORS, 1973-1975 [a/]

Company	Payments and Accruals by Calendar Year (Millions of Dollars)								
	Container and Break-Bulk Agreements and Contracts			Time Charters			Total		
	1973	1974	1975	1973	1974	1975	1973	1974	1975
Sea-Land Service, Inc.	$ 74.4	$116.8	$ 89.0	$ -	$ 0.1	$ -	$ 74.4	$116.9	$ 89.0
United States Lines, Inc.	20.1	45.5	32.5	37.7	46.4	46.8	57.8	91.9	79.3
American Export Lines, Inc.	26.6	30.0	28.9	-	-	-	26.6	30.0	28.9
American President Lines, Ltd.	8.3	25.4	23.9	0.6	6.9	0.3	8.9	32.3	24.2
Central Gulf Steamship Corp.	-	-	6.6	14.0	14.0	13.9	14.0	14.0	20.5
Waterman Steamship Corp.	7.4	7.5	19.5	2.7	0.1	-	10.1	7.6	19.5
Prudential Lines, Inc.	7.8	9.8	13.6	1.3	0.1	-	9.1	9.9	13.6
Pacific Far East Lines, Inc.	9.5	7.3	9.3	3.2	1.2	-	12.7	8.5	9.3
Lykes Bros. Steamship Corp.	9.1	8.1	7.8	2.0	0.4	-	11.1	8.5	7.8
Seatrain Lines, Inc.	9.7	3.2	0.9	19.3	19.0	2.6	29.0	22.2	3.5
Subtotal	172.9	253.6	232.0	80.8	88.2	63.6	253.7	341.8	295.6
All Other Operators	16.5	13.0	13.3	56.2	37.5	27.9	72.7	50.5	41.2
Total	$189.4	$266.6	$245.3	$137.0	$125.7	$ 91.5	$326.4	$392.3	$336.8

a/ Excludes shipments under Government Bill of Lading (GBL) and Through Government Bill of Lading (TGBL). GBL and TGBL shipments represented only a small proportion of total MSC payments and accruals during 1973-1975, the maximum being 8.5 percent (1975).

The top 10 operators are listed in order of total MSC payments and accruals for 1975.

Source: Military Sealift Command, Office of the Comptroller, Statistics and Analysis Division, July 18, 1979.

Table 2-14

REVENUES AND NET INCOME OF SELECTED U.S.-FLAG LINER OPERATORS, 1973-1975

(Millions of Dollars)

	Revenues			Net Income (Loss)		
	1973	1974	1975	1973	1974	1975
(1) Sea-Land Service, Inc.	$ 582.63	$ 854.78	$ 774.02	$ 8.43	$53.44	$44.03
(2) United States Lines, Inc.	251.53	322.89	316.14	0.73	15.75	10.53
(3) American Export Lines, Inc.	148.74	220.54	205.82	4.70	14.07	(6.09)
(4) American President Lines, Ltd.	207.39	258.27	226.74	(10.09)	10.84	(7.32)
Total	$1,190.29	$1,656.48	$1,522.72	$ 3.77	$94.10	$41.15
Percentage Change from Previous Year	—	39.2%	-8.1%	—	2,396%	-56.3%

Sources:

(1) Derived from R.J. Reynolds Industries, Inc., 1975 Annual Report, pp. 14-15. Revenues are those reported as "transportation revenues". Net income was computed by applying the "percentage contribution of transportation operations" (p.15) to consolidated corporate net earnings (p.14).

(2) Derived from Interstate Commerce Commission, Bureau of Accounts; Maritime Annual Report W-4 filed by United States Lines, Inc., for years 1974 and 1975; Schedule 300, Income Statement. Revenues were computed as the sum of Lines 1, "Waterline operating revenue", and 10, "Total other income." "Net income (loss)" is from Line 36.

(3) American Export Lines, Inc., Annual Report 1974, p. 5; Annual Report 1975, p. 5. Revenues include operating-differential subsidy.

(4) Data for 1973 and 1974 were derived from American President Lines, Ltd., Annual Report 1974, p. 7. Revenues were computed as the sum of "Terminated Voyage Revenue", "Operating-Differential Subsidy", "Interest and Other Income", and "Gain on Disposition of Ships". Data for 1975 are from the company's Maritime Annual Report W-4; see Note (2), above.

As previously shown, while the major commercial liner trades have been growing moderately over time, they are susceptible to year-to-year fluctuations in world trade. The annual revenues and net income of four major U.S.-flag liner operators for the years 1973-1975 are shown in Table 2-14. These four, collectively, accounted for about two thirds (65.7 percent) of total MSC payments and accruals to liner operators in 1975.

The year 1973 was a year of moderate recovery and expansion, while, in 1974, with a further growth in trade, the liners operated close to full capacity utilization on several major routes. The result was a substantial increase in profitability. This bears out expectations, based on knowledge that the liner industry has high fixed costs in both ships and shore facilities. With vessels operating on regular schedules, even normal operating expenses can be considered as nearly constant. As a result, marginal changes in cargo volume have an exaggerated impact on profitability. (In 1975, due to a significant recession of world trade, the rise of revenues and profitability of liner companies was reversed.)

The companies shown in Table 2-14 experienced a surge in shipping revenues and profitability in 1974. These four companies--Sea-Land Service (whose MSC payments represented 12.8 percent of total 1973 revenues), United States Lines (23.0 percent), American Export Lines (17.9 percent), and American President Lines (4.3 percent)--had an aggregate net income of $94.10 million on combined revenues of $1.66 billion in 1974, compared with an aggregate net income of only $3.77 million on combined revenues of $1.19 billion in 1973. Concurrently, MSC payments and accruals to these four companies totaled $271.1 million in 1974, compared with $167.7 million in 1973, an increase of 61.7 percent.

From a broader point of view, Table 2-13 shows that MSC payments and accruals to all U.S.-flag liner operators totaled $392.3 million in 1974, compared with $326.4 million in 1973, an increase of 20.2 percent; and fell to $336.8 million in 1975, a decline of 14.1 percent from the previous year.

From 1973 to 1974, total military non-bulk shipments (carried by commercial liners and non-liners and by the MSC Nucleus Fleet) declined by 6.4 percent, from about 10.19 million MT to about 9.54 million MT.[7] However, total military cargoes carried by U.S.-flag liner vessels increased by 37.7 percent, from 5.668 million MT to 7.805 million MT (see Table 4-1). This percentage agrees closely with the increase of 37.1 percent in total MSC payments and accruals to commercial operators for cargoes moving under shipping agreements and on berth terms (see Table 2-15). With the inclusion of MSC payments for time and voyage

Table 2-15

TOTAL MILITARY SEALIFT COMMAND COMMERCIAL PAYMENTS, CALENDAR YEARS 1973-1975

Payments Category	Payments (Thousands of Dollars) 1973	1974	1975	Percentage Change from 1973 to: 1974	1975
Commercial Shipping					
(1) Shipping Agreements (break-bulk and container payments)	$193,866	$266,868	$248,998	37.7	28.4
(2) Shipping Contracts (passenger and petroleum payments)	1,436	1,324	1,331	- 7.8	- 7.3
(3) Berth Terms	19,498	25,725	50,791	31.9	160.5
(4) Time and Voyage Charter	242,217	290,551	193,665	20.0	-20.0
(5) Other (transportation and related logistics services in Southeast Asia)	8,753	19,599	11,537	123.9	31.8
Total, Commercial Shipping	$465,770	$604,067	$506,322	29.7	8.7
Government-Owned and Bareboat Chartered Shipping					
(6) Contract-Operated Nucleus Ships	31,145	45,092	25,485	44.8	-18.2
(7) Bareboat Charter, Government-Operated	--	10,515	14,070	--	--
(8) Bareboat Charter, Contract-Operated	--	8,018	42,386	--	--
(9) Other (maintenance and repair, accident and damage, claims, extraordinary repairs, alterations, activation and inactivation for MSC-operated nucleus ships)	28,155	33,346	39,583	18.4	40.6
Total Commercial Payments	$525,070	$701,038	$627,846	33.5	19.6
Subtotals:					
Lines (1) and (3)	$213,364	$292,593	$299,789	37.1	40.5
Lines (1), (3), and (4)	455,581	582,144	493,454	27.8	8.3

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 1, FY 1974, First Half (July-Dec. 1973), p. 10; FY 1974 (July 1973-June 1974), p. 21; FY 1975 First Half (July-Dec. 1974), p. 12; FY 1975 (July 1974-June 1975), p. 16); FY 1976 First Half (July-Dec. 1975), p. 11.

charters (a significant portion of which was for the carriage of general, as opposed to bulk, cargoes), the combined total of MSC payments and accruals in these three categories increased by only 27.8 percent during the period.

CAPACITY ADJUSTMENTS TO REDUCED MILITARY TRAFFIC

In the face of a decline in military traffic, some shifting in oceanborne cargo capacity can be expected. It is difficult to predict the specific actions of fleet operators, but the possible adjustments that may occur can be summarized.

Capacity on a trade route affected by a traffic reduction may, in some cases, be shifted to other routes where traffic growth rates are high. This possibility, however, is constrained by the ability of each operator to serve alternate routes. This strategy does not, in general, make a permanent adjustment; but, if it is expected that commercial traffic will quickly grow to compensate for the lost military cargo, such inter-route capacity shifting may help some U.S.-flag operators compete more effectively with foreign-flag operators for the commercial traffic available.

If an operator has ships under construction or on order, an obvious reaction to a decline in traffic could be a slowdown or cancellation of existing orders. Such action may pass some of the effects of a decline in available traffic back to the shipyards. However, to the extent that the new ships are more efficient and more competitive than those already in service, such a reaction may delay the introduction of new vessels that would aid U.S.-flag carriers in their competition with foreign-flag operators over the long term.

Although there was a systematic elimination of older and smaller-capacity ships from the U.S.-flag fleet during the 1968-1975 period, there were in 1975 some old ships and a few very small ships. To the extent these were operating at the time of a reduction in troop support cargoes, they could be laid up or scrapped, thereby making a direct reduction in capacity to help compensate for the reduced traffic. In the long run, commercial traffic growth would necessitate replacement of this capacity, but the replacement vessels would presumably be more modern and efficient.

NOTES

1 Public Law 480, 83d Congress, Agricultural Trade Development and Assistance Act of 1954, as amended.

2 Millar, Marianne, and Martin J. Bernard, III, Argonne National Laboratory, Energy and Environmental Systems Division, Historical Rates of Change in the Transportation Stock; Transportation Energy Scenario Analysis, Technical Memorandum No. 2; Informal Report ANL/EES-TM-6; prepared for U.S. Department of Energy, Assistant Secretary for Conservation and Solar Applications, Division of Transportation Energy Conservation, Data Analysis Branch (Argonne, IL: Sept. 1978), p. 25.

3 McCaul, James R., Robert S. Zubaly, and Edward V. Lewis, "Increasing the Productivity of U.S. Shipping," paper before Spring Meeting, Society of Naval Architects and Marine Engineers, Williamsburg, VA, May 24, 1972, p. 2, Table 1.

4 Projections in this section are from Maritime Administration and Military Sealift Command, Civilian Seafaring Manpower Requirements in Peace and War, 1978-1984 (Washington: Nov. 1978), pp. 3-5.

5 Kendall, Lane C., "Toward a National Merchant Marine Policy," U.S. Naval Institute Proceedings, Vol. 105, No. 2 (Feb. 1979), pp. 42-47.

6 Derived from Maritime Administration, Containerized Cargo Statistics: Calendar Year 1974 (Washington: U.S. Government Printing Office, 1976), pp. 11-12.

7 Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 1, FY 1974, First Half (July-Dec. 1973), p. 15; FY 1974 (July 1973-June 1974), p. 23; FY 1975, First Half (July-Dec. 1974), p. 16.

Chapter 3

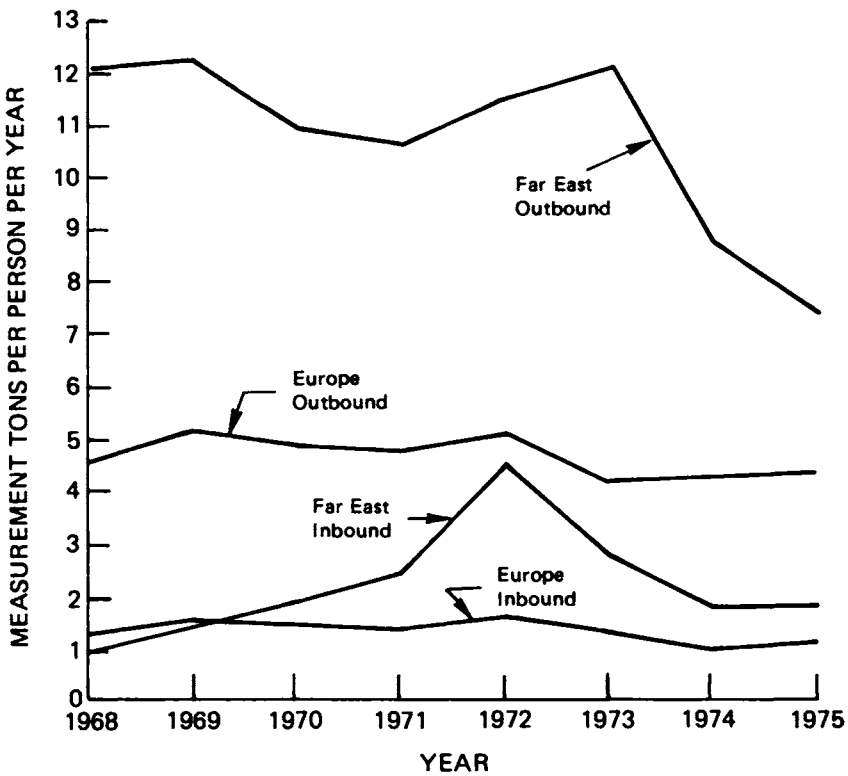
MILITARY CARGO CHARACTERISTICS

The purpose of this section is to delineate the quantities and frequency of shipments to the various troop support areas. While the discussion covers primarily Europe and the Far East, it is intended to establish the oceanborne troop support cargo characteristics (less bulk cargo) under the 1968-1975 U.S. worldwide Armed Forces deployment policies in terms of tonnages, commodities, and flow patterns. Inbound military tonnages also have been included in an effort to assess the total impact on ocean shipping during the period.

The underlying rationale of proportionality, i.e., that cutting troop strength in half will halve the cargo, has been examined in light of possible changes in DOD policies governing overseas deployment of U.S. Armed Forces.

It is concluded that the hypothesis of proportionality between cargo movement requirements and personnel supported is valid for peacetime deployments overseas, but is not so for theaters undergoing rapid transitions. Thus, during the period 1968-1975, between 4 and 5 measurement tons (MT) of outbound cargo per year were required to support each person deployed in Europe. On the other hand, there was a rapid decline from over 12 MT per person per year in the Far East during the period of active hostilities to about 7 MT during the drawdown years of 1974-1975. At the end of the 8-year period studied, the values for normalized support requirements (i.e., annual cargo tonnage per person) for the Far East theater were converging on the range of values typical of the European theater throughout the period.

The tables contained in this chapter and Appendix A provide breakdowns by type of cargo and the finer division of data required for analysis of individual trade route impact. For example, Far East tonnages to Southeast Asia, normalized for personnel strength, well illustrate the pattern and relative instability of normalized tonnage requirements for the Southeast Asia combat area, and the relative stability of demand for areas not so involved. See Figure 3-1 and Table A-11 (Appendix A).



SOURCES: Tables 3-1 and 4-1.

FIGURE 3-1 Military Cargo-Personnel Ratios, European and Far East Areas, 1968-1975

It should be noted that small fluctuations in total personnel strengths (say, 2 to 5 percent) do not, of themselves, produce immediate impact on cargo movement requirements. These are masked in the noise of detail changes in logistic operations, since policy plays a role at the level of annual requirements for given personnel strengths in any year.

Inbound cargo tonnages per U.S. personnel deployed (Figure 3-1) likewise show a high degree of stability for a readiness theater (Europe), ranging between 1.03 MT (1974) and 1.59 (1972) MT per person per year during the 1968-1975 period. Comparable figures for the Far East are 0.98 (1968) and 4.58 (1972). Here again, the distinction between cargo requirements at a time of active military operations and one in a readiness posture is noteworthy. As peacetime conditions returned to the Far East, the retrograde cargo-to-personnel ratio was converging on the values observed in the European theater. Because of the greater relative number of dependents in Europe, the pattern of returned cargo differed, e.g., greater proportions of privately owned vehicles (POV) and household goods (HHG).

PERSONNEL STRENGTHS

Shown in Tables A-1 and A-2 are U.S. Armed Forces 1968 through 1975 personnel strengths for the European and Far East areas broken down by major sub-locations. These, plus other overseas personnel deployments, are summarized in Table A-3 and further aggregated in Table 3-1. As can be seen, the European area remained relatively stable for the 8-year period. Understandably, the Far East strengths decreased significantly from a high of 990,875 in 1968 to a low of 257,294 in 1975, or a reduction of 74 percent.

OUTBOUND MILITARY CARGO

Tables A-4 through A-6 give total tonnages of outbound military cargo shipped to the general European area from the CONUS East, Gulf, and West coasts, broken down by Household Goods (HHG), Refrigerated (Reefer), Privately Owned Vehicles (POV), Ammunition and Hazardous Cargo (Ammo and Haz.), General Cargo less HHG, and Special Cargo. These are summarized in Table A-7.

Logically, shipping lanes originating from CONUS East Coast ports represent the bulk of this traffic. The geographical distribution of outbound shipments is shown in Table 3-2.

Table A-7 also shows (in parentheses) the average tonnage of cargo per person per year. As can be seen from

Table 3-1

U.S. ARMED FORCES PERSONNEL OVERSEAS DEPLOYMENT, WORLDWIDE, 1968-1975 a/

Area	1968	1969	1970	1971	1972	1973	1974	1975
Europe	566,432	534,875	510,042	515,472	520,782	555,403	544,444	572,898
Far East	990,875	970,556	803,971	568,899	374,141	296,251	270,451	257,294
Other	69,703	65,571	88,838	80,573	62,830	63,969	62,552	35,805
Total	1,627,010	1,571,002	1,402,851	1,164,944	957,753	915,623	877,447	865,997

a/ All data as of June 30 for the given year.

Source: Derived from data provided by Department of Defense, Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (OASD-MRA&L), Transportation Division.

Table 3-2

PERCENTAGE DISTRIBUTION OF OUTBOUND MILITARY CARGO TO EUROPEAN AND FAR EAST AREAS

BY U.S. COAST OF SHIPMENT, 1968-1975

To European Area	1968	1969	1970	1971	1972	1973	1974	1975
From U.S. East Coast	89	86	84	85	82	84	88	89
From U.S. Gulf Coast	10	13	15	14	17	14	10	9
From U.S. West Coast	1	1	1	1	1	1	2	2
	100	100	100	100	100	100	100	100
To Far East Area								
From U.S. West Coast	61	62	60	64	65	65	73	73
From U.S. East Coast	27	23	29	28	28	26	20	19
From U.S. Gulf Coast	12	15	11	8	7	9	7	8
	100	100	100	100	100	100	100	100

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976.

Table 3-3

OUTBOUND MILITARY CARGO RELATIONSHIP TO
U.S. ARMED FORCES PERSONNEL OVERSEAS DEPLOYMENT,
EUROPEAN AND FAR EAST AREAS, 1968-1975

European Area	1968	1969	1970	1971	1972	1973	1974	1975
Cargo (MT) a/	2,611,579	2,783,964	2,493,689	2,487,832	2,679,705	2,359,470	2,386,407	2,529,493
Personnel	566,432	534,875	510,042	515,472	520,782	555,403	544,444	572,898
Ratio (MT/Person)	4.611	5.205	4.889	4.826	5.146	4.248	4.383	4.415
Far East Area								
Cargo (MT)	12,044,566	11,944,274	8,880,733	6,068,559	4,378,182	3,608,011	2,384,166	1,921,793
Personnel	990,875	970,566	803,971	568,899	374,141	296,251	270,451	257,294
Ratio (MT/Person)	12.155	12.307	11.046	10.667	11.702	12.179	8.816	7.469

a/ MT -- Measurement tons.

Source: Cargo and personnel data are derived from the sources noted in Tables 3-2 and 3-1, respectively.

the Total Europe Summary, these fluctuated between a low of 4.25 MT per person in 1973 and a high of 5.20 MT per person in 1969, with an annual average factor for the 8 years of 4.84 MT per person.

Tables A-8 through A-10 (summarized in Table A-11) give the outbound tonnages shipped to the Far East areas during the period. As would be expected, the bulk of this traffic originated from CONUS West Coast ports. The geographical distribution is shown in Table 3-2.

Table A-11 shows the total outbound cargo shipped to the Far East destinations during the 8-year period. Again shown (in parentheses) is the average tonnage of cargo per person per year. Because the Far East was an active theater of operation for much of the 1968-1975 period, cargo tonnages per person were considerably higher than for the European theater. The total Far East summary shows a low of 7.47 MT per person and a high of 12.31 MT per person, with an overall average of 11.30 MT per person per year for the period. As shown in Figure 3-1, the tonnage-manpower ratios of the two theaters tend to converge as both reach peacetime readiness status.

To explore the relationship between overseas personnel deployment levels and outbound military cargo flow, the traffic flows for 1968-1975 have been summarized in Table 3-3. A review of those data reveal the following:

(a) Because of the relatively stable situation in Europe during the period, no significant correlation was found between year-to-year fluctuations in personnel and those in cargo flow. At certain times, inverse relationships appear. For example, 1969 showed a personnel drop from 1968 of 5.6 percent while the outbound cargo tonnage increased by 6.6 percent. This is typical of the ebb and flow of routine resupply functions.

(b) The Far East theater presents a much closer personnel-cargo flow relationship. This, of course, is because the Far East was an operationally active theater during the period. With a steady downward trend in force deployment from a high of almost one million personnel in 1968, reduction in cargo flow showed a predictable relationship. While this fluctuated somewhat from year to year, the following "peak-to-low" relationship is fairly consistent. Personnel peaked at 990,875 in 1968 and dropped to 257,294 in 1975, a decrease of 74.0 percent. Outbound cargo peaked at 12,044,566 MT (1969) and correspondingly dropped to 1,921,793 MT (1975), a decrease of 84.0 percent.

Table 3-4

INBOUND MILITARY CARGO RELATIONSHIP TO
U.S. ARMED FORCES PERSONNEL OVERSEAS DEPLOYMENT,
EUROPEAN AND FAR EAST AREAS, 1968-1975

European Area	1968	1969	1970	1971	1972	1973	1974	1975
Cargo (MT) a/	723,952	835,557	655,217	690,115	827,648	733,007	560,697	662,261
Personnel	566,432	534,875	510,042	515,472	520,782	555,403	544,444	572,898
Ratio (MT/Person)	1.278	1.562	1.285	1.339	1.589	1.320	1.030	1.157
Far East Area								
Cargo (MT)	967,834	1,381,855	1,531,369	1,403,329	1,711,796	843,397	498,783	473,132
Personnel	990,875	970,556	803,971	568,899	374,141	296,251	270,451	257,294
Ratio (MT/Person)	0.977	1.424	1.905	2.467	4.575	2.847	1.844	1.839

a/ MT -- Measurement tons.

Source: Cargo and personnel data are derived from the sources noted in Tables 3-2 and 3-1, respectively.

INBOUND MILITARY CARGO

Summarized in Table 3-4 are CONUS inbound cargoes from the overseas areas previously covered with respect to outbound cargo shipments during the 1968-1975 period. This table clearly demonstrates the stability of military inbound cargo normalized for personnel strengths in Europe for the entire period studied. Far East inbound cargo likewise was essentially stable except for the period of the 1968 build-up and the drawdown of 1971-1973. By 1974-1975, Far East cargo-to-personnel ratios were moving in the direction of the levels characteristic of the European theater. The detailed data are arranged by CONUS East Coast, Gulf Coast, and West Coast areas (Tables A-12 through A-14); these are summarized in Table A-15 and abstracted in Table 3-5. Understandably, hardly any reefer and very little ammo and hazardous cargo were included in the inbound tonnages. HHG and POV tonnages dominated the inbound traffic throughout the period, with the single exception of general cargo returns from operationally active Southeast Asia.

CARGO MOVEMENT SUMMARY

In summary, the total impact on the ocean shipping industry during the period 1968-1975 brought on by U.S. Armed Forces overseas deployments in the major theaters (Europe and Far East) can be stated as follows. Outbound military cargoes to these theaters totaled 71.56 million MT, of which 51.23 million MT went to the Far East and 20.33 million MT to Europe. Inbound cargoes from the same theaters totalled 14.50 million MT, of which 8.81 million MT were returned from the Far East and 5.69 million MT were returned from Europe. See Table 3-6.

MSC-CONTROLLED VERSUS COMMERCIAL CARRIER CARGO DISTRIBUTION

To assess the distribution of cargo between the MSC Controlled Fleet (which includes both the MSC Nucleus Fleet and vessels under time and voyage charters) and commercial carriers, information was obtained from MSC on the distribution of total (outbound, inbound, inter-area, intra-area, coastwise and intercoastal) movements of key commodity groups for the years 1974 and 1975. The MSC Controlled Fleet carried about 70 percent of special (outsized or heavy-lift) cargoes, 30 percent of privately owned vehicles, 20 percent of household goods (HHG), and 20 percent of general cargo (less HHG) tonnages. The years 1974-1975 were selected because, by that time, none of the 175 Victory ships broken out from the National Defense Reserve Fleet for Vietnam sealift was still in service, and the U.S.-flag commercial non-liner general cargo fleet had become so small that primary distribution impacts were on the liner fleet.

Table 3-5

TOTAL INBOUND MILITARY CARGO FROM EUROPEAN AND FAR EAST AREAS
TO CONTINENTAL UNITED STATES, BY CARGO CATEGORY, 1968-1975

(Thousands of Measurement Tons)

Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
HHG	255,130	366,453	399,405	309,144	575,987	372,858	227,583	317,609
Reefer	6	21	493	24	25	67	226	163
POV	389,427	416,703	409,973	398,181	328,263	371,422	321,978	282,787
Ammo & Haz.	27,771	46,758	44,777	32,126	44,609	35,400	43,819	91,464
Gen.,Less HHC	572,484	798,865	880,805	850,305	938,626	442,431	223,900	239,514
Special, etc.	446,968	588,612	511,133	503,664	651,934	354,226	241,974	203,856
Total	1,691,786	2,217,412	2,186,586	2,093,444	2,539,444	1,576,404	1,059,480	1,135,393

Source: Same as Table 3-2.

Table 3-6

MILITARY CARGO SUMMARY, EUROPEAN AND FAR EAST AREAS, 1968-1975
(Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975	Total 1968-1975
European Area									
Outbound	2,611,579	2,783,964	2,493,689	2,487,832	2,679,705	2,359,470	2,386,407	2,529,493	20,332,139
Inbound	723,952	835,557	655,217	690,115	827,648	733,007	560,697	662,261	5,688,454
Total	3,335,531	3,619,521	3,148,906	3,177,947	3,507,353	3,092,477	2,947,104	3,191,754	26,020,593
Far East Area									
Outbound	12,044,566	11,944,274	8,880,733	6,068,559	4,378,182	3,608,011	2,384,166	1,921,793	51,230,284
Inbound	967,834	1,381,855	1,531,369	1,403,329	1,711,796	843,397	498,783	473,132	8,811,495
Total	13,012,400	13,326,129	10,412,102	7,471,888	6,089,978	4,451,408	2,882,949	2,394,925	60,041,779
Both Areas									
Outbound	14,656,145	14,728,238	11,374,422	8,556,391	7,057,887	5,967,481	4,770,573	4,451,286	71,562,423
Inbound	1,691,786	2,217,412	2,186,586	2,093,444	2,539,444	1,576,404	1,059,480	1,135,393	14,499,949
Total	16,347,931	16,945,650	13,561,008	10,649,835	9,597,331	7,543,885	5,830,053	5,586,679	86,062,372

Source: Derived from Tables 3-3 and 3-4.

The shift to peacetime patterns, worldwide, emphasizes the categories of cargo that are predominantly carried by commercial liner shipping, in contrast to those categories requiring the special capabilities of the MSC Controlled Fleet (ammunition, aircraft, and special cargoes).

Chapter 4

IMPACT OF MILITARY CARGO REDUCTIONS

This chapter provides an examination of the likely effects of 10- and 50-percent reductions in troop support cargoes, restricting consideration to general (i.e., non-bulk) cargoes and focusing primarily on liner carriage. Data are given for the total of all U.S. foreign trade routes; for three major trade routes of specific interest--U.S. North Atlantic-Western Europe, Trade Routes 5-7-8-9; U.S. North Atlantic-Mediterranean, Trade Route 10; and U.S. Pacific-Far East, Trade Route 29 (which are defined more precisely in Chapter 1); and for the total of all other trade routes. In addition, the data are presented for total and U.S.-flag liner carriage; commercial cargo, military cargo carried by liners, and military cargo carried by the MSC Nucleus Fleet; and outbound and inbound carriage.

Various characteristics of U.S.-flag carriage are discussed: yearly fluctuations over the period 1968-1975, imbalances between outbound and inbound trade, and growth rates of commercial carriage. The effects of the postulated 10-percent and 50-percent reductions in military traffic are considered in the context of these various characteristics of U.S.-flag carriage.

For the total of all U.S. foreign trade routes during the years 1968-1975, total and U.S.-flag liner vessel carriage of commercial and military cargoes, outbound and inbound, are given in Table 4-1; MSC Nucleus Fleet non-bulk carriage is compared with U.S.-flag liner carriage in Table 4-2; and military shares of U.S.-flag liner vessel carriage and U.S.-flag shares of commercial and total cargoes carried by liners are given in Table 4-3. The relationships among total liner carriage, U.S.-flag liner carriage, and total military cargo are shown in Figure 4-1.

The corresponding data for the three individual trade routes of major interest and the total of all other trade routes are included in Appendix B (see Tables B-1, B-2, and B-3; and Figures B-1). These data provide the basis for the trends presented earlier (see "U.S. Oceanborne Foreign Trade and U.S.-Flag Liner Carriage: Background", Chapter 2) and for the analyses that follow.

Table 4-1

LINER VESSEL CARRIAGE IN U.S. OCEANBORNE FOREIGN TRADE, TOTAL AND U.S.-FLAG SHARE, ALL TRADE ROUTES, 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Outbound								
Commercial Cargo	47,058	43,067	53,255	43,189	43,424	53,784	54,304	47,786
Military Cargo	9,641	8,845	8,498	6,698	6,185	4,957	7,034	4,231
Total Cargo	56,699	51,912	61,753	49,887	49,609	58,741	61,338	52,017
Inbound								
Commercial Cargo	40,500	36,566	42,999	40,796	41,391	43,681	43,402	36,487
Military Cargo	816	1,199	1,149	3,415	1,361	711	771	748
Total Cargo	41,316	37,765	44,148	44,211	42,752	44,392	44,173	37,235
Total								
Commercial Cargo	87,558	79,633	96,254	83,985	84,815	97,465	97,706	84,273
Military Cargo	10,457	10,044	9,647	10,113	7,546	5,668	7,805	4,979
Total Cargo	98,015	89,677	105,901	94,098	92,361	103,133	105,511	89,252

U.S.-Flag

Outbound								
Commercial Cargo	11,848	10,410	13,119	10,093	10,160	14,913	16,583	14,633
Military Cargo	9,641	8,845	8,498	6,698	6,185	4,957	7,034	4,231
Total Cargo	21,489	19,255	21,617	16,791	16,345	19,870	23,617	18,864
Inbound								
Commercial Cargo	12,411	8,414	9,732	9,126	8,443	10,268	12,622	11,265
Military Cargo	816	1,199	1,149	3,415	1,361	711	771	748
Total Cargo	13,227	9,613	10,881	12,541	9,804	10,979	13,393	12,013
Total								
Commercial Cargo	24,259	18,824	22,851	19,219	18,603	25,181	29,205	25,898
Military Cargo	10,457	10,044	9,647	10,113	7,546	5,668	7,805	4,979
Total Cargo	34,716	28,868	32,498	29,332	26,149	30,849	37,010	30,877

Sources: (1) Commercial cargo tonnages for years 1971-1975 derived from Maritime Administration, United States Oceanborne Foreign Trade Routes (Washington: U.S. Government Printing Office, Mar. 1978).

(2) Commercial cargo tonnages for years 1968-1970 derived from the above source and from Maritime Administration, Essential United States Foreign Trade Routes (Washington: U.S. Government Printing Office, periodic), supplemented by other reports and data provided by Maritime Administration, Office of Trade Studies and Statistics.

(3) Military cargo tonnages derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976.

Table 4-2

U.S.-FLAG LINER CARRIAGE AND MSC NUCLEUS FLEET NON-BULK CARRIAGE, ALL TRADE ROUTES, 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
Outbound								
Liner Carriage	21,489	19,255	21,617	16,791	16,345	19,870	23,617	18,864
MSC Carriage	4,604	2,655	577	536	554	329	313	201
Total	26,093	21,910	22,194	17,327	16,899	20,199	23,930	19,065
Inbound								
Liner Carriage	13,227	9,613	10,881	12,541	9,804	10,979	13,393	12,013
MSC Carriage	675	572	208	235	215	145	129	124
Total	13,902	10,185	11,089	12,776	10,019	11,124	13,522	12,137
Total								
Liner Carriage	34,716	28,868	32,498	29,332	26,149	30,848	37,010	30,877
MSC Carriage	5,279	3,227	785	771	769	474	442	325
Total	39,995	32,095	33,283	30,103	26,918	31,322	37,452	31,202

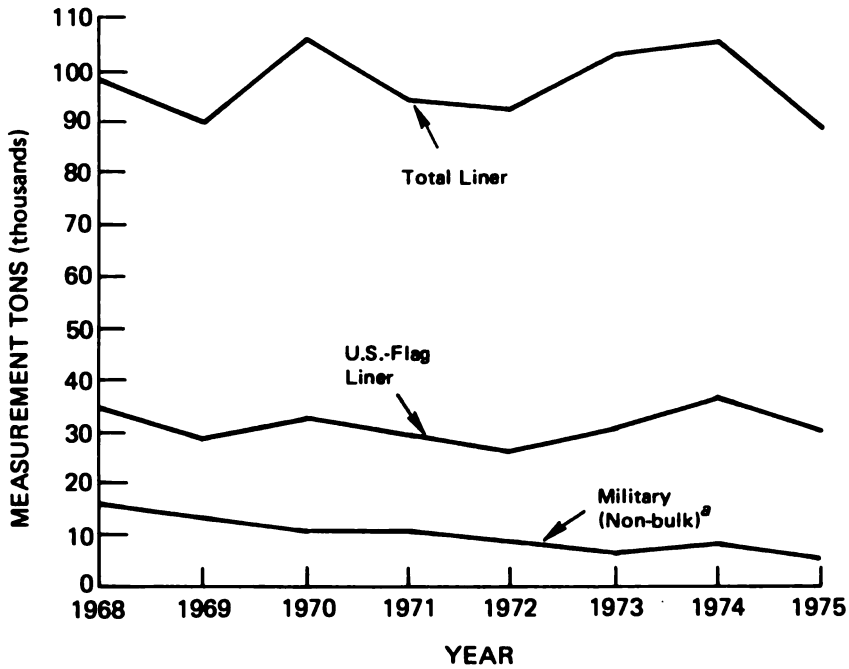
Sources: Liner carriage from Table 4-1. MSC non-bulk carriage derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976.

Table 4-3

U.S.-FLAG COMMERCIAL LINER CARRIAGE, ALL TRADE ROUTES, 1968-1975:
MILITARY CARGO PERCENTAGE OF U.S.-FLAG LINER CARRIAGE AND
U.S.-FLAG PERCENTAGES OF COMMERCIAL AND TOTAL LINER CARRIAGE

	1968	1969	1970	1971	1972	1973	1974	1975
Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage								
Outbound Cargo	44.9	45.9	39.3	39.9	37.8	24.9	29.7	22.4
Inbound Cargo	6.2	12.4	10.6	27.2	13.9	6.6	5.8	6.2
Total Cargo	30.1	34.8	29.7	34.5	28.8	18.4	21.1	16.1
U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo								
Outbound Cargo	25.2	24.2	24.6	23.4	23.4	27.7	30.5	30.6
Inbound Cargo	30.6	23.0	22.6	22.4	20.4	23.2	29.1	30.9
Total Cargo	27.7	23.6	23.7	22.9	21.9	25.7	29.9	30.7
U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)								
Outbound Cargo	37.9	37.1	35.0	33.6	32.9	33.8	38.5	36.3
Inbound Cargo	32.0	25.4	24.6	28.4	22.9	24.1	30.3	32.3
Total Cargo	35.4	32.2	30.7	31.2	28.3	29.6	35.1	36.6

Source: Derived from Table 4-1.



SOURCES: Tables 4-1 and 4-2.

FIGURE 4-1 Total Liner Carriage, U.S.-Flag Liner Carriage, and Total Non-Bulk Military Cargo in U.S. Oceanborne Foreign Trade, 1968-1975: All Trade Routes

[a]Includes carriage by MSC Nucleus Fleet as well as by U.S.-flag liners.

The analysis in this chapter takes the conservative course of assigning the MSC Nucleus Fleet first priority in the carriage of military cargo, and calculating the impacts of the postulated reductions in military cargo as being borne entirely by the U.S.-flag commercial fleet. (As noted previously, the share of total military non-bulk cargo carried by the MSC Nucleus Fleet actually declined more sharply than did the share carried by U.S.-flag liner vessels during 1968-1975. Of the military non-bulk cargo carried by these two fleets combined, the MSC share declined from about 34 percent in 1968 to 6 percent in 1975; and the tonnage carried by MSC declined by about 94 percent, compared with a decline of about 52 percent in the military tonnage carried by U.S.-flag liners over the same period. See Table 2-7, lines 5 and 7.)

Unless there is a shortage of capacity at the time of a decrease in military cargo, the commercial operators on the trade route must bear the costs of overcapacity until fleet size and routing can be adjusted or until replacement cargo is obtained. Replacement cargoes may be generated by stimulating additional non-military shipments, by increasing the U.S.-flag share of existing traffic on the route, or by natural growth in the market. To the extent that some U.S.-flag carriers can divert traffic from their foreign-flag competitors (some of whom may be U.S.-owned), the total impact on the U.S.-flag fleet can be mitigated, although it may reasonably be assumed that such diversion in a generally very inelastic market can be accomplished only through improving the terms of shipment with consequent reductions in profits. There are, in principle, longer-term impacts on the demand for new ship construction requirements through the reduction in total shipping demand.

An upper, but perhaps realistic, bound on the losses to the U.S.-flag operators can be estimated by assuming that total U.S.-flag carriage decreases by the amount of the decrease in military traffic due to the troop withdrawals. The loss to the U.S.-flag fleet then depends on how the remaining military cargoes and the U.S.-flag commercial cargoes are distributed among the sectors of the U.S.-flag fleet -- MSC Nucleus Fleet, commercial liner, commercial non-liner (tramp), and National Defense Reserve Fleet. With the withdrawal of military cargo, some flexibility is available to redistribute traffic among these sectors. (The rules used by MSC in awarding military cargo may therefore be used, to some extent, to manage the impacts.) The potential supply responses of the various sectors differ because of different operating economics. Thus, it is necessary to develop the expected distribution of total traffic by sector in order to evaluate the expected type of fleet adjustment, and consequent costs, in either the short or long run.

Unfortunately, data are not readily available for direct analysis of the financial impact. However, analyses of the impact of troop support cargo reductions on traffic in physical terms (tonnages), such as those presented here, can be useful in assessing the likely financial consequences.

Most of the remaining analysis presents the relationships (a) between hypothetical levels of reductions and observed year-to-year fluctuations, and (b) between levels of reduction and the time required to recover these levels, given overall traffic growth (or decline) trends.

The magnitude of military cargo reductions postulated to occur in 1971 is first examined in the context of these historical data to determine whether the resulting cargo reductions fall within the year-to-year fluctuations in U.S.-flag carriage observed during the period 1971-1975. Similar comparisons are made between military cargo reductions postulated to occur in 1975 and the historical 1971-1975 fluctuations. Finally, from a somewhat different viewpoint, the respective compound average annual growth rates in commercial cargoes during the period 1969-1974 are calculated and the time periods required for growth in commercial cargoes to offset the postulated 1975 military cargo reductions are established.

IMPACT ANALYSIS OF 1971-BASELINE MILITARY CARGO REDUCTIONS

This section presents a "worst-case" analysis, estimating likely U.S.-flag liner vessel carriage on three trade routes--Trade Routes 5-7-8-9, 10, and 29--following assumed 10-percent and 50-percent reductions in military cargoes from their actual 1971 levels, and discussing the magnitudes of these reductions relative to the historical year-to-year fluctuations and overall growth in commercial cargoes on those routes during the period 1971-1975.

The analysis proceeds from the following assumptions:

(1) Hypothetical instantaneous reductions of 10 and 50 percent occur on each trade route at the start of 1971.

(2) These are one-time reductions; the post-reduction volume of military cargo then remains constant through 1975.

(3) Volumes of commercial cargoes moving in U.S. oceanborne foreign trade during 1971-1975 are unaffected by the military cargo reductions.

(4) Similarly, the U.S.-flag carriers' shares of commercial cargoes during 1971-1975 are unaffected.

The approach taken is extremely conservative in several respects. First, the base year 1971 was a high-volume year for military traffic over each of the three routes examined. (The likely effects of a postulated military drawdown from the base year 1975 are discussed in a later section of this chapter.) Second, the potential effect of increased marketing activity by the U.S.-flag carriers, which undoubtedly would occur in response to the overcapacity created by the military cargo reductions, is ignored. Finally, because existing policy establishes priorities for utilization of merchant ships to meet Department of Defense requirements, military cargo reductions will not necessarily affect the MSC Nucleus Fleet and the various sectors of the U.S.-flag commercial fleet in proportion to their respective carriage of military cargoes prior to the reduction. Rather, a reallocation of the remaining military cargo might be expected. In this chapter, as noted above, the analysis takes the conservative course of assuming that military cargo tonnages carried by the MSC Nucleus Fleet will, throughout the period, be unaffected by the military reductions; and that the entire military cargo reduction will be borne by the U.S.-flag commercial sector.

There are outbound-inbound imbalances, discussed below, in both military cargoes and commercial cargoes in U.S.-flag liner vessel carriage. The reductions in military cargo will affect these imbalances in U.S.-flag carriage, given the expected market behavior described here. Consequently, the level of excess capacity and the profitability of the carriers depend on how the reduction affects the directional balance as well as the level of total traffic.

Tables 4-4 and B-4 show estimates of the expected U.S.-flag liner vessel carriage, given a postulated 10-percent reduction in 1971 military cargo levels. These estimates, presented for outbound and inbound trade, reflect the assumptions described above: U.S.-flag liner carriage of commercial cargo and MSC Nucleus Fleet carriage of military cargo are unaffected by the reductions.

Reductions and Their Relationship to Fluctuations, and Historical Growth in Commercial Traffic

On Trade Routes 5-7-8-9 (Table B-4(A)), the 10-percent reduction in military cargo results in a first-year decrease of 149 thousand measurement tons (122 thousand MT outbound and 27 thousand MT inbound). As shown in Table B-7, these traffic reductions are smaller than the yearly fluctuations in U.S.-flag carriage of commercial cargoes during the period 1971-1975. Thus, such a troop reduction would not result in an unusual variation in traffic, although its timing could be very significant. By 1973, 2 years after the assumed decline in military cargo, the growth in U.S.-

Table 4-4

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 10-PERCENT MILITARY CARGO REDUCTION: ALL TRADE ROUTES
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	10,093	10,093	10,160	14,913	16,583	14,633
	Military Cargo on:						
2)	Liners	6,698	5,974	5,956	6,181	6,197	6,309
3)	MSC Ships	536	536	554	329	313	201
4)	Total Military Cargo	7,234	6,510	6,510	6,510	6,510	6,510
	Inbound						
5)	Commercial Cargo	9,126	9,126	8,443	10,268	12,622	11,265
	Military Cargo on:						
6)	Liners	3,415	3,050	3,070	3,140	3,156	3,161
7)	MSC Ships	235	235	215	145	129	124
8)	Total Military Cargo	3,650	3,285	3,285	3,285	3,285	3,285
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	67	4,820	6,490	4,540
10)	Military Cargo		-724	-742	-517	-501	-389
11)	Total		-724	-675	4,303	5,989	4,151
	Inbound						
12)	Commercial Cargo		0	-683	1,142	3,496	2,139
13)	Military Cargo		-365	-345	-275	-259	-254
14)	Total		-365	-1,028	867	3,237	1,885
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		967	1,717	4,645	3,961	3,368
16)	Military Cargo on Liners		2,924	2,886	3,041	3,041	3,148
17)	Total Liner Carriage		3,891	4,603	7,686	7,002	6,516
18)	Military Cargo on MSC Ships		301	339	184	184	77
19)	Total Liner and MSC Carriage		4,192	4,942	7,870	7,186	6,593

Data sources and computation method:

Lines 1 and 5 -- from Table 4-1.
Lines 3 and 7 -- from Table 4-2.
Lines 4 and 8 -- "Actual 1971" tonnage, outbound or inbound, is the sum of Line 3 or Line 7 and the corresponding tonnage of military cargo carried by U.S. - flag liners (from Table 4-1). "Projected" tonnage equals 90% of "actual 1971" tonnage.
Lines 2 and 6 -- equal, respectively, Line 4 minus Line 3, and Line 8 minus Line 7.
Lines 9, 10, 12, and 13 -- derived from Lines 1, 2, 5, and 6, respectively.
Lines 15, 16, and 18 -- equal, respectively, Line 1 minus Line 5, Line 2 minus Line 6, and Line 3 minus Line 7.
Lines 11, 14, 17, and 19 -- derived by addition.

flag commercial trade is sufficient to increase total U.S.-flag liner carriage to a level exceeding the initial 1971 traffic level for both outbound and inbound traffic (see Table B-4(A), lines 11 and 14).

On Trade Route 10 (Table B-4(B)), the 10-percent military traffic reduction totals 57 thousand MT (47 thousand outbound and 10 thousand inbound). Again, the changes in military cargo are smaller than most of the year-to-year fluctuations in commercial cargo levels during the 1971-1975 period. Thus, as on Trade Routes 5-7-8-9, such a reduction would not result in an unusual variation in traffic unless timing were inopportune. In this case, U.S.-flag liner carriage surpasses the original 1971 traffic level for inbound traffic by 1972 and for outbound traffic by 1973.

On Trade Route 29 (Table B-4(C)), the 10-percent reduction is less than that actually experienced over this period. The 10-percent reduction results in a decrease of 364 thousand MT (311 thousand outbound and 53 thousand inbound). As on the other two routes, the reductions in military cargo are smaller than the year-to-year fluctuations in U.S.-flag carriage of commercial cargoes actually experienced. In this case, total U.S.-flag liner carriage regains its initial 1971 level for both outbound and inbound traffic by 1972.

Tables 4-5 and B-5 show estimates of the expected U.S.-flag liner vessel carriage, given a postulated 50-percent reduction in 1971 military cargo levels. On Trade Routes 5-7-8-9 (Table B-5(A)), this reduction amounts to a first-year decrease of 742 thousand MT (609 thousand outbound and 133 thousand inbound). This contrasts sharply with the 10-percent reduction case. The 50-percent reduction in outbound military cargo exceeds all annual fluctuations in outbound commercial carriage throughout the period. In fact, the reduction is so large that the growth in commercial traffic to 1975 is inadequate to erase the loss. Although the inbound military cargo reduction is less than three of the annual fluctuations in inbound commercial cargo, inbound U.S.-flag liner carriage regains its pre-reduction level only temporarily. Overall, the military cargo reductions are so great and the commercial cargo fluctuations so erratic that, in 1975, both inbound and outbound U.S.-flag liner carriage stand well below their initial 1971 levels.

On Trade Route 10 (Table B-5(B)), the 50-percent reduction represents a military cargo decrease of 284 thousand MT (233 thousand outbound and 51 thousand inbound). In this case, the military traffic reductions both outbound and inbound are more than offset by commercial cargo growth in 1973 alone. Because of the more rapid growth of

Table 4-5

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 50-PERCENT MILITARY CARGO REDUCTION: ALL TRADE ROUTES
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	10,093	10,093	10,160	14,913	16,583	14,633
	Military Cargo on:						
2)	Liners	6,698	3,081	3,063	3,288	3,304	3,416
3)	MSC Ships	536	536	554	329	313	201
4)	Total Military Cargo	7,234	3,617	3,617	3,617	3,617	3,617
	Inbound						
5)	Commercial Cargo	9,126	9,126	8,443	10,268	12,622	11,265
	Military Cargo on:						
6)	Liners	3,415	1,590	1,610	1,680	1,696	1,701
7)	MSC Ships	235	235	215	145	129	124
8)	Total Military Cargo	3,650	1,825	1,825	1,825	1,825	1,825
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	67	4,820	6,490	4,540
10)	Military Cargo		-3,617	-3,635	-3,410	-3,394	-3,282
11)	Total		-3,617	-3,568	-1,410	3,096	1,258
	Inbound						
12)	Commercial Cargo		0	-683	1,142	3,496	2,139
13)	Military Cargo		-1,825	-1,805	-1,735	-1,719	-1,714
14)	Total		-1,825	-2,488	-593	1,777	425
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		967	1,717	4,645	3,961	3,368
16)	Military Cargo on Liners		1,491	1,453	1,608	1,608	1,715
17)	Total Liner Carriage		2,458	3,170	6,253	5,569	5,083
18)	Military Cargo on MSC Ships		301	339	184	184	77
19)	Total Liner and MSC Carriage		2,759	3,509	6,437	5,753	5,160

Data sources and computation method: same as Table 4-4, except that, on Lines 4 and 8, the "projected" tonnage equals 50% of the "actual 1971" tonnage.

commercial carriage, and the relatively smaller percentage of military cargo carried on this route, both outbound and inbound traffic surpass their original 1971 levels by 1973.

On Trade Route 29 (Table B-5(C)), the 50-percent reduction amounts to a decrease in military cargoes of 1,820 thousand MT (1,553 thousand outbound and 267 thousand inbound). Here, the outbound military cargo reduction greatly exceeds all annual fluctuations in outbound commercial cargo, and, in 1975, outbound U.S.-flag liner carriage on this route stands far below its pre-reduction level. Although annual fluctuations in inbound commercial cargo generally exceed the inbound military cargo reduction, inbound U.S.-flag liner carriage in 1975 is slightly below its original level. Overall, the growth in commercial cargo is insufficient to offset the military cargo reductions and restore the level of either outbound or inbound carriage to the initial 1971 levels by 1975--a situation like that which actually occurred, as shown in Table B-1(C).

On all three trade routes, the 10-percent military cargo reductions are smaller than historical fluctuations in commercial cargo, either outbound or inbound. Similarly, on all three routes, the 50-percent reductions in inbound military cargo are less than the annual fluctuations in inbound commercial cargo. However, on two of these routes (Trade Routes 5-7-8-9 and 29), the 50-percent reductions in outbound military cargo are so large that they exceed all normal historical fluctuations and are not offset by growth in commercial cargoes within the 5-year period analyzed.

Liner and Non-Liner Market Shares

Although the main focus of this analysis is on liner vessel carriage, data also were compiled covering dry cargo carriage by non-liners (excluding tankers) during 1968-1975. However, the latter category comprises both dry bulk and general cargo; dry bulk is not within the scope of this study; and separating the two could be accomplished only through line-by-line examination of Bureau of Census data at the 7-digit level of commodity classification. For this reason, the data on non-liner carriage are not included in this report--although they were used in calculating the differential impact, by U.S.-flag shipping sector, of the postulated military cargo reductions from 1975 levels (see discussion of Table 4-9, below).

Nevertheless, some general observations can be drawn from examination of the data on total and U.S.-flag non-liner carriage in U.S. foreign commerce.

In U.S. oceanborne foreign trade carried by commercial dry cargo ships of <u>all flags</u> over the aggregate of all trade

routes, commercial cargoes carried by non-liners greatly exceeded those carried by liners, either outbound or inbound, throughout the period 1968-1975, with the annual tonnage (MT) ratios ranging between 4:1 and 7:1. Military cargoes carried by commercial vessels divided much more evenly between the liner and non-liner sectors. In outbound military cargoes, liner carriage consistently dominated, although the tonnage ratios exceeded 2:1 only in the last 2 years of the period. In inbound military cargoes, non-liner carriage slightly exceeded liner carriage in 3 of the 8 years.

Similarly, on each of the three trade routes of major interest, carriage of outbound commercial cargo was consistently dominated by the non-liners. However, in inbound commercial cargo, liner carriage exceeded non-liner carriage consistently on two routes--U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9) and U.S. North Atlantic-Mediterranean (Trade Route 10)--and in 4 of the 8 years on the third route--U.S. Pacific-Far East (Trade Route 29).

The carriage of military cargoes on these three routes presents a mixed picture. On Trade Routes 5-7-8-9, non-liners dominated outbound during the first 4 years of the period and, inbound, in 5 of the 8 years. On Trade Route 10, liner carriage exceeded non-liner carriage, both outbound and inbound, in all years. On Trade Route 29, liner carriage exceeded non-liner carriage outbound in all years but, inbound, in only 4 of the 8 years.

The data on U.S.-flag dry cargo carriage contrast sharply with those on total U.S. oceanborne dry cargo foreign trade, summarized above. Liners consistently dominated in the carriage of commercial cargoes, both outbound and inbound, throughout the period. This was true of each of the three trade routes of major interest, as well as of the aggregate of all trade routes.

Since almost all military cargo was carried by U.S.-flag vessels, the patterns of military dry cargo allocation between U.S.-flag liners and non-liners are identical to those characterizing total carriage of military dry cargo by vessels of all flags, summarized above, for the aggregate of all trade routes and for each of the three routes of major interest.

Because, in U.S. oceanborne foreign trade, non-liners dominated in the total carriage of dry cargoes by vessels of all flags while liners dominated in the U.S.-flag sector, it follows that U.S.-flag shares of total commercial cargo carried by liners were significantly larger than U.S.-flag shares of total commercial cargo carried by non-liners.

U.S.-flag shares of total liner carriage of commercial cargoes during 1968-1975 ranged between 21.9 and 30.7 percent (see Table 4-3). And, on two of the three trade routes of major interest, they ranged considerably higher in some years. On Trade Routes 5-7-8-9, the U.S.-flag liner shares of commercial cargo showed strong consistency, varying only between 29.6 and 32.8 percent. However, on Trade Route 10, they ranged between 27.7 and 34.2 percent during 1968-1972, rising to 52.8 percent over the last 3 years of the period; and, on Trade Route 29, they fluctuated widely, with lows of 34.5 percent (1968) and 34.7 percent (1975) and a peak of 50.6 percent (1970) during the 8-year period (see Tables B-3).

In contrast, U.S.-flag shares of total commercial dry cargo carried by non-liners during 1968-1975 ranged between 1.4 and 3.0 percent, and tended to decline over the period (see Table 2-8). On the three trade routes of major interest, the U.S.-flag non-liner shares never exceeded 7 percent, either outbound or inbound, and generally ranged below 2 percent in either direction.

Outbound-Inbound Imbalance and Military Cargo Reductions

A significant characteristic of U.S.-flag carriage is the imbalance between outbound and inbound cargo volumes. Tables 4-6 and B-6 give the outbound-inbound imbalances in total liner carriage and U.S.-flag liner carriage of commercial, military, and total cargoes during 1968-1975. The data are portrayed graphically in Figures 4-2 and B-2.

As shown in Table 4-6 and Figure 4-2, in total U.S.-flag liner vessel carriage, outbound military cargo exceeded inbound military cargo throughout the period, 1968-1975, and outbound commercial cargo exceeded inbound commercial cargo for all years in the period except 1968. (For military cargoes, outbound carriage is, of course, greater than inbound carriage on each trade route of interest.)

Commercial cargo imbalances varied among trade routes (see Table B-6 and Figures B-2). On Trade Routes 5-7-8-9, inbound commercial cargo exceeded outbound commercial cargo throughout the 8-year period. On Trade Route 10, commercial cargoes showed an inbound imbalance in 4 years, an outbound imbalance in 3 years, and no directional imbalance during the remaining year. On Trade Route 29 and on the sum of all other trade routes, outbound commercial cargoes consistently exceeded inbound commercial cargoes.

It should be noted that every annual inbound imbalance in commercial cargo in Trade Routes 5-7-8-9 or Trade Route 10 was outweighed by a greater annual outbound imbalance in

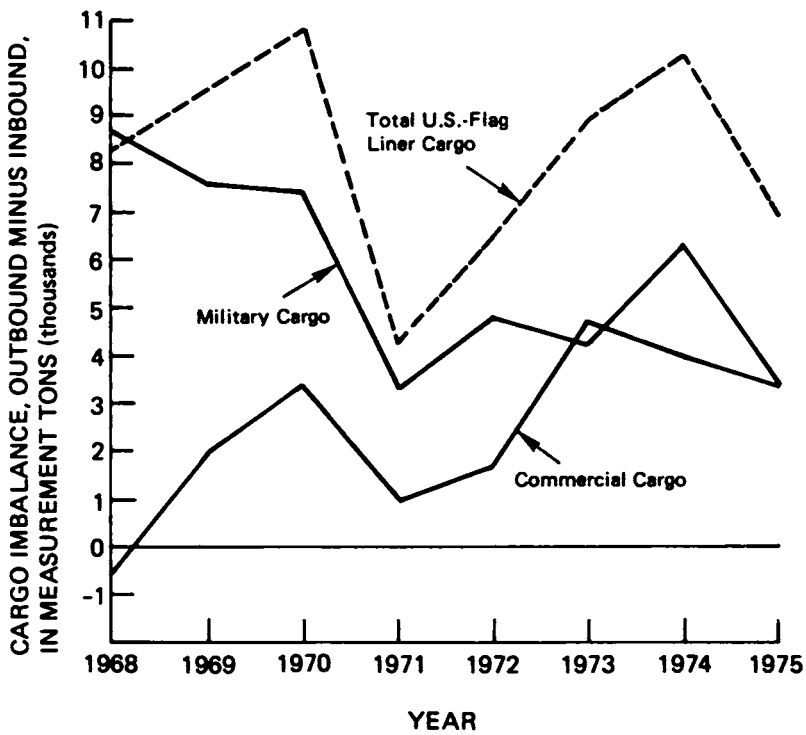
Table 4-6

CARGO IMBALANCES IN LINER VESSEL CARRIAGE, ALL TRADE ROUTES, 1968-1975:
TOTAL AND U.S.-FLAG, COMMERCIAL AND MILITARY CARGOES
(Net Outbound Imbalance, Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Commercial Cargo	6,558	6,501	10,256	2,393	2,033	10,103	10,902	11,299
Military Cargo	8,825	7,646	7,347	3,283	4,824	4,246	6,263	3,483
Net Imbalance	15,383	14,147	17,603	5,676	6,857	14,349	17,165	14,782
U.S.-Flag								
Commercial Cargo	- 563	1,996	3,387	967	1,717	4,775	3,961	3,368
Military Cargo	8,825	7,646	7,347	3,283	4,824	4,246	6,263	3,483
Net Imbalance	8,262	9,642	10,736	4,250	6,541	9,022	10,224	6,851

Note: Because each imbalance is computed as the outbound tonnage less the inbound tonnage, a minus sign indicates an inbound imbalance.

Source: Derived from Table 4-1.



SOURCE: Table 4-5.

FIGURE 4-2 Outbound-Inbound Imbalances in U.S.-Flag Liner Carriage of Commercial and Military Cargoes, 1968-1975: All Trade Routes

Table 4-7

FLUCTUATIONS IN U.S.-FLAG LINER VESSEL CARRIAGE, ALL TRADE ROUTES, 1968-1975:
ANNUAL CHANGES IN COMMERCIAL CARGO ONLY, AND IN THE TOTAL OF COMMERCIAL AND MILITARY CARGOES
(Thousands of Measurement Tons)

	Tonnage Changes from Previous Year							Magnitude of 1971 Military Cargo Reduction of:		Magnitude of 1975 Military Cargo Reduction of:	
	1969	1970	1971	1972	1973	1974	1975	10 Percent	50 Percent	10 Percent	50 Percent
Outbound											
Commercial Cargo	-1,438	2,709	-3,026	67	4,753	1,670	-1,950				
Total Cargo	-2,234	2,362	-4,826	-446	3,525	3,747	-4,753	723.4	3,617.0	423.1	2,115.5
Inbound											
Commercial Cargo	-3,997	1,318	-606	-683	1,825	2,354	-1,357				
Total Cargo	-3,614	1,268	1,660	-2,737	1,175	2,414	-1,380	365.0	1,825.0	74.8	374.0

Source: Derived from Table 4-1.

military cargo. Thus, in all cases, each year's total liner vessel carriage showed an overall outbound imbalance.

Since military cargo is consistently in outbound imbalance, it follows that military cargo reductions of the magnitudes postulated here will tend to reduce directional imbalance. As an extreme example, the postulated 50-percent reduction in total military cargo on Trade Route 29 reduces the outbound imbalance in U.S.-flag liner carriage of military cargo by 415 thousand MT (Table B-8(D)) and reduces the outbound imbalance in total U.S.-flag liner carriage on the route from its actual 1975 level of 1,041 thousand MT (Table B-6) to 626 thousand MT--a 40-percent reduction in the magnitude of the imbalance.

IMPACT ANALYSIS OF 1975-BASELINE MILITARY CARGO REDUCTIONS

To assess the impact of military cargo reductions on a more current basis, an analysis is carried out for a postulated troop reduction occurring in 1975, because the U.S. armed forces posture overseas in the current time-frame more closely resembles 1975 values than those of 1971, before the Vietnam drawdown. At the same time, opportunity is taken to attain a finer resolution of the impact on the commercial liner and non-liner sectors, and on outbound-inbound imbalance. However, in this case, a purely historical analysis is not possible. Therefore, commercial liner cargo is projected using historical growth rates. Recovery periods for commercial cargo growth to offset military cargo reductions are calculated, using the method described in this section.

Fluctuations in Commercial Traffic and Military Cargo Reductions

Table 4-7 gives the year-to-year fluctuations in commercial cargo carriage and total cargo carriage by U.S.-flag liners over all trade routes during 1968-1975; and, for comparison, shows the magnitudes of postulated 10-percent and 50-percent reductions in the levels of military cargoes carried by U.S.-flag liners during 1971 and 1975. (The corresponding data for the three major trade routes and for the total of all other routes are given in Table B-7.) From these tables, it is evident that the historical year-to-year fluctations in commercial trade during the period 1968-1975 generally exceeded in magnitude a 10-percent reduction in either 1971 or 1975 military cargo levels. This was true in all or most years, for both outbound and inbound cargoes, in every case.

Also, in most cases, there were instances of fluctuations exceeding in magnitude even a 50-percent reduction in 1971 or 1975 military cargo levels. (Note that

the 50-percent reductions from 1971 and 1975 levels are equivalent to the sudden and simultaneous withdrawal of over 700,000 and 430,000 overseas personnel, respectively.) However, there were three cases in which the postulated 50-percent reductions are significantly larger than were the historical fluctuations in commercial cargo. On Trade Routes 5-7-8-9, a 50-percent reduction in outbound military cargoes from either 1971 or 1975 levels is significantly greater than the maximum year-to-year fluctuations in outbound commercial cargoes; and on Trade Route 29, a 50-percent reduction in outbound military cargoes from the 1971 level is nearly double the maximum annual fluctuation in outbound commercial cargo during the period. (As noted in Chapter 1, however, either the 1971 or 1975 50-percent reduction case for Trade Routes 5-7-8-9 implies the sudden removal from Western Europe of almost a quarter of a million persons. And, as shown in Table B-3(C), military cargo still represented 63.3 percent of total outbound U.S.-flag liner vessel carriage on Trade Route 29 in 1971.)

In all cases, there were instances in which inbound commercial cargo fluctuations exceeded the magnitude of 50-percent reductions in inbound military cargoes from either 1971 or 1975 levels. While this suggests that the disruption that may be caused by postulated troop withdrawals may not be of unusual magnitude, it must be remembered that the year-to-year fluctuations that normally occur are generally the result of temporary phenomena, such as a slowdown in economic activity, rather than of a permanent nature such as a troop reduction.

Comparisons with the magnitudes of postulated 10-percent and 50-percent reductions in the levels of military cargo carried by U.S.-flag liners during 1975 can be briefly summarized.

(1) In every case, the commercial traffic fluctuations in all or most years exceeded the 10-percent military traffic reductions, in both the outbound and inbound directions.

(2) This also was true, in every case, of the 50-percent military traffic reductions in the inbound direction.

(3) On Trade Routes 5-7-8-9, the 50-percent reduction in outbound military traffic is significantly greater than the range of commercial traffic fluctuations.

(4) In the other four cases, the 50-percent reductions in outbound military traffic were exceeded by commercial traffic fluctuations in two or more years during the 1968-1975 period.

Growth Rate of Commercial Traffic

Although many methods may be used to forecast commercial traffic, for purposes of this study, average past rates of growth may reasonably be assumed to persist for the short times expected for commercial traffic growth to compensate for the military traffic reductions. This assumption does not take proper account of major forces on world trade markets or, indeed, of major structural changes; but it is nevertheless useful in obtaining a rough idea of the impacts that can be expected.

For this purpose, 5-year compound average annual growth rates were computed for U.S.-flag liner carriage of commercial cargoes over the period, 1969 to 1974. To base the calculations on the traffic actually carried in those two years would, however, make the results subject to the vagaries in world shipping markets in those specific years. To overcome this possible defect, three-year averages were used: 1969 traffic was estimated as the average of 1968, 1969, and 1970 traffic; and 1974 traffic was estimated as the average of 1973, 1974, and 1975 traffic. (As noted in Chapter 2, the 1973-1975 period included a time of depressed shipping activity. Thus the conservative bias of this study is maintained.) Compound annual growth was computed between these values.

Table 4-8 gives the results of the growth-rate calculations for liner, non-liner, and combined total traffic, for the trade routes of interest, by direction and in total.

It will be seen that overall U.S.-flag traffic growth rates--and those of U.S.-flag liner traffic in particular--consistently exceeded those of all flags for the three trade routes of specific interest, with the single exception of outbound liner traffic on Trade Route 29. The relative performance of the non-liner sector on these three trade routes was very mixed.

Net Effect of Postulated 1975 Military Traffic Reductions

Table 4-9 shows the effects of the postulated military cargo reductions of 10 and 50 percent from 1975 levels for all trade routes on carriage by liner, non-liner, and MSC Nucleus Fleet, by direction of flow and in total. Military traffic after the reduction is allocated as in the preceding analysis of the postulated 1971-baseline military cargo reductions (q.v.). Total MSC Nucleus Fleet traffic levels are assumed to be maintained. Next, the percentage of the reduction is applied to the previous level of liner carriage. Finally, all remaining military cargo is allocated to the non-liner sector.

Table 4-8

COMPOUND AVERAGE ANNUAL GROWTH RATES
IN LINER VESSEL CARRIAGE OF COMMERCIAL CARGO,
U.S.-FLAG AND TOTAL, BY TRADE ROUTE,
CENTERED ON 1969 AND 1974

	Growth Rate (Percent)	
	All Flags	U.S. Flag
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)		
Outbound Liner Carriage	4.51	5.91
Inbound Liner Carriage	2.55	3.78
Total Liner Carriage	3.38	4.61
U.S. North Atlantic-Mediterranean (Trade Route 10)		
Outbound Liner Carriage	6.87	20.08
Inbound Liner Carriage	2.68	8.41
Total Liner Carriage	4.82	14.40
U.S. Pacific-Far East (Trade Route 29)		
Outbound Liner Carriage	11.31	8.39
Inbound Liner Carriage	5.28	9.64
Total Liner Carriage	8.61	8.95
All Other Trade Routes		
Outbound Liner Carriage	-0.88	3.57
Inbound Liner Carriage	-0.76	-0.20
Total Liner Carriage	-0.83	2.01
All Trade Routes		
Outbound Liner Carriage	1.29	5.45
Inbound Liner Carriage	0.58	2.17
Total Liner Carriage	0.97	3.98

Note: The 1969 traffic was estimated as the average of the 1968, 1969, and 1970 levels; the 1974 traffic was estimated as the average of the 1973, 1974, and 1975 levels; and the 5-year compound average annual growth rate was then computed between the two values.

Sources: Derived from Tables 4-1 and B-1.

The 50-percent reduction in total military traffic as of 1975 is an extreme case, however. Since troop reductions would likely take place only in one theater at a time and over a period of time, it is most unlikely that the impacts of these reductions over all trade routes would be as great as those shown in Table 4-9.

The corresponding data for the three trade routes of major interest and the total of all other trade routes are given in Tables B-8.

The comparison of year-to-year fluctuations in U.S.-flag liner carriage (Tables 4-7 and B-7) with the magnitudes of postulated reductions in military cargo tonnages from 1975 levels (Tables 4-9 and B-8) is portrayed graphically in Figures 4-3 and B-3.

Computation of Time Required to Recover Reductions in Military Traffic Through Commercial Traffic Growth

We begin by presenting a formula to estimate the length of time it will take for the growth in commercial traffic to compensate for the military traffic lost due to the reduction in troop support cargoes carried by U.S.-flag commercial ships. For purposes of these illustrations, troop reductions are assumed to take place, all at once, in 1975.

For each case, let:

C_{75} = Commercial traffic tonnage in year 1975,

M_{75} = Military traffic tonnage carried commercially in year 1975, without troop reduction,

ΔM = Military traffic reduction as the result of the postulated 1975 troop reduction (expressed as a positive quantity),

g = Compound average annual growth rate in commercial traffic during the period in question, and

n = Number of years of commercial traffic growth.

Then the 1975 level of carriage by U.S.-flag commercial ships is

$$C_{75} + M_{75},$$

and the 1975 traffic level that would exist after the postulated troop reduction takes place is

Table 4-9

IMPACT OF POSTULATED MILITARY CARGO REDUCTIONS FROM 1975 LEVELS, BY DIRECTION AND TOTAL, ALL TRADE ROUTES

(Thousands of Measurement Tons)

Direction	U.S. Shipping Sector	1975 Military Tonnage	Reduction in Military Traffic: 10 Percent — New Traffic Level	10 Percent — Reduction	50 Percent — New Traffic Level	50 Percent — Reduction
Outbound	Commercial:					
	Liner	4,231	3,807.9	423.1	2,115.5	2,115.5
	Non-Liner	1,461	1,294.8	166.2	630.0	831.0
	MSC	201	201.0	0.0	201.0	0.0
	Total	5,893	5,303.7	589.3	2,946.5	2,946.5
Inbound	Commercial:					
	Liner	748	673.2	74.8	374.0	374.0
	Non-Liner	433	377.3	55.7	154.0	278.5
	MSC	124	124.0	0.0	124.0	0.0
	Total	1,305	1,174.5	130.5	652.5	652.5
Total	Commercial					
	Liner	4,979	4,481.1	497.9	2,489.5	2,489.5
	Non-Liner	1,894	1,672.1	221.9	784.5	1,109.5
	MSC	325	325.0	0.0	325.0	0.0
	Total	7,198	6,478.2	719.8	3,599.0	3,599.0

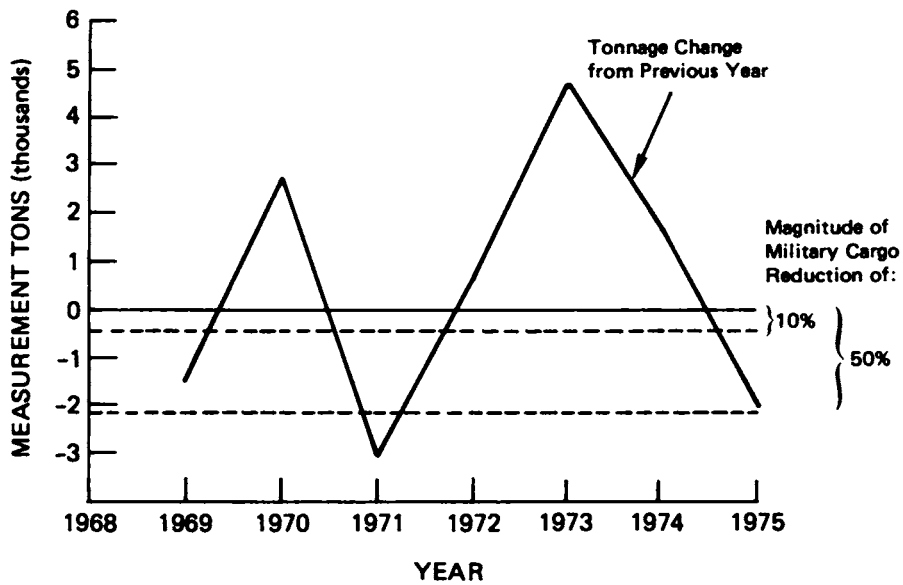
Table 4-9 (continued)

Data sources and computation method:

(1) Sources of data on 1975 tonnages of non-bulk military cargo:
   (a) Commercial liner carriage -- from Table 4-1.
   (b) Commercial non-liner carriage -- from Maritime Administration sources (see Table 4-1, notes 1 and 2).
   (c) MSC Nucleus Fleet carriage -- from Table 4-2.

(2) The 10-percent and 50-percent military cargo reductions were calculated in the following sequence:
   (a) Total reduction -- 10 percent or 50 percent of the 1975 total tonnage.
   (b) Reduction in MSC Nucleus Fleet carriage -- assumed to equal zero.
   (c) Reduction in commercial liner carriage -- 10 percent or 50 percent of the 1975 liner tonnage.
   (d) Reduction in commercial non-liner carriage -- total reduction minus reduction in commercial liner carriage.

(3) The new traffic levels following the 10-percent and 50-percent reductions were computed by subtracting the respective reductions from the 1975 tonnages.



SOURCE: Table 4-4.

FIGURE 4-3 Comparison of Year-to-Year Fluctuations in Outbound U.S.-Flag Liner Carriage of Commercial Cargo, 1968-1975, with Magnitudes of Postulated Reductions in Outbound Military Cargo Tonnages from 1975 Levels: All Trade Routes

$$C_{75} + M_{75} - \Delta M.$$

We wish to find how long it will take for this latter level of traffic to grow to equal the historical 1975 traffic level (which, in our example, equals the traffic that would have existed if the postulated troop reduction had not taken place), i.e.,

$$C_{75}\ (1+g)^n + M_{75} - \Delta M = C_{75} + M_{75}.$$

(We assume no further changes in military traffic during this n-year adjustment period.)

Thus,

$$C_{75}\ (1+g)^n = C_{75} + \Delta M$$

or

$$(1+g)^n = 1 + \Delta M/C_{75}.$$

Given g, ΔM, and C_{75}, the equation can be solved for the number of years, n, that will be required for the reduced traffic to grow to its pre-troop-reduction level. (All required data are available from the preceding tables).

For the two cases postulated, the time required for commercial traffic growth to compensate for the military cargo reductions can be computed according to the formulation derived above. Tables 4-10 give these times (in years) for liner traffic, inbound, outbound, and total. If the cargo replacement for the U.S. liners had to come from expected growth in U.S.-flag commercial traffic, under the 10-percent reduction case, a maximum of 2 years' growth would be required to replace the lost liner traffic, in either direction, on any of the three trade routes of interest; and, for traffic aggregated over all trade routes, less than 1 year's growth would be required. In contrast, under the 50-percent reduction case, the adjustment could take up to 8 years, in the case of outbound traffic on the North Atlantic-Western Europe route (Trade Routes 5-7-8-9).

Since the military traffic reductions will decrease the outbound-inbound imbalance in commercial liner vessel carriage, it is of interest to note the recovery periods for the inbound segment, which has less traffic than the outbound segment. Under the 10-percent reduction case, a maximum of 3 months is required to recover inbound traffic on any of the three trade routes of interest; and a maximum of 4 months is needed to recover inbound traffic aggregated over all trade routes. Under a 50-percent reduction case, a maximum of 13 months is required to recover inbound traffic on any trade route of interest, and a maximum of 18 months

Table 4-10(A)

ADJUSTMENT PERIODS FOR COMMERCIAL TRAFFIC GROWTH IN LINER CARRIAGE TO OFFSET A POSTULATED 10-PERCENT REDUCTION IN TOTAL MILITARY NON-BULK CARGO FROM 1975 LEVELS: U.S.-FLAG AND TOTAL LINER SECTOR, BY TRADE ROUTE

	Adjustment Period (Years) for 10-Percent Reduction in 1975 Military Cargo Levels	
	All Flags	U.S. Flag
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)		
Outbound Liner Carriage	0.72	1.84
Inbound Liner Carriage	0.10	0.22
Total Liner Carriage	0.48	1.12
U.S. North Atlantic-Mediterranean (Trade Route 10)		
Outbound Liner Carriage	0.18	0.12
Inbound Liner Carriage	0.15	0.10
Total Liner Carriage	0.18	0.12
U.S. Pacific-Far East (Trade Route 29)		
Outbound Liner Carriage	0.13	0.55
Inbound Liner Carriage	0.06	0.09
Total Liner Carriage	0.12	0.32
All Other Trade Routes		
Outbound Liner Carriage	*	0.44
Inbound Liner Carriage	*	*
Total Liner Carriage	*	0.58
All Trade Routes		
Outbound Liner Carriage	0.69	0.54
Inbound Liner Carriage	0.35	0.31
Total Liner Carriage	0.61	0.49

* - Infinite recovery period (negative growth rate).

Sources: Computed by formula given in text. Values of commercial cargo tonnages carried by liners in 1975 are from Tables 4-1 and A-1; compound average annual growth rates in liner carriage of commercial cargo, from Table 4-8; and postulated military cargo reductions from actual 1975 tonnage levels, from Tables 4-9 and B-8.

Table 4-10(B)

ADJUSTMENT PERIODS FOR COMMERCIAL TRAFFIC GROWTH IN LINER CARRIAGE TO OFFSET A POSTULATED 50-PERCENT REDUCTION IN TOTAL MILITARY NON-BULK CARGO FROM 1975 LEVELS: U.S.-FLAG AND TOTAL LINER SECTOR, BY TRADE ROUTE

	Adjustment Period (Years) for 50-Percent Reduction in 1975 Military Cargo Levels	
	All Flags	U.S. Flag
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)		
Outbound Liner Carriage	3.40	7.72
Inbound Liner Carriage	0.52	1.09
Total Liner Carriage	2.33	5.12
U.S. North Atlantic-Mediterranean (Trade Route 10)		
Outbound Liner Carriage	0.86	0.56
Inbound Liner Carriage	0.76	0.49
Total Liner Carriage	0.86	0.57
U.S. Pacific-Far East (Trade Route 29)		
Outbound Liner Carriage	0.64	2.55
Inbound Liner Carriage	0.32	0.43
Total Liner Carriage	0.57	1.51
All Other Trade Routes		
Outbound Liner Carriage	*	2.14
Inbound Liner Carriage	*	*
Total Liner Carriage	*	2.18
All Trade Routes		
Outbound Liner Carriage	3.38	2.54
Inbound Liner Carriage	1.77	1.52
Total Liner Carriage	3.02	2.35

* - Infinite recovery period (negative growth rate).

Sources: Same as Table 4-10(A).

Table 4-11

COMPARISON OF GROWTH-RATE MODEL RESULTS WITH ACTUAL LINER CARRIAGE OF COMMERCIAL CARGOES, BY TRADE ROUTE, 1976-1978
(Thousands of Measurement Tons)

	Year	Actual Tonnage	Projected Tonnage	Tonnage Difference (Percent)
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)				
Outbound Liner Carriage	1976	5,310	4,541	- 14.5
	1977	4,624	4,746	2.6
	1978	4,725	4,960	5.0
Inbound Liner Carriage	1976	6,956	5,389	- 22.5
	1977	6,608	5,526	- 16.4
	1978	7,854	5,667	- 27.8
U.S. North Atlantic-Mediterranean (Trade Route 10)				
Outbound Liner Carriage	1976	2,301	2,929	27.3
	1977	1,726	3,131	81.4
	1978	1,774	3,346	88.6
Inbound Liner Carriage	1976	2,138	2,267	6.0
	1977	2,126	2,328	9.5
	1978	2,676	2,390	- 10.7
U.S. Pacific-Far East (Trade Route 29)				
Outbound Liner Carriage	1976	8,415	7,785	- 8.6
	1977	8,782	8,666	- 1.3
	1978	10,539	9,646	- 8.5
Inbound Liner Carriage	1976	6,558	5,155	- 21.4
	1977	8,193	5,427	- 33.8
	1978	8,311	5,713	- 31.3

Data sources and computation method:

(1) Actual Tonnages: derived from data provided by Maritime Administration, Office of Policy and Plans, Division of Analyses. The MarAd data were converted from pounds to measurement tons (MT) of 40 cu ft, assuming a cargo stowage factor of 76 cu ft per long ton (LT) of 2,240 lb. The original source (Bureau of Census, Waterborne Exports and General Imports, Report No. FT 985) excludes export "shipments to U.S. Armed Forces for their own use..." and imports of "U.S. merchandise returned by U.S. Armed Forces for their own use."

(2) Projected Tonnages: computed by applying the compound average annual growth rates in outbound and inbound liner vessel carriage of commercial cargoes in U.S. oceanborne foreign trade (Table 4-8, "All Flags") to the corresponding 1975 tonnages (Tables B-1 (A), (B), and (C), "All Flags", "Commercial Cargo").

(3) Difference (Percent): computed as the percentage difference of the Projected Tonnage from the Actual Tonnage (i.e., Actual Tonnage = 100 percent).

is needed to recover inbound traffic aggregated over all routes.

Because there is an outbound-inbound trade imbalance, which the military traffic reduction decreases, this shorter period of recovery may be the one of interest for some analyses.

Similar calculations of recovery periods were made for total liner vessel carriage. These also are shown in Tables 4-10. Again, as with U.S.-flag liner vessel carriage, on each of the three trade routes of major interest and for the aggregate of all routes, inbound traffic recovery periods are shorter than the corresponding outbound traffic recovery periods.

In all cases, recovery period calculations assume that growth in liner vessel carriage of commercial cargoes continues at historical (1969-1974) rates. In none of these calculations is allowance made for the probable reassignment of cargo capacity to other routes in response to the decline in military cargoes.

In summary, the quantitative estimation of the potential impact of troop withdrawals was addressed by comparing postulated reductions in troop support cargo with two phenomena: (a) the industry's experienced year-to-year cargo fluctuations on given trade routes, and (b) rates of growth (or decline) in liner vessel carriage of commercial cargo on the given trade routes.

The first analysis involves few assumptions, and consists of examining the historical variability of the industry's traffic and then comparing it to the magnitude of perturbation resulting from the postulated reduction in troop support cargo.

In the second analysis, growth rates are estimated by trade route. The purpose is to compare the loss in cargo due to a troop reduction with the "normal" growth of commercial cargo. Through this technique, a base is established for evaluating the impact of a troop reduction on the maritime industry.

After this study was essentially completed, data for 1976-1978 became available. In Table 4-11, the results of the growth-rate model are compared with actual liner carriage of commercial cargoes during these years on the three trade routes of principal interest.

Major differences arise because the growth-rate model implicitly assumes stability in the operating "drivers" and in the functional relationships. It seems clear that, under the increased inflation and new energy environment that

prevailed in the turbulent late 1970's, the underlying structural factors have changed and may continue to change. However, one might speculate that, if the forecast could be corrected for these changes independently, the underlying traffic growth rate might nevertheless be shown to persist. Thus, it seems reasonable to use the model for the purpose of this study, recognizing that the impact on the industry of a troop reduction should not be confused with the effects of other, concurrent events.

Appendix A

SUPPLEMENTARY DATA ON MILITARY CARGOES, OVERSEAS PERSONNEL DEPLOYMENT, AND CARGO-TO-PERSONNEL RATIOS

Tables A-1 through A-15 supplement the data presented in Chapter 3 on military cargoes, overseas personnel deployment, and cargo-to-personnel ratios. Included are cargo distributions by direction (outbound, inbound, and total), overseas theater and area, U.S. coast of shipment or destination, and military cargo category.

Table A-1

U.S. ARMED FORCES PERSONNEL OVERSEAS DEPLOYMENT, EUROPEAN AREA, 1968-1975 [a/]

Personnel Category	Area	1968	1969	1970	1971	1972	1973	1974	1975
Military	W. Europe	232,644	213,959	222,556	231,367	218,044	236,409	215,550	228,896
	British Isles	24,118	23,349	21,193	20,908	21,541	21,546	21,146	22,879
	E.Mediterranean	13,424	13,371	10,427	10,057	10,185	10,909	9,916	11,628
	W.Mediterranean	24,829	25,055	20,373	22,490	22,533	22,324	23,943	43,825
	Total	295,015	275,734	274,549	284,822	272,303	291,188	270,555	307,228
Civilian	Europe	6,400	6,762	6,427	6,763	6,603	9,073	12,534	12,968
	British Isles	794	761	730	733	780	663	1,163	1,093
	E.Mediterranean	426	383	321	277	278	348	423	413
	W.Mediterranean	1,315	1,241	1,009	1,109	1,127	1,218	1,649	1,658
	Total	8,935	9,147	8,487	8,882	8,788	11,302	15,769	16,132
Dependents	Europe	179,100	169,434	152,022	148,212	163,985	171,177	173,586	170,110
	British Isles	35,598	33,941	30,048	30,861	31,097	34,190	36,016	35,396
	E.Mediterranean	13,834	14,397	11,778	9,892	10,139	13,081	13,366	10,104
	W.Mediterranean	33,950	32,222	33,158	32,863	34,470	34,465	35,212	33,934
	Total	262,482	249,994	227,006	221,768	239,691	252,913	258,120	249,538
Total	Europe	418,144	390,155	381,005	386,342	388,632	416,659	401,670	411,974
	British Isles	60,810	58,051	51,971	52,502	53,418	56,399	58,325	59,362
	E.Mediterranean	27,684	28,151	22,526	20,226	20,602	24,338	23,645	22,145
	W.Mediterranean	60,094	58,518	54,540	56,402	58,130	58,007	60,804	79,417
	Total, Europe	566,432	534,875	510,042	515,472	520,782	555,403	544,444	572,898

a/ All data as of June 30 for the given year.

Source: Derived from data provided by Department of Defense, Office of the Assistant Secretary of Defense for Manpower, Reserve Afairs and Logistics (OASD-MRA&L), Transportation Division.

Table A-2

U.S. ARMED FORCES PERSONNEL DEPLOYMENT, FAR EAST AREA, 1968-1975 [a/]

Personnel Category	Area	1968	1969	1970	1971	1972	1973	1974	1975
Military	Japan	40,210	40,055	37,614	31,910	21,997	19,172	57,876	57,973
	S. Korea	67,409	60,887	54,350	42,753	40,260	42,236	37,630	43,144
	S. Vietnam	534,252	573,296	431,241	254,829	86,538	10,919	166	0
	Thailand	47,603	47,857	40,158	32,092	46,836	42,370	31,062	20,087
	Taiwan	9,121	9,124	8,609	8,932	8,123	8,629	5,145	4,867
	Ryukyu Is.	38,850	42,540	43,363	46,890	42,718	38,239	[b/]	[b/]
	Other	122,241	67,485	67,471	35,067	28,295	37,552	36,875	30,253
	Total	859,686	841,244	683,306	452,473	275,127	199,117	168,754	156,324
Civilian	Japan	3,601	3,656	2,580	2,456	3,464	4,368	4,357	4,906
	S. Korea	1,510	1,563	1,471	1,192	1,028	1,069	1,295	1,341
	S. Vietnam	1,153	1,479	1,155	930	747	841	919	0
	Thailand	408	584	447	365	301	335	375	342
	Taiwan	220	224	253	289	271	268	285	264
	Ryukyu Is.	2,925	2,304	2,284	3,476	[b/]	[b/]	[b/]	[b/]
	Other	893	891	851	807	731	678	702	1,040
	Total	10,710	10,701	9,047	9,515	6,542	7,559	7,933	7,893
Dependents	Japan	49,930	45,039	45,486	38,873	32,352	28,214	50,399	46,281
	S. Korea	5,274	7,052	3,865	4,582	2,772	5,183	7,206	14,261
	S. Vietnam	117	87	94	57	53	29	25	0
	Thailand	3,447	4,316	4,709	4,781	4,923	3,470	7,139	6,336
	Taiwan	5,682	4,289	6,212	5,546	6,255	5,900	5,321	2,946
	Ryukyu Is.	31,486	28,038	28,754	27,191	27,493	25,303	[b/]	[b/]
	Other	27,543	29,790	22,498	23,881	18,624	21,476	23,674	23,853
	Total	120,479	118,611	111,618	106,911	92,472	89,575	93,764	93,677
Total	Japan	93,741	88,750	85,686	73,239	57,813	51,754	112,632	109,160
	S. Korea	74,193	69,502	59,686	48,527	44,420	48,488	46,131	58,746
	S. Vietnam	535,522	574,862	432,490	255,816	87,338	11,789	1,110	0
	Thailand	51,458	52,757	45,814	37,238	52,060	46,175	38,576	26,649
	Taiwan	15,023	13,637	15,074	14,767	14,649	14,797	10,751	8,077
	Ryukyu Is.	73,261	72,882	74,401	79,557	70,211	63,542	[b/]	[b/]
	Other	150,677	98,166	90,820	59,755	47,650	59,706	61,251	54,662
	Total, Far East	990,875	970,556	803,971	568,899	374,141	296,251	270,451	257,294

[a/] All data as of June 30 for the given year.
[b/] Included in totals for Japan.

Source: Derived from data provided by Department of Defense, Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (OASD-MRA&L), Transportation Division.

Table A-3

U.S. ARMED FORCES PERSONNEL OVERSEAS DEPLOYMENT, WORLDWIDE, 1968-1975 [a/]

Personnel Category	Area	1968	1969	1970	1971	1972	1973	1974	1975
Military	Europe	295,015	275,734	274,549	284,822	272,303	291,188	270,555	307,228
	Far East	859,686	841,244	683,306	452,473	275,127	199,117	168,754	156,324
	Other	45,055	37,937	74,765	66,606	47,539	51,285	50,506	21,863
	Total	1,199,756	1,154,915	1,032,620	803,901	594,969	541,590	489,815	485,415
Civilian	Europe	8,935	9,147	8,487	8,882	8,788	11,302	15,769	16,132
	Far East	10,710	10,701	9,047	9,515	6,542	7,559	7,933	7,893
	Other	928	868	855	553	537	554	608	781
	Total	20,573	20,716	18,389	18,950	15,867	19,415	24,310	24,806
Dependents	Europe	262,482	249,994	227,006	221,768	239,691	257,913	258,120	249,538
	Far East	120,479	118,611	111,618	166,911	92,472	89,575	93,764	93,077
	Other	23,720	26,766	13,218	13,414	14,754	12,130	11,438	13,161
	Total	406,681	395,371	351,842	342,093	346,917	354,618	363,322	355,776
Total	Europe	566,432	534,875	510,042	515,472	520,782	555,403	544,444	572,898
	Far East	990,875	970,556	803,971	568,899	374,141	296,251	270,451	257,294
	Other	69,703	65,571	88,838	80,573	62,830	63,969	62,552	35,805
	Total	1,627,010	1,571,002	1,402,851	1,164,944	957,753	915,623	877,447	865,997

a/ All data as of June 30 for the given year.

Source: Derived from data provided by Department of Defense, Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (OASD-MRA&L), Transportation Division.

Table A-4

OUTBOUND MILITARY CARGO, U.S. EAST COAST TO EUROPEAN AREA,
BY DESTINATION AREA AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Destination Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	4,588	11,468	6,033	3,571	9,994	7,426	7,426	6,173
	Reefer	15,647	15,568	13,612	8,439	12,926	9,556	10,741	10,638
	POV	24,129	29,925	23,877	22,312	17,412	22,522	21,945	21,620
	Ammo & Haz.	8,047	2,049	1,544	1,466	7,159	1	3,804	16,100
	Gen., Less HHG	126,998	137,319	119,481	114,554	138,997	112,631	111,625	146,411
	Special	12,885	12,132	7,758	6,072	7,082	11,454	1,245	476
	Total	192,294	208,461	172,305	156,414	193,570	163,590	156,786	201,418
Western Europe	HHG	7,814	31,644	32,531	19,772	50,981	26,310	14,585	19,556
	Reefer	174,833	154,403	130,387	99,079	101,622	120,954	131,194	126,304
	POV	262,475	196,238	229,893	205,264	187,376	169,073	155,311	180,658
	Ammo & Haz.	52,309	70,330	51,296	42,525	43,742	53,084	56,873	60,011
	Gen., Less HHG	783,458	813,923	733,467	766,902	963,300	784,383	1,017,650	1,115,146
	Special	296,126	349,445	294,476	386,392	180,414	200,097	97,020	126,476
	Total	1,577,015	1,615,983	1,472,050	1,519,934	1,527,435	1,353,901	1,472,633	1,628,151
Eastern Mediterranean	HHG	10,778	16,409	7,806	4,862	13,265	15,115	16,762	13,707
	Reefer	10,728	10,275	8,924	8,030	6,819	8,121	7,645	7,430
	POV	21,586	24,572	18,528	15,167	15,545	18,043	15,544	19,450
	Ammo & Haz.	6,334	5,700	5,443	13,289	9,879	6,933	2,884	4,755
	Gen., Less HHG	126,620	141,364	105,620	83,698	106,226	84,459	93,978	83,631
	Special	98,931	79,867	64,732	50,730	53,263	39,779	56,074	10,491
	Total	274,977	277,687	211,053	175,776	204,997	172,450	192,887	139,464

Western Mediterranean	HHG	20,328	35,007	24,471	23,445	40,797	29,944	19,539	23,446
	Reefer	17,524	19,999	14,200	14,889	13,679	15,385	16,449	15,109
	POV	30,078	36,288	29,814	32,819	23,742	29,376	27,309	28,804
	Ammo & Haz.	9,921	9,308	7,032	7,474	4,702	1,895	1,719	1,873
	Gen., Less HHG	181,304	185,697	163,810	159,354	179,636	198,037	199,851	197,906
	Special	23,517	14,119	11,129	20,623	17,927	17,414	16,572	21,141
	Total	282,672	300,418	250,456	258,604	280,483	292,051	281,439	288,279
Total, Europe	HHG	43,508	94,528	70,841	51,650	115,037	78,795	58,312	62,882
	Reefer	218,732	200,245	167,123	130,437	135,045	154,016	166,029	159,481
	POV	338,268	287,023	302,112	275,562	244,075	239,014	220,109	250,532
	Ammo & Haz.	76,611	87,387	65,315	64,754	65,482	61,913	65,280	82,739
	Gen., Less HHG	1,218,380	1,278,303	1,122,378	1,124,508	1,388,159	1,179,510	1,423,104	1,543,094
	Special	431,459	455,063	378,095	463,817	258,686	268,744	170,911	158,584
	Total	2,326,958	2,402,549	2,105,864	2,110,728	2,206,485	1,981,992	2,103,745	2,257,312

Abbreviations:

HHG--household goods.
Reefer--refrigerated cargo.
POV--privately owned vehicles.
Ammo & Haz.--ammunition and other hazardous cargo.
Gen.--general cargo. This category includes any cargo not otherwise categorized (except bulk cargoes, which are excluded from all tables).
Special--special cargo (items exceeding 10,000 lb in weight or 35 ft in length).

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976, inclusive.

Table A-5

OUTBOUND MILITARY CARGO, U.S. GULF COAST TO EUROPEAN AREA,
BY DESTINATION AREA AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Destination Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	1,007	10,007	7,042	2,595	11,469	10,214	2,053	5,859
	Reefer	0	0	0	0	0	0	0	0
	POV	1,059	1,108	1,033	1,335	859	1,724	1,668	1,628
	Ammo & Haz.	4	35	55	4	4	2	2	0
	Gen., Less HHG	16,036	14,349	14,884	6,252	7,294	8,074	7,405	5,660
	Special	753	1,341	2,148	2,700	527	1,376	892	1,329
	Total	18,859	26,840	25,162	12,886	20,153	21,390	12,020	14,476
Western Europe	HHG	11,147	27,678	17,141	16,075	61,085	28,687	10,261	29,749
	Reefer	2	4	0	0	155	293	299	580
	POV	7,970	6,995	8,157	8,405	9,356	11,399	10,716	13,868
	Ammo & Haz.	116	454	95	241	118	30	28	2
	Gen., Less HHG	90,033	110,722	119,856	123,254	152,520	112,175	103,512	86,309
	Special	21,914	48,346	94,833	102,584	76,253	68,055	39,588	53,991
	Total	131,182	194,199	240,082	250,559	299,487	220,639	164,412	184,499
Eastern Mediterranean	HHG	11,102	10,563	4,053	1,650	706	201	510	159
	Reefer	0	0	0	0	0	0	0	0
	POV	2,529	2,656	2,221	1,989	1,770	2,297	2,151	1,880
	Ammo & Haz.	7	144	42	13	14	1	1	4
	Gen., Less HHG	48,493	47,662	33,902	26,630	25,967	22,745	17,824	11,295
	Special	11,244	40,481	38,542	54,068	83,963	53,026	37,008	9,206
	Total	73,375	101,506	78,760	84,350	112,420	78,270	57,494	22,544

Western Mediterranean	HHG	7,093	9,287	5,986	1,195	567	127	313	356
	Reefer	0	0	0	0	0	0	1	0
	POV	1,549	1,623	1,617	1,712	1,811	1,872	1,836	1,980
	Ammo & Haz.	4	16	65	12	1	252	3	1
	Gen., Less HHG	17,006	13,217	12,808	7,158	8,564	6,805	8,331	5,955
	Special	2,610	4,206	10,232	3,440	6,363	7,126	4,651	5,332
	Total	28,262	28,349	30,708	13,517	17,306	16,182	15,135	13,624
Total, Europe	HHG	30,349	57,535	34,222	21,515	73,827	39,229	13,145	36,123
	Reefer	2	4	0	0	155	293	300	580
	POV	13,107	12,382	13,028	13,441	13,796	17,292	16,371	19,356
	Ammo & Haz.	131	649	257	270	137	285	34	7
	Gen., Less HHG	171,568	185,950	181,450	163,294	194,345	149,799	137,072	109,211
	Special	36,521	94,374	145,755	162,792	167,106	129,583	82,139	61,858
	Total	251,678	350,894	374,712	361,312	449,366	336,481	249,061	235,143

Abbreviations:

HHG--household goods.
Reefer--refrigerated cargo.
POV--privately owned vehicles.
Ammo & Haz.--ammunition and other hazardous cargo.
Gen.--general cargo. This category includes any cargo not otherwise categorized (except bulk cargoes, which are excluded from all tables).
Special--special cargo (items exceeding 10,000 lb in weight or 35 ft in length).

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976, inclusive.

Table A-6

OUTBOUND MILITARY CARGO, U.S. WEST COAST TO EUROPEAN AREA,
BY DESTINATION AREA AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Destination Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	22	0	0	0	0	20	20	2
	Reefer	0	0	0	4	0	0	7	6
	POV	299	171	206	256	77	699	853	975
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	607	349	1,357	1,909	567	1,509	2,738	1,363
	Special	1,910	41	0	0	0	5,264	0	30
	Total	2,838	561	1,563	2,169	644	7,492	3,618	2,376
Western Europe	HHG	161	213	20	72	18	147	173	308
	Reefer	0	0	17	242	139	329	1,801	1,106
	POV	3,372	3,227	1,692	1,851	1,939	4,543	6,004	6,197
	Ammo & Haz.	0	0	95	0	0	0	3,717	0
	Gen., Less HHG	11,443	20,659	8,587	10,642	17,198	25,980	25,001	17,028
	Special	101	2,080	1,063	297	0	355	0	6,611
	Total	15,077	26,179	11,474	13,104	19,294	31,354	36,696	32,050
Eastern Mediterranean	HHG	0	0	0	0	0	0	1	0
	Reefer	0	0	0	0	0	0	0	0
	POV	397	223	23	10	8	75	149	130
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	548	2,093	0	150	1,936	135	0	13
	Special	638	1,002	0	67	1,911	0	0	0
	Total	1,583	3,318	23	227	3,855	210	150	143

Western Mediterranean	HHG	38	66	0	0	0	18	0	0
	Reefer	0	0	0	0	0	0	0	0
	POV	459	258	53	200	61	1,074	619	1,079
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	12,458	139	0	3	0	612	401	58
	Special	490	0	0	89	0	317	117	1,332
	Total	13,445	463	53	292	61	2,021	1,137	2,469
Total, Europe	HHG	221	279	20	72	18	185	194	310
	Reefer	0	0	17	246	139	329	1,808	1,112
	POV	4,527	3,879	1,974	2,317	2,085	6,391	7,625	9,181
	Ammo & Haz.	0	0	95	0	0	0	3,717	0
	Gen., Less HHG	25,056	23,240	9,944	12,704	19,701	28,236	28,140	18,462
	Special	3,139	3,123	1,063	453	1,911	5,936	117	7,973
	Total	32,943	30,521	13,113	15,792	23,854	41,077	41,601	37,038

Abbreviations:

HHG--household goods.
Reefer--refrigerated cargo.
POV--privately owned vehicles.
Ammo & Haz.--ammunition and other hazardous cargo.
Gen.--general cargo. This category includes any cargo not otherwise categorized (except bulk cargoes, which are excluded from all tables).
Special--special cargo (items exceeding 10,000 lb in weight or 35 ft in length).

Source: Derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976, inclusive.

Table A-7

TOTAL OUTBOUND MILITARY CARGO TO EUROPEAN AREA, BY DESTINATION AREA AND CARGO CATEGORY, AND CARGO-PERSONNEL RATIOS, 1968-1975 a/

Destination and Cargo Category	1968		1969		1970		1971		1972		1973		1974		1975	
British Isles																
HHG	5,617		21,475		13,075		6,166		21,463		17,660		9,499		12,034	
Reefer	15,647		15,568		13,612		8,443		12,926		9,556		10,748		10,644	
POV	25,467		31,204		25,116		23,903		18,348		24,945		24,466		24,223	
Ammo & Haz.	8,051		2,084		1,599		1,470		7,163		3		3,806		13,100	
Gen., Less HHG	43,541		152,017		135,722		122,715		145,858		122,214		121,768		153,434	
Special	15,548		13,514		9,906		8,772		7,609		18,094		2,137		1,335	
Total	213,991	(3.54)	235,862	(4.06)	199,030	(3.83)	171,459	(3.27)	214,367	(4.01)	192,472	(3.41)	172,424	(2.96)	218,270	(3.69)
Western Europe																
HHG	19,122		59,535		49,692		35,919		112,084		55,144		25,027		49,613	
Reefer	174,335		154,407		130,404		99,321		101,916		121,576		133,294		127,990	
POV	273,817		206,460		293,742		215,520		198,671		185,015		172,031		201,523	
Ammo & Haz.	52,425		70,784		51,486		42,766		43,860		53,114		60,618		60,013	
Gen., Less HHG	884,934		945,304		861,910		900,798		1,133,018		922,538		1,146,163		1,184,483	
Special	318,141		399,871		390,372		489,273		256,667		268,507		136,608		137,073	
Total	1,723,274	(4.13)	1,836,361	(4.71)	1,723,606	(4.52)	1,783,597	(4.62)	1,846,616	(4.75)	1,605,894	(3.85)	1,673,741	(4.17)	1,844,700	(4.40)
Eastern Mediterranean																
HHG	21,880		26,972		11,859		6,512		13,971		15,316		17,273		13,866	
Reefer	10,728		10,275		8,924		8,030		6,819		8,121		7,645		7,430	
POV	24,512		27,451		20,772		17,166		17,323		20,415		17,844		21,460	
Ammo & Haz.	6,341		5,844		5,485		13,302		9,893		6,934		2,885		4,759	
Gen., Less HHG	175,661		191,119		139,522		110,478		134,129		107,339		111,802		94,939	
Special	110,813		120,850		103,274		104,865		139,137		92,805		93,082		19,617	
Total	349,935	(12.64)	382,511	(13.59)	289,836	(12.87)	260,353	(12.87)	321,272	(15.59)	250,930	(10.31)	250,531	(10.60)	16,215	(7.32)

Western Mediterranean											
HHG	27,459		44,360		30,457		24,640		41,364		30,089		19,852		23,802	
Reefer	17,524		19,999		14,200		14,889		13,679		15,385		16,450		15,109	
POV	32,086		38,169		31,484		34,731		25,614		32,322		29,764		31,863	
Ammo & Haz.	9,925		9,324		7,097		7,486		4,703		2,147		1,722		1,874	
Gen., Less HHG	210,768		199,053		176,618		166,515		188,200		205,454		208,583		203,919	
Special	26,617		18,325		21,361		24,152		24,290		24,857		21,340		27,005	
Total	324,379	(5.40)	329,230	(5.63)	281,217	(5.16)	272,413	(4.83)	297,850	(5.12)	310,254	(5.35)	297,711	(4.90)	304,372	(3.83)
Total, Europe																
HHG	74,078		152,342		105,083		73,237		188,882		118,209		71,651		99,315	
Reefer	218,734		200,249		167,140		130,683		135,340		154,638		168,137		161,173	
POV	355,902		303,284		317,114		291,320		259,956		262,617		244,105		279,069	
Ammo & Haz.	76,742		88,036		65,667		65,024		65,619		62,198		61,031		82,746	
Gen., Less HHG	1,415,004		1,487,493		1,313,772		1,300,506		1,603,205		1,357,545		1,588,316		1,670,775	
Special	471,119		552,560		524,913		627,062		427,703		404,263		253,167		236,415	
Total	2,611,579	(4.61)	2,783,964	(5.20)	2,493,689	(4.89)	2,487,832	(4.83)	2,679,705	(5.15)	2,359,470	(4.25)	2,386,407	(4.40)	2,529,493	(4.41)

a/ Cargo in thousands of measurement tons; cargo-personnel ratios in measurement tons per person per year.

Abbreviations and data source: same as Table A-4.

Table A-8

OUTBOUND MILITARY CARGO, U.S. WEST COAST TO FAR EAST AREA,
BY DESTINATION AREA AND CARGO CATEGORY, CALENDAR YEARS 1968-1975
(Thousands of Measurement Tons)

Japan, Korea, and Ryukyu and Bonin Is.	1968	1969	1970	1971	1972	1973	1974	1975
HHG	9,461	11,497	11,249	6,494	20,988	9,716	10,251	6,181
Reefer	86,314	101,390	91,595	95,694	77,485	77,509	78,839	70,412
POV	61,055	61,944	48,566	37,901	22,729	28,032	36,506	29,814
Ammo & Haz.	77,371	66,577	34,637	21,812	20,751	32,771	49,930	29,507
Gen., Less HHG	1,057,031	1,088,518	902,009	703,859	608,174	501,160	540,014	512,354
Special	95,872	8,269	10,846	3,311	39,178	42,489	27,938	27,252
Total	1,387,104	1,338,195	1,098,902	869,071	789,305	691,677	743,478	675,520
Taiwan								
HHG	1,202	1,725	2,174	1,851	3,673	1,615	1,338	1,017
Reefer	6,199	7,902	8,563	7,900	5,946	6,854	5,506	3,476
POV	2,411	2,683	2,304	2,468	2,484	2,321	4,007	4,355
Ammo & Haz.	7,168	3,438	963	1,154	0	2	1,461	1,968
Gen., Less HHG	67,862	76,562	99,566	75,389	79,646	62,516	59,331	49,152
Special	21,554	5,759	6,419	32,140	10,856	6,468	1,768	795
Total	106,396	98,069	119,989	120,902	102,605	79,776	73,411	60,763
Southeast Asia (Vietnam, Cambodia, Thailand, Philipines, and Other S.E. Asia)								
HHG	16,494	15,930	15,749	11,399	9,661	10,895	18,850	25,611
Reefer	252,275	316,123	298,421	235,834	136,504	71,205	48,528	48,124
POV	42,442	35,519	32,193	22,753	22,152	23,809	30,290	26,926
Ammo & Haz.	840,782	939,186	511,399	463,574	563,124	588,476	259,923	132,223
Gen., Less HHG	3,904,473	3,824,334	2,840,484	2,014,254	1,105,291	811,341	528,348	413,049
Special	780,409	808,069	400,020	144,510	83,971	75,032	28,482	18,678
Total	5,836,875	5,939,161	4,098,266	2,892,324	1,920,703	1,580,758	914,421	664,611

Total, Far East

HHG	27,157	29,152	29,172	19,744	34,322	22,226	30,439	32,809
Reefer	344,788	425,415	398,579	339,428	219,935	155,568	132,873	122,012
POV	105,908	100,146	83,063	63,122	47,365	54,162	70,803	61,095
Ammo & Haz.	925,321	1,009,201	546,999	486,540	583,875	621,249	311,314	163,698
Gen., Less HHG	5,029,366	4,989,414	3,842,059	2,793,502	1,793,111	1,375,017	1,127,693	974,555
Special	897,835	822,097	417,285	179,961	134,005	123,989	58,188	46,725
Total	7,330,375	7,375,425	5,317,157	3,882,297	2,812,613	2,352,211	1,731,310	1,400,894

Abbreviations and data source: same as Table A-4.

Table A-9

OUTBOUND MILITARY CARGO, U.S. EAST COAST TO FAR EAST AREA,
BY DESTINATION AREA AND CARGO CATEGORY, CALENDAR YEARS 1968-1975
(Thousands of Measurement Tons)

Japan, Korea, and Ryukyu and Bonin Is.	1968	1969	1970	1971	1972	1973	1974	1975
HHG	1,950	7,239	3,946	2,942	12,626	9,402	4,314	5,069
Reefer	2,024	347	647	1,050	191	5	54,919	79,881
POV	16,221	14,972	15,385	11,750	10,915	9,347	7,721	6,768
Ammo & Haz.	182,534	252,685	167,619	69,951	19,305	86,562	32,820	5,715
Gen., Less HHG	224,137	219,299	169,124	89,486	74,672	68,090	32,887	42,078
Special	197,889	194,100	127,842	79,212	55,271	31,322	32,953	30,206
Total	624,765	688,642	484,563	254,391	172,980	204,728	165,614	169,717
Taiwan								
HHG	366	1,626	1,685	2,003	2,776	2,198	719	597
Reefer	1	45	0	0	19	0	0	0
POV	2,203	2,520	2,617	1,863	2,599	2,605	1,697	1,415
Ammo & Haz.	1,050	508	1,512	29	645	571	21	12
Gen., Less HHG	20,035	11,147	9,894	7,788	6,918	8,107	10,255	4,543
Special	5,143	11,837	4,415	24,231	30,603	29,875	5,812	3,161
Total	28,798	27,683	20,123	35,914	43,560	43,356	18,504	9,728
Southeast Asia								
HHG	4,927	5,516	4,460	2,448	4,220	5,685	10,013	10,573
Reefer	4,345	381	129	50	121	2	85	35
POV	15,186	12,366	13,206	9,267	7,590	6,763	8,209	8,167
Ammo & Haz.	1,018,746	1,043,593	1,118,777	843,409	647,305	464,737	134,386	109,580
Gen., Less HHG	924,884	529,579	517,251	413,455	278,557	158,340	105,598	46,194
Special	607,462	399,791	315,879	149,239	67,004	43,894	27,880	10,997
Total	2,575,550	1,991,226	1,969,702	1,417,868	1,004,797	679,421	286,171	185,546

Total, Far East

HHG	7,243	14,381	10,091	7,393	19,622	17,285	15,046	16,239
Reefer	6,370	773	776	1,100	331	7	55,004	79,916
POV	33,610	29,858	31,208	22,880	21,104	18,715	17,627	16,350
Ammo & Haz.	1,202,330	1,296,786	1,287,908	913,389	667,255	551,870	167,227	115,307
Gen., Less HHG	1,169,056	760,025	696,269	510,729	360,147	234,537	148,740	92,815
Special	810,504	605,728	448,136	252,682	152,878	105,091	66,645	44,364
Total	3,229,113	2,707,551	2,474,388	1,708,173	1,221,337	927,505	470,289	364,991

Abbreviations and data source: same as Table A-4.

Table A-10

OUTBOUND MILITARY CARGO, U.S. GULF COAST TO FAR EAST AREA,
BY DESTINATION AREA AND CARGO CATEGORY, CALENDAR YEARS 1968-1975
(Thousands of Measurement Tons)

Japan, Korea, and Ryukyu and Bonin Is.	1968	1969	1970	1971	1972	1973	1974	1975
HHG	991	3,927	3,642	2,101	7,717	5,694	2,042	14
Reefer	0	2	0	0	2	1	0	0
POV	6,324	6,478	4,919	4,354	3,403	3,078	4,370	4,120
Ammo & Haz.	26	110	359	249	177	77	26	615
Gen., Less HHG	217,104	134,649	147,011	94,434	63,429	44,803	19,951	21,228
Special	69,486	40,326	38,991	28,402	13,967	17,964	19,056	73,686
Total	293,931	185,492	194,922	129,540	88,695	71,617	45,445	99,663
Taiwan								
HHG	119	1,255	903	317	2,140	1,440	582	0
Reefer	0	0	0	0	0	0	0	0
POV	659	689	588	618	562	795	780	648
Ammo & Haz.	0	0	1	1	6	16	0	1
Gen., Less HHG	3,168	4,246	5,349	5,250	5,458	4,476	4,710	1,820
Special	5,378	2,007	2,449	7,302	30,097	8,765	11,421	1,319
Total	9,324	8,197	9,290	13,488	38,263	15,492	17,493	3,788
Southeast Asia								
HHG	3,518	3,482	3,528	2,370	4,027	4,751	3,366	6
Reefer	66	63	0	0	0	2	0	54
POV	6,444	5,461	4,617	4,879	3,335	3,664	4,176	4,717
Ammo & Haz.	92	554	338	280	162	131	50	449
Gen., Less HHG	739,813	720,255	442,213	170,008	127,514	93,251	47,739	33,460
Special	431,890	937,794	434,280	157,524	43,059	64,288	14,866	13,771
Total	1,181,823	1,667,609	884,976	335,061	178,097	166,087	70,197	52,457

Total, Far East

HHG	4,628	8,664	8,073	4,788	13,884	11,885	5,990	20
Reefer	66	65	0	0	2	3	0	54
POV	13,427	12,628	10,124	9,851	7,300	7,537	9,326	9,485
Ammo & Haz.	118	664	698	530	345	224	76	1,065
Gen., Less HHG	960,085	859,150	594,573	269,692	196,401	142,530	72,400	56,508
Special	506,754	980,127	475,720	193,228	87,123	91,017	45,343	88,776
Total	1,485,078	1,861,298	1,089,188	478,089	305,055	253,196	133,135	155,908

Abbreviations and data source: same as Table A-4.

Table A-11

TOTAL OUTBOUND MILITARY CARGO TO FAR EAST AREA, BY DESTINATION AREA AND CARGO CATEGORY WITH CARGO-PERSONNEL RATIOS, 1968-1975 [a]

Destination and Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Japan, Korea, and Ryukyu and Bonin Is.								
HHG	12,402	22,663	18,837	11,537	35,127	24,812	16,607	11,264
Reefer	88,338	101,739	92,242	96,744	77,676	77,515	133,758	150,293
POV	83,600	83,394	68,870	54,005	36,779	40,457	48,597	40,702
Ammo & Haz.	259,931	319,372	202,615	92,012	40,235	119,410	82,776	35,837
Gen., Less HHG	1,498,272	1,442,466	1,218,144	887,779	750,838	614,053	592,852	575,660
Special	363,257	242,695	177,679	110,925	114,898	91,775	79,947	131,144
Total	2,305,800	2,212,329	1,778,387	1,253,002	1,055,553	968,022	954,537	944,900
	(8.44)	(9.57)	(8.09)	(6.22)	(6.12)	(5.91)	(6.01)	(5.63)
Taiwan								
HHG	1,687	4,606	4,762	4,171	6,677	5,253	2,639	1,614
Reefer	6,200	7,947	8,563	7,900	5,965	6,854	5,506	3,476
POV	5,273	5,892	5,509	4,949	5,528	5,721	6,484	6,418
Ammo & Haz.	8,218	3,946	2,476	1,184	646	589	1,482	1,981
Gen., Less HHG	91,065	91,955	114,809	88,427	90,344	75,099	74,296	55,515
Special	32,075	19,603	13,283	63,673	46,716	120,207	19,001	5,275
Total	144,518	133,949	149,402	170,304	155,876	213,723	109,408	74,279
	(9.62)	(9.82)	(9.91)	(11.53)	(10.64)	(14.44)	(10.18)	(9.20)
Southeast Asia								
HHG	24,939	24,928	23,737	16,217	15,587	21,331	32,229	36,190
Reefer	256,686	316,567	298,550	235,884	136,625	71,209	48,613	48,213
POV	64,072	53,346	50,016	36,899	33,264	34,236	42,675	39,810
Ammo & Haz.	1,859,620	1,983,333	1,630,514	1,307,263	1,210,631	1,053,344	394,369	242,252
Gen., Less HHG	5,569,170	5,074,168	3,799,948	2,597,717	1,506,254	1,062,932	681,685	492,703
Special	1,819,761	2,145,654	1,150,179	451,273	264,392	183,214	120,650	43,446
Total	9,594,248	9,597,996	6,952,944	4,645,253	3,166,753	2,426,266	1,320,221	902,614
	(13.00)	(13.22)	(12.22)	(13.17)	(16.93)	(20.62)	(13.08)	(11.10)

Total, Far East								
HHG	39,028	52,197	47,336	31,925	57,391	51,396	51,475	49,068
Reefer	351,224	426,253	399,355	340,528	220,266	155,578	187,877	201,982
POV	152,945	142,632	124,395	95,853	75,571	80,414	97,756	86,930
Ammo & Haz.	2,127,769	2,306,651	1,835,605	1,400,459	1,251,512	1,173,343	478,627	280,070
Gen., Less HHG	7,158,507	6,608,589	5,132,901	3,573,923	2,347,436	1,752,084	1,348,833	1,123,878
Special	2,215,093	2,407,952	1,341,141	625,871	426,006	395,196	219,598	179,865
Total	12,044,566	11,944,274	8,880,733	6,068,559	4,378,182	3,608,011	2,384,166	1,921,793
	(12.16)	(12.31)	(11.05)	(10.67)	(11.70)	(12.18)	(8.82)	(7.47)

a/ Cargo in thousands of measurement tons; cargo-personnel ratios derived, using personnel data from Table A-2.

Abbreviations and cargo data source: same as Table A-4.

Table A-12

INBOUND MILITARY CARGO, TO U.S. EAST COAST FROM EUROPEAN AND FAR EAST AREAS, BY ORIGIN AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	11,840	14,854	13,201	8,915	34,571	17,006	8,530	11,428
	Reefer	0	0	0	0	0	0	0	0
	POV	21,078	17,357	21,816	15,003	15,575	25,506	19,862	18,043
	Ammo & Haz.	543	2,376	104	0	393	766	0	1,374
	Gen., Less HHG	11,295	10,970	9,370	12,648	8,246	2,874	1,487	2,183
	Special	1,237	652	2,934	868	5,554	1,658	817	224
	Total	45,993	46,209	47,425	37,434	64,339	47,810	30,696	33,252
Western Europe	HHG	54,882	75,737	82,419	85,095	192,320	91,051	58,882	67,666
	Reefer	0	0	0	9	0	217	0	75
	POV	188,385	211,187	194,056	198,409	173,267	188,814	168,213	138,845
	Ammo & Haz.	8,088	23,434	21,537	6,781	8,037	20,623	15,738	33,793
	Gen., Less HHG	63,612	40,984	77,710	89,092	71,201	44,407	55,306	54,760
	Special	79,057	125,142	34,914	65,718	64,053	69,630	30,987	37,093
	Total	394,024	476,484	410,636	445,104	508,878	414,525	329,343	332,232
E. Mediterranean	HHG	19,399	11,694	9,888	6,879	8,055	13,561	16,372	26,170
	Reefer	0	0	0	0	0	0	0	0
	POV	15,166	16,822	18,668	12,595	11,269	13,897	15,840	16,927
	Ammo & Haz.	431	1,114	1,222	253	0	40	0	93
	Gen., Less HHG	6,714	5,053	6,241	5,162	3,510	3,012	7,438	2,762
	Special	147	113	345	142	206	743	322	524
	Total	41,857	34,796	36,364	25,031	23,040	31,253	39,972	46,476
W. Mediterranean	HHG	30,182	43,818	34,396	34,139	51,856	58,686	33,304	47,025
	Reefer	6	1	0	0	0	0	0	0
	POV	25,537	31,618	30,388	28,293	26,395	32,774	27,043	29,513
	Ammo & Haz.	3,561	764	2,524	86	662	0	580	2,700
	Gen., Less HHG	15,375	21,881	25,683	9,691	19,173	8,558	4,527	12,210
	Special	15,989	3,770	4,749	2,710	1,390	1,296	1,919	2,578
	Total	90,650	101,852	97,740	74,919	99,476	101,314	67,373	94,026

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Europe	HHG	116,303	146,103	139,904	135,028	286,802	180,304	117,088	152,289
	Reefer	6	1	0	9	0	0	217	0
	POV	250,166	276,984	264,928	254,300	226,506	260,991	230,958	203,328
	Ammo & Haz.	12,623	27,688	25,387	7,120	9,092	21,429	16,318	37,960
	Gen., Less HHG	96,996	78,888	119,004	116,593	102,130	58,851	68,758	71,915
	Special	96,430	129,677	42,942	69,438	71,203	73,327	34,045	40,419
	Total	572,524	659,341	592,165	582,488	695,733	594,902	467,384	505,986
	Percent [a/]	(88.5)	(82.5)	(76.5)	(78.3)	(76.1)	(81.3)	(82.4)	(81.7)
Japan, Korea, Ryukyu and Bonin Is.	HHG	6,254	16,087	10,407	7,309	31,441	16,787	10,124	15,113
	Reefer	0	14	42	0	0	0	0	0
	POV	12,412	13,487	13,777	16,244	15,432	11,809	12,555	8,657
	Ammo & Haz.	0	2	3	7	0	3	236	25
	Gen., Less HHG	3,327	5,265	9,167	7,873	9,633	10,320	8,662	17,633
	Special	1,748	11,076	5,901	9,470	23,635	8,836	28,545	13,502
	Total	23,741	45,931	39,297	40,903	80,141	47,755	60,122	54,930
Taiwan	HHG	6,147	2,842	2,528	1,651	16,022	6,336	656	1,656
	Reefer	0	0	0	0	0	0	0	0
	POV	491	1,201	1,486	1,293	1,964	2,069	1,259	1,936
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	496	282	656	1,215	1,062	849	432	204
	Special	112	84	86	196	1,657	8,946	5,701	29,946
	Total	7,246	4,409	4,756	4,355	20,705	18,200	8,048	33,742
Southeast Asia	HHG	11,670	21,844	31,099	32,865	25,860	18,127	17,062	15,745
	Reefer	0	0	10	3	0	0	0	0
	POV	5,870	7,459	8,314	7,685	4,390	3,604	3,549	2,802
	Ammo & Haz	4,525	1,480	0	4,131	29	572	8	110
	Gen., Less HHG	6,805	13,470	40,306	28,528	39,627	13,565	3,772	4,136
	Special	14,268	45,101	58,021	42,914	47,328	34,704	7,164	1,882
	Total	43,138	89,354	137,750	116,126	117,234	70,572	31,555	24,675

Table A-12 (continued)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Far East	HHG	24,071	40,773	44,034	41,825	73,323	41,250	27,842	32,514
	Reefer	0	14	52	3	0	0	0	0
	POV	18,773	22,147	23,577	25,222	21,786	17,482	17,363	13,395
	Ammo & Haz.	4,525	1,482	3	4,138	29	575	244	135
	Gen., Less HHG	10,628	19,017	50,129	37,616	50,322	24,734	12,866	21,973
	Special	16,128	56,261	64,008	52,580	72,620	52,486	41,410	45,330
	Total	74,125	139,694	181,803	161,384	218,080	136,527	99,725	113,347
	Percent [a/]	(11.5)	(17.5)	(23.5)	(21.7)	(23.9)	(18.7)	(17.6)	(18.3)
Totals, Europe and Far East	HHG	140,374	186,875	183,938	176,853	360,125	221,554	144,930	184,803
	Reefer	6	15	52	12	0	0	217	75
	POV	268,939	299,131	288,505	279,522	248,292	278,473	248,321	216,723
	Ammo & Haz.	17,148	29,170	25,390	11,258	9,121	22,004	16,562	38,095
	Gen., Less HHG	107,624	97,905	169,133	154,209	152,452	83,585	81,624	93,888
	Special	112,558	185,938	106,950	122,018	143,823	125,813	75,455	85,749
	Total	646,649	799,034	773,968	743,872	913,813	731,429	567,109	619,333

[a/] The percentage breakdown of inbound cargo between the European and Far East areas is shown in parentheses below the respective area subtotals.

Abbreviations and data source: same as Table A-4.

Table A-13

INBOUND MILITARY CARGO, TO U.S. GULF COAST FROM EUROPEAN AND FAR EAST AREAS, BY ORIGIN AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	1,778	10,536	1,670	674	601	3,861	462	5,623
	Reefer	0	0	0	0	0	0	0	0
	POV	1,019	1,015	2,177	781	778	1,442	965	1,219
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	7,172	6,611	10,113	9,695	1,156	1,326	465	157
	Special	1,068	1,343	1,139	1,852	914	748	333	0
	Total	11,037	19,505	15,099	13,002	3,449	7,377	2,225	6,999
Western Europe	HHG	34,402	68,179	46,499	27,524	54,556	25,351	2,521	36,510
	Reefer	0	0	0	0	0	0	0	0
	POV	9,669	11,943	9,409	9,129	8,877	14,453	10,831	1,055
	Ammo & Haz.	6	2	0	9	12	14	0	0
	Gen., Less HHG	7,754	4,622	32,684	15,824	8,557	8,859	12,825	11,707
	Special	26,601	24,699	5,878	21,304	43,721	44,081	40,971	38,616
	Total	78,432	109,445	94,470	73,853	115,723	92,758	67,148	97,390
Eastern Mediterranean	HHG	11,675	9,742	5,544	1,698	988	1,408	1,169	1,438
	Reefer	0	0	0	0	0	0	0	0
	POV	3,594	2,573	3,676	2,467	1,693	2,430	3,398	2,770
	Ammo & Haz.	0	0	44	0	0	0	0	5
	Gen., Less HHG	1,962	3,018	8,190	661	317	142	87	183
	Special	852	1,047	417	278	1,027	376	528	443
	Total	18,083	16,380	17,871	5,104	4,025	4,356	5,182	4,839
Western Mediterranean	HHG	12,370	9,314	2,064	1,470	436	219	175	669
	Reefer	0	0	0	0	0	0	0	0
	POV	1,102	1,521	1,316	1,184	1,078	1,886	1,925	2,267
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	765	2,273	1,832	272	2,413	1,291	820	654
	Special	2,798	135	287	0	165	9,649	786	1,939
	Total	17,035	13,243	5,499	2,926	4,092	13,045	3,706	5,529

Table A-13 (continued)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Europe	HHG	60,225	97,771	55,777	31,366	56,581	30,839	4,327	44,240
	Reefer	0	0	0	0	0	0	0	0
	POV	15,384	17,052	16,578	13,624	12,426	20,211	17,119	16,813
	Ammo & Haz.	6	2	44	9	12	14	0	5
	Gen., Less HHG	17,653	16,524	52,819	26,452	12,443	11,618	14,197	12,701
	Special	31,319	27,224	7,721	23,434	45,827	54,854	42,618	40,998
	Total	124,587	158,573	132,939	94,885	127,289	117,536	78,261	114,757
	Percent [a/]	(47.8)	(53.9)	(40.6)	(29.2)	(25.6)	(43.8)	(49.3)	(58.0)
Japan, Korea, Ryukyu & Bonin Islands	HHG	1,181	6,380	4,154	1,570	20,767	7,112	863	4,344
	Reefer	0	0	0	0	0	37	0	53
	POV	4,889	5,343	6,358	6,625	6,710	6,097	6,488	5,226
	Ammo & Haz.	0	0	1	7	9	7	136	94
	Gen., Less HHG	6,619	12,482	15,824	11,090	10,263	18,727	7,768	12,207
	Special	8,365	22,942	20,612	9,192	8,909	19,265	40,381	37,554
	Total	21,054	47,147	46,949	28,484	46,658	51,245	55,636	59,478
Taiwan	HHG	2,981	1,878	3,249	1,071	12,988	2,043	363	1,747
	Reefer	0	0	0	0	0	0	0	0
	POV	154	338	966	444	860	1,073	969	993
	Ammo & Haz.	0	0	0	0	0	0	2	0
	Gen., Less HHG	996	359	1,340	801	1,212	843	2,098	665
	Special	177	61	108	193	1,393	3,421	3,752	4,869
	Total	4,308	2,636	5,663	2,509	16,453	7,380	7,184	8,274
Southeast Asia	HHG	1,212	7,504	14,006	18,160	19,747	14,747	994	482
	Reefer	0	0	0	0	0	0	0	0
	POV	3,142	3,412	4,030	4,511	3,280	3,422	1,942	2,017
	Ammo & Haz.	175	278	257	0	93	0	131	16
	Gen., Less HHG	44,287	23,575	30,477	42,947	84,874	25,926	8,020	10,589
	Special	61,986	50,824	93,416	133,584	199,468	48,006	6,606	2,142
	Total	110,802	85,593	142,186	199,202	307,462	92,101	17,693	15,246

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Far East	HHG	5,374	15,762	21,409	20,801	53,502	23,902	2,220	6,563
	Reefer	0	0	0	0	0	37	0	53
	POV	8,185	9,093	11,354	11,580	10,850	10,592	9,399	8,236
	Ammo & Haz.	175	278	258	7	102	7	269	110
	Gen., Less HHG	51,902	36,416	47,641	54,838	96,349	45,496	17,886	23,461
	Special	70,528	73,827	114,136	142,969	209,770	70,692	50,739	44,565
	Total	136,164	135,376	194,798	230,195	370,573	150,726	80,513	82,988
	Percent [a/]	(52.2)	(46.1)	(59.4)	(70.8)	(74.4)	(56.2)	(50.7)	(42.0)
Totals	HHG	65,599	113,533	77,186	52,167	110,083	54,741	6,457	50,803
	Reefer	0	0	0	0	0	37	0	53
	POV	23,569	26,145	27,932	25,204	23,276	30,803	26,518	25,049
	Ammo & Haz.	181	280	302	16	114	21	269	115
	Gen., Less HHG	69,555	52,940	100,460	81,290	108,792	57,114	32,083	36,162
	Special	101,847	101,050	121,857	166,403	255,597	125,546	93,357	85,563
	Total	260,751	293,949	327,737	325,080	497,862	268,262	158,774	197,745

[a/] The percentage breakdown of inbound cargo between the European and Far East areas is shown in parentheses below the respective area subtotals.

Abbreviations and data source: same as Table A-4.

Table A-14

INBOUND MILITARY CARGO, TO U.S. WEST COAST FROM EUROPEAN AND FAR EAST AREAS, BY ORIGIN AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	5	824	1,632	379	8	84	88	3,174
	Reefer	0	0	0	0	0	0	0	0
	POV	939	947	1,179	1,082	427	1,815	1,573	1,487
	Ammo & Haz.	0	0	0	0	0	0	0	6,675
	Gen., Less HHG	137	16	194	229	1,047	972	240	658
	Special	0	0	0	0	0	68	0	266
	Total	1,081	1,787	3,005	1,690	1,482	2,939	1,901	12,260
Western Europe	HHG	4,428	21	5,972	968	2,182	37	167	0
	Reefer	0	0	0	0	0	0	0	0
	POV	8,219	7,184	7,071	6,837	12	10,156	9,645	7,367
	Ammo & Haz.	0	0	16	0	0	0	0	20,037
	Gen., Less HHG	3,491	0	806	652	0	276	1,753	1,978
	Special	2,771	0	0	17	0	0	0	0
	Total	18,909	7,205	13,865	8,474	2,194	10,469	11,565	29,382
Eastern Mediterranean	HHG	0	37	28	4	0	0	0	0
	Reefer	0	0	0	0	0	0	0	0
	POV	0	119	251	220	25	11	0	0
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	2,352	0	2	33	0	4	0	0
	Special	0	0	0	0	0	0	0	0
	Total	2,352	156	281	257	25	15	0	0
Western Mediterranean	HHG	2,232	5,350	1,618	977	99	407	316	95
	Reefer	0	0	0	0	0	0	0	0
	POV	1,390	2,381	1,842	1,277	659	1,413	1,483	223
	Ammo & Haz.	0	0	0	0	0	0	0	0
	Gen., Less HHG	847	687	845	58	167	154	57	48
	Special	30	77	0	0	0	0	0	0
	Total	4,499	8,495	4,305	2,312	925	1,974	1,856	366

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Europe	HHG	6,665	6,232	9,250	2,328	2,289	528	571	3,269
	Reefer	0	0	0	0	0	0	0	0
	POV	10,548	10,631	10,343	9,416	1,123	13,395	12,701	9,077
	Ammo & Haz.	0	0	16	0	0	0	0	26,712
	Gen., Less HHG	6,827	703	1,847	972	1,214	1,406	2,050	2,684
	Special	2,801	77	0	17	0	68	0	266
	Total	26,841	17,643	21,456	12,733	4,626	15,397	15,322	42,008
	Percent [a/]	(3.4)	(1.6)	(1.8)	(1.2)	(0.4)	(2.7)	(4.6)	(13.2)
Japan, Korea, Ryukyu and Bonin Is.	HHG	22,210	30,870	27,369	27,550	55,714	39,783	26,180	31,618
	Reefer	0	0	355	3	2	4	9	35
	POV	59,047	55,663	57,252	61,366	42,152	35,153	23,141	21,629
	Ammo & Haz.	4,974	11,006	11,464	10,558	17,859	6,557	8,145	5,739
	Gen., Less HHG	94,975	214,375	246,085	226,886	221,913	120,462	61,377	63,905
	Special	87,041	99,104	107,701	33,410	36,883	34,247	41,129	16,982
	Total	268,247	411,018	450,226	359,773	374,523	236,206	159,981	139,908
Taiwan	HHG	4,362	3,542	5,487	2,979	16,107	7,633	2,384	3,555
	Reefer	0	0	0	0	0	0	0	0
	POV	1,352	2,242	2,559	2,157	3,351	3,899	1,758	2,708
	Ammo & Haz.	435	268	88	506	2,056	0	108	0
	Gen., Less HHG	6,988	4,081	5,948	5,937	12,430	8,980	4,428	12,344
	Special	862	364	175	540	965	3,330	2,059	9,500
	Total	13,999	10,497	14,257	12,119	34,909	23,842	10,737	28,107
Southeast Asia	HHG	15,920	25,400	36,175	47,267	31,669	48,619	46,971	43,550
	Reefer	0	6	86	9	23	26	0	0
	POV	25,972	22,891	23,382	19,214	10,069	9,699	9,539	7,601
	Ammo & Haz.	5,033	6,034	7,517	9,888	15,459	6,818	18,735	20,803
	Gen., Less HHG	286,515	428,861	448,855	381,011	411,825	165,712	42,608	30,531
	Special	141,859	202,078	174,270	181,276	214,666	65,222	29,974	6,286
	Total	475,299	685,270	690,285	638,665	713,711	296,096	147,827	108,771

Table A-14 (continued)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Far East	HHG	42,492	59,812	69,031	77,796	103,490	96,035	75,535	78,724
	Reefer	0	6	441	12	25	30	9	35
	POV	86,371	80,796	83,193	82,737	55,572	48,751	34,438	31,938
	Ammo & Haz.	10,442	17,308	19,069	20,952	35,374	13,375	26,988	26,542
	Gen., Less HHG	388,478	647,317	700,888	613,834	676,168	295,154	108,413	106,780
	Special	229,762	301,546	282,146	215,226	252,514	102,799	73,162	32,768
	Total	757,545	1,106,785	1,154,768	1,010,557	1,123,143	556,144	318,545	276,787
	Percent [a/]	(96.6)	(98.4)	(98.2)	(98.8)	(99.6)	(97.3)	(95.4)	(86.8)
Totals	HHG	49,157	66,044	78,281	80,124	105,779	96,563	76,106	81,993
	Reefer	0	6	441	12	25	30	9	35
	POV	96,919	91,427	93,536	92,153	56,695	62,146	47,139	41,015
	Ammo & Haz.	10,442	17,308	19,085	20,952	35,374	13,375	26,988	53,254
	Gen., Less HHG	395,305	648,020	702,735	614,806	677,382	296,560	110,463	109,464
	Special	232,563	301,623	282,146	215,243	252,514	102,867	73,162	33,034
	Total	784,386	1,124,428	1,176,224	1,023,290	1,127,769	571,541	333,867	318,795

[a/] The percentage breakdown of inbound cargo between the European and Far East areas is shown in parentheses below the respective area subtotals.

Abbreviations and data source: same as Table A-4.

Table A-15

INBOUND MILITARY CARGO, TO CONTINENTAL UNITED STATES FROM EUROPEAN AND FAR EAST AREAS, BY ORIGIN AND CARGO CATEGORY, 1968-1975
(Thousands of Measurement Tons)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
British Isles	HHG	13,623	26,214	16,503	9,968	35,180	20,951	9,080	20,225
	Reefer	0	0	0	0	0	0	0	0
	POV	23,036	19,319	25,172	16,866	16,780	28,763	22,400	20,749
	Ammo & Haz.	543	2,376	104	0	393	766	0	8,049
	Gen., Less HHG	18,604	17,597	19,677	22,572	10,449	5,172	2,192	2,998
	Special	2,305	1,995	4,073	2,720	6,468	2,474	1,150	0
	Total	58,111	67,501	65,529	52,126	69,270	58,126	34,822	52,021
Western Europe	HHG	93,712	143,937	134,890	113,587	249,058	116,439	61,570	104,176
	Reefer	0	0	0	9	0	0	217	75
	POV	206,273	230,314	210,536	214,447	182,156	213,423	188,689	156,769
	Ammo & Haz.	8,094	23,436	21,553	6,790	8,049	20,637	15,738	53,830
	Gen., Less HHG	74,857	45,606	19,677	105,568	79,758	53,542	69,614	68,445
	Special	108,429	149,841	40,972	87,039	107,774	113,711	71,958	75,709
	Total	491,365	593,134	427,628	527,430	626,795	517,752	407,786	459,004
Eastern Mediterranean	HHG	31,074	21,473	15,460	8,581	9,043	14,969	17,541	27,608
	Reefer	0	0	0	0	0	0	0	0
	POV	18,760	19,514	22,595	15,282	12,987	16,338	19,238	19,697
	Ammo & Haz.	431	1,114	1,266	253	0	40	0	98
	Gen., Less HHG	11,028	8,071	14,433	5,856	3,827	3,158	7,525	2,945
	Special	999	1,160	762	420	1,233	1,119	850	967
	Total	62,292	51,332	54,516	30,392	27,090	35,624	45,154	51,315
Western Mediterranean	HHG	44,784	58,482	38,078	36,586	52,391	59,312	33,795	47,789
	Reefer	6	1	0	0	0	0	0	0
	POV	28,029	35,520	33,546	30,754	28,132	36,073	30,451	32,003
	Ammo & Haz.	3,561	764	2,524	86	662	0	580	2,700
	Gen., Less HHG	16,987	24,841	28,360	10,021	21,753	10,003	5,404	12,912
	Special	18,817	3,982	5,036	2,710	1,555	10,945	2,705	4,517
	Total	112,184	123,590	107,544	80,157	104,493	116,333	72,935	99,921

Table A-15 (continued)

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Europe	HHG	183,193	250,106	204,931	168,722	345,672	211,671	121,986	199,798
	Reefer	6	1	0	9	0	0	217	75
	POV	276,098	304,667	291,849	277,349	240,055	294,597	260,778	229,218
	Ammo & Haz.	12,629	27,690	25,447	7,129	9,104	21,443	16,318	64,677
	Gen., Less HHG	121,476	96,115	82,147	144,017	115,787	77,047	84,735	87,300
	Special	130,550	156,978	50,843	92,889	117,030	128,249	76,663	81,193
	Total	723,952	835,557	655,217	690,115	827,648	733,007	560,697	662,261
Japan, Korea, Ryukyu and Bonin Is.	HHG	29,645	53,337	41,930	36,429	107,922	63,682	37,167	51,075
	Reefer	0	14	397	3	2	41	9	88
	POV	76,348	74,493	77,387	84,235	64,294	53,059	42,184	35,512
	Ammo & Haz.	4,974	11,008	11,468	10,572	17,868	6,567	8,517	5,858
	Gen., Less HHG	104,921	232,122	271,076	245,849	241,809	149,509	77,807	93,745
	Special	97,154	133,122	134,214	52,072	69,427	62,348	110,055	68,038
	Total	313,042	504,096	536,472	429,160	501,322	335,206	275,739	254,316
Taiwan	HHG	13,490	8,262	11,264	5,701	45,117	16,012	3,403	6,958
	Reefer	0	0	0	0	0	0	0	0
	POV	1,997	3,781	5,011	5,187	6,175	7,041	3,986	5,637
	Ammo & Haz.	435	268	88	506	2,056	0	110	0
	Gen., Less HHG	8,480	4,722	7,944	7,953	14,704	10,672	6,958	13,213
	Special	1,151	509	369	929	4,015	15,697	11,512	44,315
	Total	25,553	17,542	24,676	20,276	72,067	49,422	25,969	70,123
Southeast Asia	HHG	28,802	54,748	81,280	98,292	77,276	81,493	65,027	59,778
	Reefer	0	6	96	12	23	26	0	0
	POV	34,984	33,762	35,726	31,410	17,739	16,725	15,030	12,420
	Ammo & Haz.	9,733	7,792	7,774	13,919	15,581	7,390	18,874	20,929
	Gen., Less HHG	337,607	465,906	519,638	452,486	566,326	205,203	54,400	45,256
	Special	218,113	298,003	325,707	357,774	461,462	147,932	43,744	10,310
	Total	629,239	860,217	970,221	953,893	1,138,407	458,769	197,075	148,693

Origin Area	Cargo Category	1968	1969	1970	1971	1972	1973	1974	1975
Subtotals, Far East	HHG	71,937	116,347	134,474	140,422	230,315	161,187	105,597	117,811
	Reefer	0	20	493	15	25	67	9	88
	POV	113,329	112,036	118,124	120,832	88,208	76,825	61,200	53,569
	Ammo & Haz.	15,142	19,068	19,330	24,997	35,505	13,957	27,501	26,787
	Gen., Less HHG	451,008	702,750	798,658	706,288	822,839	365,384	139,165	152,214
	Special	316,418	431,634	460,290	410,775	534,904	225,977	165,311	122,663
	Total	967,834	1,381,855	1,531,369	1,403,329	1,711,796	843,397	498,783	473,132
Totals	HHG	255,130	366,453	339,405	309,144	575,987	372,858	227,583	317,609
	Reefer	6	21	493	24	25	67	226	163
	POV	389,427	416,703	409,973	398,181	328,263	371,422	321,978	282,787
	Ammo & Haz.	27,771	46,758	44,777	32,126	44,609	35,400	43,819	91,464
	Gen., Less HHG	572,484	798,865	880,805	850,305	938,626	442,431	223,900	239,514
	Special	446,968	588,612	511,133	503,664	651,934	354,226	241,974	203,856
	Total	1,691,786	2,217,412	2,186,586	2,093,444	2,539,444	1,576,404	1,059,480	1,135,393

Abbreviations and data source: same as Table A-4.

Appendix B

SUPPLEMENTARY DATA ON TOTAL AND U.S.-FLAG CARRIAGE OF COMMERCIAL AND MILITARY GENERAL CARGOES

In Chapter 4, eight of the 11 tables include data only for the aggregate of all U.S. essential foreign trade routes. This appendix contains the corresponding data for the three individual trade routes of major interest--U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9), U.S. North Atlantic-Mediterranean (Trade Route 10), and U.S. Pacific-Far East (Trade Route 29)--and for the total of all other trade routes. Tables B-1 through B-7 correspond to Tables 4-1 through 4-7, respectively; and Table B-8 corresponds to Table 4-9.

The relationships among total liner carriage, U.S.-flag liner carriage, and total military cargo (Tables B-1 through B-3); the outbound-inbound imbalances in U.S.-flag liner carriage of commercial and military cargoes (Table B-5); and the comparison of year-to-year fluctuations in U.S.-flag liner carriage (Table B-4) with the magnitudes of postulated reductions in military cargo tonnages from 1975 levels (Tables B-8) are portrayed graphically in Figures B-1 through B-3, respectively. These sets of graphs correspond to Figures 4-1 through 4-3.

Table B-1(A)

LINER VESSEL CARRIAGE IN U.S. OCEANBORNE FOREIGN TRADE, TOTAL AND U.S.-FLAG SHARE,
U.S. NORTH ATLANTIC-WESTERN EUROPE (TRADE ROUTES 5-7-8-9), 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Outbound								
Commercial Cargo	3,697	3,540	4,710	3,813	3,878	4,915	5,632	4,345
Military Cargo	1,123	1,257	1,195	1,163	1,365	1,189	1,534	1,405
Total Cargo	4,820	4,797	5,905	4,976	5,243	6,104	7,166	5,750
Inbound								
Commercial Cargo	6,111	4,910	5,900	6,219	6,008	6,998	6,939	5,255
Military Cargo	115	144	172	233	352	152	167	139
Total Cargo	6,226	5,054	6,072	6,452	6,360	7,150	7,106	5,394
Total								
Commercial Cargo	9,808	8,450	10,610	10,032	9,886	11,913	12,571	9,600
Military Cargo	1,238	1,401	1,367	1,396	1,717	1,341	1,701	1,544
Total Cargo	11,046	9,851	11,977	11,428	11,603	13,244	14,272	11,144
U.S.-Flag								
Outbound								
Commercial Cargo	982	1,022	1,396	1,182	1,125	1,524	1,746	1,260
Military Cargo	1,123	1,257	1,195	1,163	1,365	1,189	1,534	1,405
Total Cargo	2,105	2,279	2,591	2,345	2,480	2,713	3,380	2,665
Inbound								
Commercial Cargo	1,562	1,626	2,088	1,989	1,803	2,309	2,360	1,682
Military Cargo	115	144	172	233	352	152	167	139
Total Cargo	1,677	1,770	2,260	2,222	2,155	2,461	2,527	1,821
Total								
Commercial Cargo	2,544	2,648	3,484	3,171	2,928	3,833	4,106	2,942
Military Cargo	1,238	1,401	1,367	1,396	1,717	1,341	1,701	1,544
Total Cargo	3,782	4,049	4,851	4,567	4,645	5,174	5,807	4,486

Source and notes: same as Table 4-1.

Table B-1(B)

LINER VESSEL CARRIAGE IN U.S. OCEANBORNE FOREIGN TRADE, TOTAL AND U.S.-FLAG SHARE,
U.S. NORTH ATLANTIC-MEDITERRANEAN (TRADE ROUTE 10), 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Outbound								
Commercial Cargo	1,801	1,853	2,058	1,659	1,820	2,407	2,813	2,741
Military Cargo	508	500	379	430	470	429	441	324
Total Cargo	2,398	2,353	2,437	2,089	2,290	2,836	3,254	3,065
Inbound								
Commercial Cargo	2,098	1,862	1,965	1,793	2,086	2,215	2,358	2,208
Military Cargo	95	96	93	74	115	85	89	89
Total Cargo	2,193	1,958	2,058	1,867	2,201	2,300	2,447	2,297
Total								
Commercial Cargo	3,899	3,715	4,023	3,452	3,906	4,622	5,171	4,949
Military Cargo	603	596	472	504	585	514	530	413
Total Cargo	4,502	4,311	4,495	3,956	4,491	5,136	5,701	5,362
U.S.-Flag								
Outbound								
Commercial Cargo	555	545	651	515	456	1,011	1,351	1,509
Military Cargo	508	500	379	430	470	429	441	324
Total Cargo	1,063	1,045	1,030	945	926	1,440	1,792	1,833
Inbound								
Commercial Cargo	777	545	663	627	625	798	1,155	1,094
Military Cargo	95	96	93	74	115	85	89	89
Total Cargo	872	641	756	701	740	883	1,244	1,183
Total								
Commercial Cargo	1,332	1,090	1,314	1,142	1,081	1,809	2,506	2,603
Military Cargo	603	596	472	504	585	514	530	413
Total Cargo	1,935	1,686	1,786	1,646	1,666	2,323	3,036	3,016

Source and notes: same as Table 4-1.

Table B-1(C)

LINER VESSEL CARRIAGE IN U.S. OCEANBORNE FOREIGN TRADE, TOTAL AND U.S.-FLAG SHARE,
U.S. PACIFIC-FAR EAST (TRADE ROUTE 29), 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Outbound								
Commercial Cargo	4,336	5,187	3,897	4,254	5,255	8,033	7,895	6,994
Military Cargo	5,804	2,274	4,300	2,975	2,185	1,478	1,416	991
Total Cargo	10,140	7,461	8,197	7,229	7,440	9,511	9,311	7,985
Inbound								
Commercial Cargo	3,678	3,865	4,609	4,961	5,105	5,172	5,649	4,896
Military Cargo	328	520	511	479	417	140	146	161
Total Cargo	4,006	4,385	5,120	5,440	5,522	5,312	5,795	5,057
Total								
Commercial Cargo	8,014	9,052	8,506	9,215	10,360	13,205	13,544	11,890
Military Cargo	6,132	2,794	4,811	3,454	2,602	1,618	1,562	1,152
Total Cargo	14,146	11,846	13,317	12,669	12,962	14,823	15,106	13,042
U.S.-Flag								
Outbound								
Commercial Cargo	1,666	1,805	2,290	1,702	2,206	3,213	3,237	2,168
Military Cargo	5,804	2,274	4,300	2,975	2,185	1,478	1,416	991
Total Cargo	7,470	4,079	6,590	4,677	4,391	4,691	4,653	3,159
Inbound								
Commercial Cargo	1,096	1,480	2,012	1,737	2,042	1,965	2,316	1,959
Military Cargo	328	520	511	479	417	140	146	161
Total Cargo	1,424	2,000	2,523	2,216	2,459	2,105	2,462	2,118
Total								
Commercial Cargo	2,762	3,285	4,302	3,439	4,248	5,178	5,553	4,125
Military Cargo	6,132	2,794	4,811	3,454	2,602	1,618	1,562	1,152
Total Cargo	8,894	6,079	9,113	6,893	6,850	6,796	7,115	5,277

Source and notes: same as Table 4-1.

Table B-1(D)

LINER VESSEL CARRIAGE IN U.S. OCEANBORNE FOREIGN TRADE, TOTAL AND U.S.-FLAG SHARE, ALL OTHER TRADE ROUTES, 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
All Flags								
Outbound								
Commercial Cargo	37,224	32,487	42,590	33,463	32,471	38,429	37,964	33,706
Military Cargo	2,206	4,814	2,624	2,130	2,165	1,861	3,643	1,511
Total Cargo	39,430	37,301	45,214	35,593	34,636	40,290	41,607	35,217
Inbound								
Commercial Cargo	28,613	25,929	30,525	27,823	28,192	29,296	28,456	24,128
Military Cargo	278	439	373	2,629	477	334	369	359
Total Cargo	28,891	26,368	30,898	30,452	28,669	29,630	28,825	24,487
Total								
Commercial Cargo	65,837	58,416	73,115	61,286	60,663	67,725	66,420	57,834
Military Cargo	2,484	5,253	2,997	4,759	2,642	2,195	4,012	1,870
Total Cargo	68,321	63,669	76,112	66,045	63,305	69,920	70,432	59,704
U.S.-Flag								
Outbound								
Commercial Cargo	8,645	7,038	8,782	6,694	6,373	9,165	10,249	9,696
Military Cargo	2,206	4,814	2,624	2,130	2,165	1,861	3,643	1,511
Total Cargo	10,851	11,852	11,406	8,824	8,538	11,026	13,892	11,207
Inbound								
Commercial Cargo	8,976	4,763	4,969	4,773	3,973	5,196	6,791	6,532
Military Cargo	278	439	373	2,629	477	334	369	359
Total Cargo	9,254	5,202	5,342	7,402	4,450	5,530	7,160	6,891
Total								
Commercial Cargo	17,621	11,801	13,751	11,467	10,346	14,361	17,040	16,228
Military Cargo	2,484	5,253	2,997	4,759	2,642	2,195	4,012	1,870
Total Cargo	20,105	17,054	16,748	16,226	12,988	16,556	21,052	18,098

Source and notes: same as Table 4-1.

Table B-2

U.S.-FLAG LINER CARRIAGE AND MSC NUCLEUS FLEET NON-BULK CARRIAGE, BY TRADE ROUTE, 1968-1975
(Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)								
Outbound								
Liner Carriage	2,105	2,279	2,591	2,345	2,480	2,713	3,380	2,665
MSC Carriage	204	172	63	55	62	33	48	54
Total	2,309	2,451	2,654	2,400	2,542	2,746	3,428	2,719
Inbound								
Liner Carriage	1,677	1,770	2,260	2,222	2,155	2,461	2,527	1,821
MSC Carriage	22	67	44	33	37	17	30	22
Total	1,699	1,837	2,304	2,255	2,192	2,478	2,557	1,843
Total								
Liner Carriage	3,782	4,049	4,851	4,567	4,645	5,174	5,807	4,486
MSC Carriage	226	239	108	88	99	50	78	76
Total	4,008	4,288	4,959	4,655	4,744	5,224	5,885	4,562
U.S. North Atlantic-Mediterranean (Trade Route 10)								
Outbound								
Liner Carriage	1,063	1,045	1,030	945	926	1,440	1,792	1,833
MSC Carriage	30	34	21	37	24	22	26	18
Total	1,099	1,079	1,051	982	950	1,660	1,818	1,851
Inbound								
Liner Carriage	872	641	756	701	740	883	1,244	1,183
MSC Carriage	22	26	21	28	14	21	16	22
Total	894	667	777	729	754	904	1,260	1,205
Total								
Liner Carriage	1,935	1,686	1,786	1,646	1,666	2,323	3,036	3,016
MSC Carriage	52	60	42	65	38	43	42	40
Total	1,987	1,746	1,828	1,711	1,704	2,366	3,078	3,056

	1968	1969	1970	1971	1972	1973	1974	1975
U.S. Pacific-Far East (Trade Route 29)								
Outbound								
Liner Carriage	7,470	4,079	6,590	4,677	4,391	4,691	4,653	3,159
MSC Carriage	2,714	1,342	218	131	160	123	72	38
Total	10,184	5,421	6,808	4,808	4,551	4,814	4,725	3,197
Inbound								
Liner Carriage	1,424	2,000	2,523	2,216	2,459	2,105	2,462	2,118
MSC Carriage	407	250	67	54	99	53	14	19
Total	1,831	2,250	2,580	2,270	2,558	2,158	2,476	2,137
Total								
Liner Carriage	8,894	6,079	9,113	6,893	6,850	6,796	7,115	5,277
MSC Carriage	3,121	1,592	285	185	259	176	86	57
Total	12,015	7,671	9,398	7,078	7,109	6,972	7,201	5,334
All Other Trade Routes								
Outbound								
Liner Carriage	10,851	11,852	11,406	8,824	8,538	11,026	13,892	11,207
MSC Carriage	1,656	1,107	275	313	308	151	167	91
Total	12,507	12,959	11,681	9,137	8,846	11,177	14,059	11,298
Inbound								
Liner Carriage	9,254	5,202	5,342	7,402	4,450	5,530	7,160	6,891
MSC Carriage	224	229	76	120	65	54	69	61
Total	9,478	5,431	5,418	7,522	4,515	5,584	7,229	6,952
Total								
Liner Carriage	20,105	17,054	16,748	16,226	12,988	16,556	21,052	18,098
MSC Carriage	1,880	1,336	351	433	373	205	236	152
Total	21,985	18,390	17,099	16,659	13,361	16,761	21,288	18,250

Source and notes: Liner carriage from Tables B-1. MSC non-bulk carriage derived from Military Sealift Command, Financial and Statistical Report, MSC Report 7700-2, Part 2, Fiscal Years 1968-1976.

Table B-3(A)

U.S.-FLAG COMMERCIAL LINER CARRIAGE, U.S. NORTH ATLANTIC-WESTERN EUROPE (TRADE ROUTES 5-7-8-9), 1968-1975:
MILITARY CARGO PERCENTAGE OF U.S.-FLAG LINER CARRIAGE AND
U.S.-FLAG PERCENTAGES OF COMMERCIAL AND TOTAL LINER CARRIAGE

	1968	1969	1970	1971	1972	1973	1974	1975
Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage								
Outbound Cargo	53.3	55.2	46.1	49.6	55.0	43.8	45.4	52.7
Inbound Cargo	6.9	8.1	7.6	10.5	16.3	6.2	6.6	7.7
Total Cargo	32.7	34.6	28.2	30.6	37.0	25.9	29.3	34.4
U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo								
Outbound Cargo	26.6	28.9	29.6	31.0	29.0	31.0	31.0	29.0
Inbound Cargo	25.6	33.1	35.4	32.0	30.0	33.0	34.0	32.0
Total Cargo	25.9	31.3	32.8	31.6	29.6	32.2	32.7	30.6
U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)								
Outbound Cargo	43.7	47.5	43.9	47.1	47.3	44.4	47.2	46.3
Inbound Cargo	26.9	35.0	37.2	34.4	33.9	34.4	35.6	33.8
Total Cargo	34.2	41.1	40.5	40.0	40.0	39.1	40.7	40.2

Source: Derived from Table B-1(A).

Table B-3(B)

U.S.-FLAG COMMERCIAL LINER CARRIAGE, U.S. NORTH ATLANTIC-MEDITERRANEAN (TRADE ROUTE 10), 1968-1975:
MILITARY CARGO PERCENTAGE OF U.S.-FLAG LINER CARRIAGE AND
U.S.-FLAG PERCENTAGES OF COMMERCIAL AND TOTAL LINER CARRIAGE

	1968	1969	1970	1971	1972	1973	1974	1975
Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage								
Outbound Cargo	47.8	47.8	36.8	45.5	50.8	29.8	24.6	17.7
Inbound Cargo	10.8	14.8	12.3	10.6	15.5	9.6	7.2	7.5
Total Cargo	31.1	35.3	26.4	30.6	35.1	22.1	17.5	13.7
U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo								
Outbound Cargo	30.8	29.4	31.6	31.0	25.1	42.0	48.0	55.1
Inbound Cargo	37.0	29.3	33.7	35.0	30.0	36.0	49.0	49.5
Total Cargo	34.2	29.3	32.7	33.1	27.7	39.1	48.5	52.8
U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)								
Outbound Cargo	44.3	44.4	42.3	45.2	40.4	50.8	55.1	59.8
Inbound Cargo	39.7	32.7	36.7	37.5	33.6	38.4	50.8	51.5
Total Cargo	43.0	39.1	39.7	41.6	37.1	45.2	53.3	56.4

Source: Derived from Table B-1(B).

Table B-3(C)

U.S.-FLAG COMMERCIAL LINER CARRIAGE, U.S. PACIFIC-FAR EAST (TRADE ROUTE 29), 1968-1975:
MILITARY CARGO PERCENTAGE OF U.S.-FLAG LINER CARRIAGE AND
U.S.-FLAG PERCENTAGES OF COMMERCIAL AND TOTAL LINER CARRIAGE

	1968	1969	1970	1971	1972	1973	1974	1975
Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage								
Outbound Cargo	77.7	55.7	65.2	63.6	49.1	31.5	30.4	31.4
Inbound Cargo	23.0	26.0	20.3	21.6	17.0	6.7	5.9	7.6
Total Cargo	68.9	46.0	52.8	50.1	38.0	23.8	22.0	21.8
U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo								
Outbound Cargo	38.4	34.8	58.8	40.0	42.0	40.0	41.0	31.0
Inbound Cargo	29.8	38.3	43.7	35.0	40.0	38.0	41.0	40.0
Total Cargo	34.5	36.3	50.6	37.3	41.0	39.2	41.0	34.7
U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)								
Outbound Cargo	79.7	54.7	80.4	64.7	59.0	49.3	50.0	39.5
Inbound Cargo	35.5	45.6	49.3	40.7	44.5	39.6	42.5	41.9
Total Cargo	62.9	51.3	68.4	54.4	52.8	45.8	47.1	40.5

Source: Derived from Table B-1(C).

Table B-3(D)
U.S.-FLAG COMMERCIAL LINER CARRIAGE, ALL OTHER TRADE ROUTES, 1968-1975:
MILITARY CARGO PERCENTAGE OF U.S.-FLAG LINER CARRIAGE AND
U.S.-FLAG PERCENTAGES OF COMMERCIAL AND TOTAL LINER CARRIAGE

	1968	1969	1970	1971	1972	1973	1974	1975
Military Cargo Percentage of U.S.-Flag Liner Vessel Carriage								
Outbound Cargo	21.1	40.6	23.0	24.1	25.4	16.9	26.2	13.5
Inbound Cargo	3.0	8.4	7.0	35.5	10.7	6.0	5.2	5.2
Total Cargo	12.4	30.8	17.9	29.3	20.3	13.3	19.1	10.3
U.S.-Flag Percentage of Liner Vessel Carriage of Commercial Cargo								
Outbound Cargo	23.2	21.7	20.6	20.0	19.6	23.8	27.0	28.8
Inbound Cargo	31.4	18.4	16.3	17.2	14.1	17.7	23.9	27.1
Total Cargo	26.8	20.2	18.8	18.7	17.1	21.2	25.7	28.1
U.S.-Flag Percentage of Total Liner Vessel Carriage (Commercial and Military Cargo)								
Outbound Cargo	27.5	31.8	25.2	24.8	24.7	27.4	33.4	31.8
Inbound Cargo	32.0	19.7	17.3	24.3	15.5	18.7	24.8	28.1
Total Cargo	29.4	26.7	22.0	24.6	20.5	23.7	29.9	30.3

Source: Derived from Table B-1(D).

Table B-4(A)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 10-PERCENT MILITARY CARGO REDUCTION:
U.S. NORTH ATLANTIC-WESTERN EUROPE (TRADE ROUTES 5-7-8-9)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
	U.S.-Flag Liner and MSC Non-Bulk Carriage						
	Outbound						
1)	Commercial Cargo	1,182	1,182	1,125	1,524	1,746	1,260
	Military Cargo on:						
2)	Liners	1,163	1,041	1,034	1,063	1,048	1,042
3)	MSC Ships	55	55	62	33	48	54
4)	Total Military Cargo	1,218	1,096	1,096	1,096	1,096	1,096
	Inbound						
5)	Commercial Cargo	1,989	1,989	1,803	2,309	2,360	1,682
	Military Cargo on:						
6)	Liners	233	206	202	222	209	217
7)	MSC Ships	33	33	37	17	30	22
8)	Total Military Cargo	266	239	239	239	239	239
	Change in Liner Carriage from Base Year						
	Outbound						
9)	Commercial Cargo		0	-57	342	564	78
10)	Military Cargo		-122	-129	-100	-115	-121
11)	Total		-122	-186	242	449	-43
	Inbound						
12)	Commercial Cargo		0	-186	320	371	-307
13)	Military Cargo		-27	-31	-11	-24	-16
14)	Total		-27	-217	309	347	-323
	Cargo Imbalances (Outbound-Inbound)						
15)	Commercial Cargo		-807	-678	-785	-614	-422
16)	Military Cargo on Liners		835	832	841	839	825
17)	Total Liner Carriage		28	154	56	225	403
18)	Military Cargo on MSC Ships		22	25	16	18	32
19)	Total Liner and MSC Carriage		50	179	72	243	435

Data sources and computation method:

Lines 1 and 5 -- from Table B-1(A).
Lines 3 and 7 -- from Table B-2.
Lines 4 and 8 -- "Actual 1971" tonnage, outbound or inbound, is the sum of Line 3 or Line 7 and the corresponding tonnage of military cargo carried by U.S. - flag liners (from Table B-1(A)). "Projected" tonnage equals 90% of "actual 1971" tonnage.
Lines 2 and 6 -- equal, respectively, Line 4 minus Line 3, and Line 8 minus Line 7.
Lines 9, 10, 12, and 13 -- derived from Lines 1, 2, 5, and 6, respectively.
Lines 15, 16, and 18 -- equal, respectively, Line 1 minus Line 5, Line 2 minus Line 6, and Line 3 minus Line 7.
Lines 11, 14, 17, and 19 -- derived by addition.

Table B-4(B)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 10-PERCENT MILITARY CARGO REDUCTION:
U.S. NORTH ATLANTIC-MEDITERRANEAN (TRADE ROUTE 10)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	515	515	456	1,011	1,351	1,509
	Military Cargo on:						
2)	Liners	430	383	396	398	394	402
3)	MSC Ships	37	37	24	22	26	18
4)	Total Military Cargo	467	420	420	420	420	420
	Inbound						
5)	Commercial Cargo	627	627	625	798	1,155	1,094
	Military Cargo on:						
6)	Liners	74	64	78	71	76	70
7)	MSC Ships	28	28	14	21	16	22
8)	Total Military Cargo	102	92	92	92	92	92
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	-59	496	836	994
10)	Military Cargo		-47	-34	-32	-36	-28
11)	Total		-47	-93	464	800	966
	Inbound						
12)	Commercial Cargo		0	-2	171	528	467
13)	Military Cargo		-10	4	-3	2	-4
14)	Total		-10	2	168	530	463
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		-112	-169	213	196	415
16)	Military Cargo on Liners		319	318	327	318	332
17)	Total Liner Carriage		207	149	540	514	747
18)	Military Cargo on MSC Ships		9	10	1	10	-4
19)	Total Liner and MSC Carriage		216	159	541	524	743

Data sources and computation method: Same as Table B-4(A), except that data source for Lines 1, 5, 4, and 8 is Table B-1(B), rather than B-1(A).

Table B-4(C)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 10-PERCENT MILITARY CARGO REDUCTION:
U.S. PACIFIC-FAR EAST (TRADE ROUTE 29)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	1,702	1,702	2,206	3,213	3,237	2,168
	Military Cargo on:						
2)	Liners	2,975	2,664	2,635	2,672	2,723	2,757
3)	MSC Ships	131	131	160	123	72	38
4)	Total Military Cargo	3,106	2,795	2,795	2,795	2,795	2,795
	Inbound						
5)	Commercial Cargo	1,737	1,737	2,042	1,965	2,316	1,959
	Military Cargo on:						
6)	Liners	479	426	381	427	466	461
7)	MSC Ships	54	54	99	53	14	19
8)	Total Military Cargo	533	480	480	480	480	480
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	504	1,511	1,535	466
10)	Military Cargo		-311	-340	-303	-252	-218
11)	Total		-311	164	1,208	1,283	248
	Inbound						
12)	Commercial Cargo		0	305	228	579	222
13)	Military Cargo		-53	-98	-52	-13	-18
14)	Total		-53	207	176	566	204
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		-35	164	1,248	921	209
16)	Military Cargo on Liners		2,238	2,254	2,245	2,257	2,296
17)	Total Liner Carriage		2,203	2,418	3,493	3,178	2,505
18)	Military Cargo on MSC Ships		77	61	70	58	19
19)	Total Liner and MSC Carriage		2,280	2,479	3,563	3,236	2,524

Data sources and computation method: Same as Table B-4(A), except that data source for Lines 1, 5, 4, and 8 is Table B-1(C), rather than B-1(A).

Table B-5(A)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 50-PERCENT MILITARY CARGO REDUCTION:
U.S. NORTH ATLANTIC-WESTERN EUROPE (TRADE ROUTES 5-7-8-9)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	1,182	1,182	1,125	1,524	1,746	1,260
	Military Cargo on:						
2)	Liners	1,163	554	547	576	561	555
3)	MSC Ships	55	55	62	33	48	54
4)	Total Military Cargo	1,218	609	609	609	609	609
	Inbound						
5)	Commercial Cargo	1,989	1,989	1,803	2,309	2,360	1,682
	Military Cargo on:						
6)	Liners	233	100	96	116	103	111
7)	MSC Ships	33	33	37	17	30	22
8)	Total Military Cargo	266	133	133	133	133	133
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	-57	342	564	78
10)	Military Cargo		-609	-616	-587	-602	-608
11)	Total		-609	-673	-245	-38	-530
	Inbound						
12)	Commercial Cargo		0	-186	320	371	-307
13)	Military Cargo		-133	-137	-117	-130	-122
14)	Total		-133	-323	203	241	-429
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		-807	-678	-785	-614	-422
16)	Military Cargo on Liners		454	451	460	458	444
17)	Total Liner Carriage		-353	-227	-325	-156	22
18)	Military Cargo on MSC Ships		22	25	16	18	32
19)	Total Liner and MSC Carriage		-331	-202	-309	-138	54

Data sources and computation method: same as Table B-4(A), except that, on Lines 4 and 8, the "projected" tonnage equals 50% of the "actual 1971" tonnage.

Table B-5(B)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 50-PERCENT MILITARY CARGO REDUCTION:
U.S. NORTH ATLANTIC-MEDITERRANEAN (TRADE ROUTE 10)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
U.S.-Flag Liner and MSC Non-Bulk Carriage							
	Outbound						
1)	Commercial Cargo	515	515	456	1,011	1,351	1,509
	Military Cargo on:						
2)	Liners	430	197	210	212	208	216
3)	MSC Ships	37	37	24	22	26	18
4)	Total Military Cargo	467	234	234	234	234	234
	Inbound						
5)	Commercial Cargo	627	627	625	798	1,155	1,094
	Military Cargo on;						
6)	Liners	74	23	37	30	35	29
7)	MSC Ships	28	28	14	21	16	22
8)	Total Military Cargo	102	51	51	51	51	51
Change in Liner Carriage from Base Year							
	Outbound						
9)	Commercial Cargo		0	-59	496	836	994
10)	Military Cargo		-233	-220	-218	-222	-214
11)	Total		-233	-279	278	614	780
	Inbound						
12)	Commercial Cargo		0	-2	171	528	467
13)	Military Cargo		-51	-37	-44	-39	-45
14)	Total		-51	-39	127	489	422
Cargo Imbalances (Outbound-Inbound)							
15)	Commercial Cargo		-112	-169	213	196	415
16)	Military Cargo on Liners		174	173	182	173	187
17)	Total Liner Carriage		62	4	395	369	602
18)	Military Cargo on MSC Ships		9	10	1	10	-4
19)	Total Liner and MSC Carriage		71	14	396	379	598

Data sources and computation method: same as Table B-4(B), except that, on Lines 4 and 8, the "projected" tonnage equals 50% of the "actual 1971" tonnage.

Table B-5(C)

U.S.-FLAG LINER VESSEL CARRIAGE, 1971-1975,
UNDER POSTULATED 1971 50-PERCENT MILITARY CARGO REDUCTION:
U.S. PACIFIC-FAR EAST (TRADE ROUTE 29)
(Thousands of Measurement Tons)

		Actual	Projected				
		1971	1971	1972	1973	1974	1975
	U.S.-Flag Liner and MSC Non-Bulk Carriage						
	Outbound						
1)	Commercial Cargo	1,702	1,702	2,206	3,213	3,237	2,168
	Military Cargo on:						
2)	Liners	2,975	1,422	1,393	1,430	1,481	1,515
3)	MSC Ships	131	131	160	123	72	38
4)	Total Military Cargo	3,106	1,553	1,553	1,553	1,553	1,553
	Inbound						
5)	Commercial Cargo	1,737	1,737	2,042	1,965	2,316	1,959
	Military Cargo on:						
6)	Liners	479	212	167	213	252	247
7)	MSC Ships	54	54	99	53	14	19
8)	Total Military Cargo	533	266	266	266	266	266
	Change in Liner Carriage from Base Year						
	Outbound						
9)	Commercial Cargo		0	504	1,511	1,535	466
10)	Military Cargo		-1,553	-1,582	-1,545	-1,494	-1,460
11)	Total		-1,553	-1,078	-34	41	-994
	Inbound						
12)	Commercial Cargo		0	305	228	579	222
13)	Military Cargo		-267	-312	-266	-227	-232
14)	Total		-267	-7	-38	352	-10
	Cargo Imbalances (Outbound-Inbound)						
15)	Commercial Cargo		-35	164	1,248	921	209
16)	Military Cargo on Liners		1,210	1,226	1,217	1,229	1,268
17)	Total Liner Carriage		1,175	1,390	2,465	2,150	1,477
18)	Military Cargo on MSC Ships		77	61	70	58	19
19)	Total Liner and MSC Carriage		1,252	1,451	2,535	2,208	1,496

Data sources and computation method: same as Table B-4(C), except that, on Lines 4 and 8, the "projected" tonnage equals 50% of the "actual 1971" tonnage.

Table B-6

CARGO IMBALANCES IN LINER VESSEL CARRIAGE, BY TRADE ROUTE, 1968-1975:
TOTAL AND U.S.-FLAG, COMMERCIAL AND MILITARY CARGOES
(Net Outbound Imbalance, Thousands of Measurement Tons)

	1968	1969	1970	1971	1972	1973	1974	1975
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)								
All Flags								
Commercial Cargo	-2,414	-1,370	-1,190	-2,406	-2,130	-2,083	-1,307	-910
Military Cargo	1,008	1,113	1,023	903	1,013	1,037	1,367	1,266
Net Imbalance	-1,406	-257	-167	-1,476	-1,117	-1,046	60	356
U.S.-Flag								
Commercial Cargo	-580	-604	-692	-807	-678	-785	-614	-422
Military Cargo	1,008	1,113	1,023	930	1,013	1,037	1,367	1,266
Net Imbalance	428	509	331	123	335	252	753	844
U.S. North Atlantic-Mediterranean (Trade Route 10)								
All Flags								
Commercial Cargo	-297	-9	93	-134	-266	192	455	533
Military Cargo	413	404	286	356	355	344	352	235
Net Imbalance	116	395	379	222	89	536	807	768
U.S.-Flag								
Commercial Cargo	-222	0	-12	-112	-169	213	196	415
Military Cargo	413	404	286	356	355	344	352	235
Net Imbalance	191	404	274	244	186	557	548	650

	1968	1969	1970	1971	1972	1973	1974	1975
U.S. Pacific-Far East (Trade Route 29)								
All Flags								
Commercial Cargo	658	1,322	-712	-707	150	2,861	2,246	2,098
Military Cargo	5,476	1,754	3,789	2,496	1,768	1,338	1,270	830
Net Imbalance	6,134	3,076	3,077	1,789	1,918	4,199	3,516	2,928
U.S.-Flag								
Commercial Cargo	570	325	278	-35	164	1,248	921	211
Military Cargo	5,476	1,754	3,789	2,496	1,768	1,338	1,270	830
Net Imbalance	6,046	2,079	4,067	2,461	1,932	2,586	2,191	1,041
All Other Trade Routes								
All Flags								
Commercial Cargo	8,611	6,558	12,065	5,640	4,279	9,133	9,508	9,578
Military Cargo	1,928	4,375	2,251	-499	1,688	1,527	3,274	1,152
Net Imbalance	10,539	10,933	14,316	5,141	5,967	10,660	12,782	10,730
U.S.-Flag								
Commercial Cargo	-331	2,275	3,813	1,921	2,400	3,969	3,458	3,164
Military Cargo	1,928	4,375	2,251	-499	1,688	1,527	3,274	1,152
Net Imbalance	1,597	6,650	6,064	1,422	4,088	5,496	6,732	4,316

Note: Because each imbalance is computed as the outbound tonnage less the inbound tonnage, a minus sign indicates an inbound imbalance.

Source: Derived from Tables B-1.

Table B-7

FLUCTUATIONS IN U.S.-FLAG LINER VESSEL CARRIAGE, BY TRADE ROUTE, 1968-1975:
ANNUAL CHANGES IN COMMERCIAL CARGO ONLY, AND IN THE TOTAL OF COMMERCIAL AND MILITARY CARGOES
(Thousands of Measurement Tons)

	Tonnage Change from Previous Year							Magnitude of 1971 Military Cargo Reduction of:		Magnitude of 1975 Military Cargo Reduction of:	
	1969	1970	1971	1972	1973	1974	1975	10 Percent	50 Percent	10 Percent	50 Percent
U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)											
Outbound											
Commercial Cargo	40	374	-214	-57	399	222	-486				
Total Cargo	174	312	-246	135	233	667	-715	121.8	609.0	140.5	702.5
Inbound											
Commercial Cargo	64	462	-99	-186	506	51	-678				
Total Cargo	93	490	-38	-67	306	66	-706	26.6	133.0	13.9	69.5
U.S. North Atlantic-Mediterranean (Trade Route 10)											
Outbound											
Commercial Cargo	-10	106	-136	-59	555	340	158				
Total Cargo	-18	-15	-85	-19	514	352	41	46.7	233.5	32.4	170.0
Inbound											
Commercial Cargo	-232	118	-36	-2	173	357	-61				
Total Cargo	-231	115	-55	39	143	361	-61	10.2	51.0	8.9	48.5

	1969	1970	1971	1972	1973	1974	1975	10 Percent	50 Percent	10 Percent	50 Percent
U.S. Pacific-Far East (Trade Route 29)											
Outbound											
Commercial Cargo	139	485	-588	504	1,007	24	-1,069				
Total Cargo	-3,391	2,511	-1,913	-286	300	-38	-1,494	310.6	1,553.0	99.1	495.5
Inbound											
Commercial Cargo	384	532	-275	305	-77	351	-357				
Total Cargo	576	523	-307	243	-354	357	-344	53.3	266.5	16.1	80.5
All Other Trade Routes											
Outbound											
Commercial Cargo	-1,607	1,834	-2,178	-321	2,792	1,084	-553				
Total Cargo	1,001	-446	-2,582	-286	2,488	2,866	-2,685	244.3	1,221.5	151.1	775.5
Inbound											
Commercial Cargo	-4,213	206	-196	-800	1,223	1,595	-259				
Total Cargo	-4,052	140	2,060	-2,952	1,080	1,630	-269	274.9	1,374.5	35.9	179.5

Source: Derived from Tables B-1.

Table B-8(A)

IMPACT OF POSTULATED MILITARY CARGO REDUCTIONS FROM 1975 LEVELS,
BY DIRECTION AND TOTAL, U.S. NORTH ATLANTIC-WESTERN EUROPE (TRADE ROUTES 5-7-8-9)

(Thousands of Measurement tons)

Direction	U.S. Shipping Sector	1975 Military Tonnage	Reduction in Military Traffic: 10 Percent — New Traffic Level	10 Percent — Reduction	50 Percent — New Traffic Level	50 Percent — Reduction
Outbound	Commercial:					
	Liner	1,405	1,264.5	140.5	702.5	702.5
	Non-Liner	1,013	906.3	106.7	479.5	533.5
	MSC	54	54.0	0.0	54.0	0.0
	Total	2,472	2,224.8	247.2	1,236.0	1,236.0
Inbound	Commercial:					
	Liner	139	125.1	13.9	69.5	69.5
	Non-Liner	132	116.6	15.4	55.0	77.0
	MSC	22	22.0	0.0	22.0	0.0
	Total	293	263.7	29.3	146.5	146.5
Total	Commercial:					
	Liner	1,544	1,389.6	154.4	772.0	772.0
	Non-Liner	1,145	1,022.9	122.1	534.5	610.5
	MSC	76	76.0	0.0	76.0	0.0
	Total	2,765	2,488.5	276.5	1,382.5	1,382.5

Data sources and computation method:

(1) Sources of data on 1975 tonnages of non-bulk military cargo:
    (a) Commercial liner carriage -- from Table B-1(A).
    (b) Commercial non-liner carriage -- from Maritime Administration sources (see Table 4-1, notes 1 and 2).
    (c) MSC Nucleus Fleet carriage -- from Table B-2.

(2) The 10-percent and 50-percent military cargo reductions were calculated in the following sequence:
    (a) Total reduction -- 10 percent or 50 percent of the 1975 total tonnage.
    (b) Reduction in MSC Nucleus Fleet carriage -- assumed to equal zero.
    (c) Reduction in commercial liner carriage -- 10 percent or 50 percent of the 1975 liner tonnage.
    (d) Reduction in commercial non-liner carriage -- total reduction minus reduction in commercial liner carriage.

(3) The new traffic levels following the 10-percent and 50-percent reductions were computed by subtracting the respective reductions from the 1975 tonnages.

Table B-8(B)

IMPACT OF POSTULATED MILITARY CARGO REDUCTIONS FROM 1975 LEVELS, BY DIRECTION AND TOTAL, U.S. NORTH ATLANTIC-MEDITERRANEAN (TRADE ROUTE 10)

(Thousands of Measurement Tons)

Direction	U.S. Shipping Sector	1975 Military Tonnage	Reduction in Military Traffic: 10 Percent — New Traffic Level	10 Percent — Reduction	50 Percent — New Traffic Level	50 Percent — Reduction
Outbound	Commercial:					
	Liner	324	291.6	32.4	154.0	170.0
	Non-Liner	2	0.0	2.0	0.0	2.0
	MSC	18	18.0	0.0	18.0	0.0
	Total	344	309.6	34.4	172.0	172.0
Inbound	Commercial:					
	Liner	89	80.1	8.9	40.5	48.5
	Non-Liner	14	10.4	3.6	0.0	14.0
	MSC	22	22.0	0.0	22.0	0.0
	Total	125	112.5	12.5	62.5	62.5
Total	Commercial:					
	Liner	413	371.7	41.3	195.0	218.0
	Non-Liner	17	11.3	5.7	0.0	17.0
	MSC	40	40.0	0.0	40.0	0.0
	Total	470	423.0	47.0	235.0	235.0

Data sources and computation method: same as Table B-8(A), except that the data on 1975 tonnage of commercial liner carriage is from Table B-1(B).

Table B-8(C)

IMPACT OF POSTULATED MILITARY CARGO REDUCTIONS FROM 1975 LEVELS, BY DIRECTION AND TOTAL, U.S. PACIFIC-FAR EAST (TRADE ROUTE 29)

(Thousands of Measurement Tons)

Direction	U.S. Shipping Sector	1975 Military Tonnage	Reduction in Military Traffic: 10 Percent — New Traffic Level	10 Percent — Reduction	50 Percent — New Traffic Level	50 Percent — Reduction
Outbound	Commercial:					
	Liner	991	891.9	99.1	495.5	495.5
	Non-Liner	125	108.7	16.3	43.5	81.5
	MSC	38	38.0	0.0	38.0	0.0
	Total	1,154	1,038.6	115.4	577.0	577.0
Inbound	Commercial:					
	Liner	161	144.9	16.1	80.5	80.5
	Non-Liner	103	90.8	12.2	42.0	61.0
	MSC	19	19.0	0.0	19.0	0.0
	Total	283	254.7	28.3	141.5	141.5
Total	Commercial:					
	Liner	1,152	1,036.8	115.2	576.0	576.0
	Non-Liner	229	200.4	28.6	86.0	143.0
	MSC	57	57.0	0.0	57.0	0.0
	Total	1,438	1,294.2	143.8	719.0	719.0

Data sources and computation method: same as Table B-8(A), except that the data on 1975 tonnage of commercial liner carriage is from Table B-1(C).

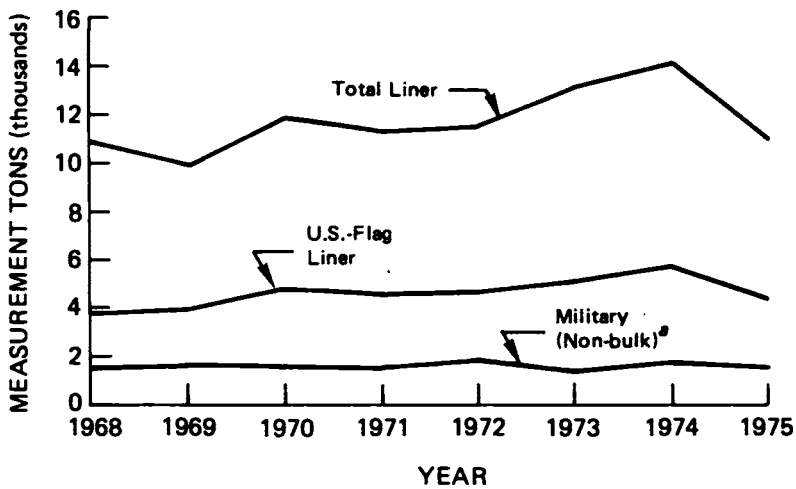
Table B-8(D)

IMPACT OF POSTULATED MILITARY CARGO REDUCTIONS FROM 1975 LEVELS, BY DIRECTION AND TOTAL, ALL OTHER TRADE ROUTES

(Thousands of Measurement Tons)

Direction	U.S. Shipping Sector	1975 Military Tonnage	Reduction in Military Traffic: 10 Percent — New Traffic Level	10 Percent — Reduction	50 Percent — New Traffic Level	50 Percent — Reduction
Outbound	Commercial:					
	Liner	1,511	1,359.9	151.1	775.5	775.5
	Non-Liner	321	279.8	41.2	115.0	206.0
	MSC	91	91.0	0.0	91.0	0.0
	Total	1,923	1,730.7	192.3	961.5	961.5
Inbound	Commercial:					
	Liner	359	322.2	35.9	179.5	179.5
	Non-Liner	184	159.5	24.5	61.5	122.5
	MSC	61	61.0	0.0	61.0	0.0
	Total	604	543.6	60.4	302.0	302.0
Total	Commercial					
	Liner	1,870	1,683.0	187.0	935.0	935.0
	Non-Liner	505	439.3	65.7	176.5	328.5
	MSC	152	152.0	0.0	152.0	0.0
	Total	2,527	2,274.3	252.7	1.263.5	1,263.5

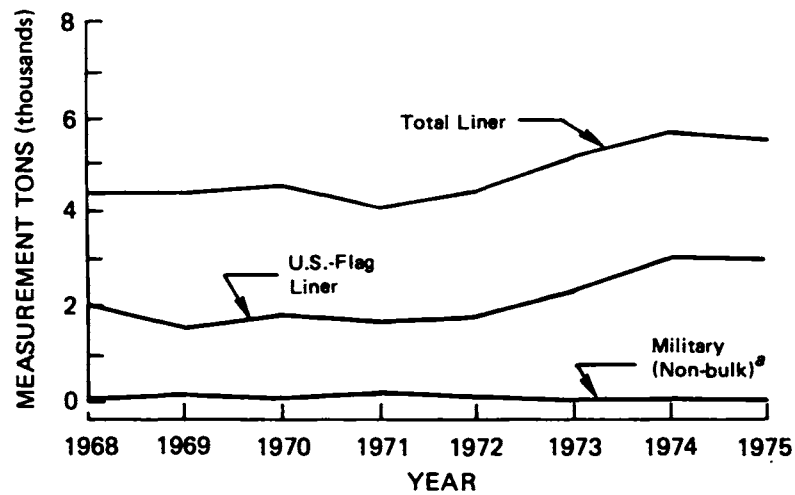
Data sources and computation method: same as Table B-8(A), except that the data on 1975 tonnage of commercial liner carriage is from Table B-1(D).



SOURCES: Tables B-1(A) and B-2.

FIGURE B-1(A) Total Liner Carriage, U.S.-Flag Liner Carriage, and Total Non-Bulk Military Cargo in U.S. Oceanborne Foreign Trade, 1968-1975: U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)

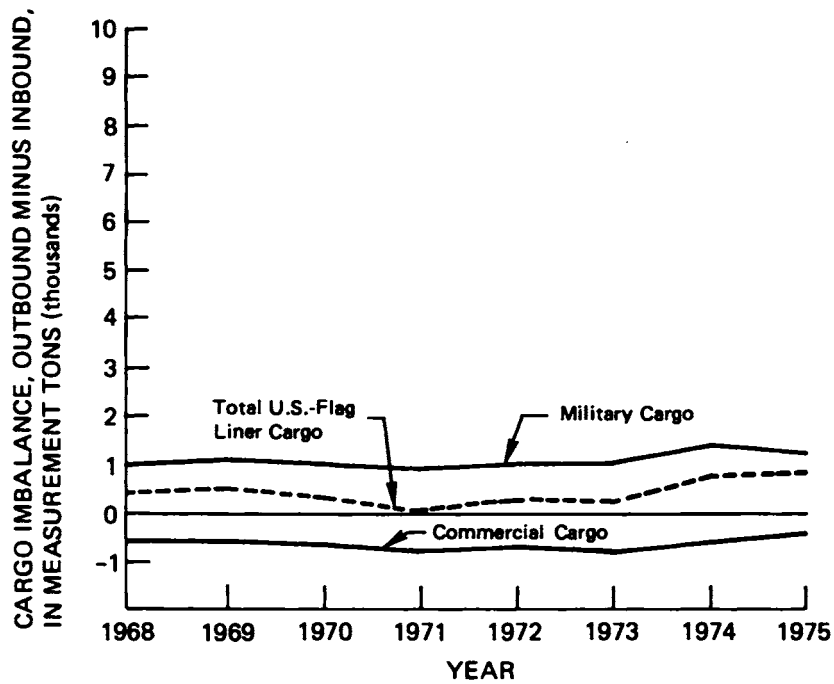
[a] Includes carriage by MSC Nucleus Fleet as well as by U.S.-flag liners.



SOURCES: Tables B-1(B) and B-2.

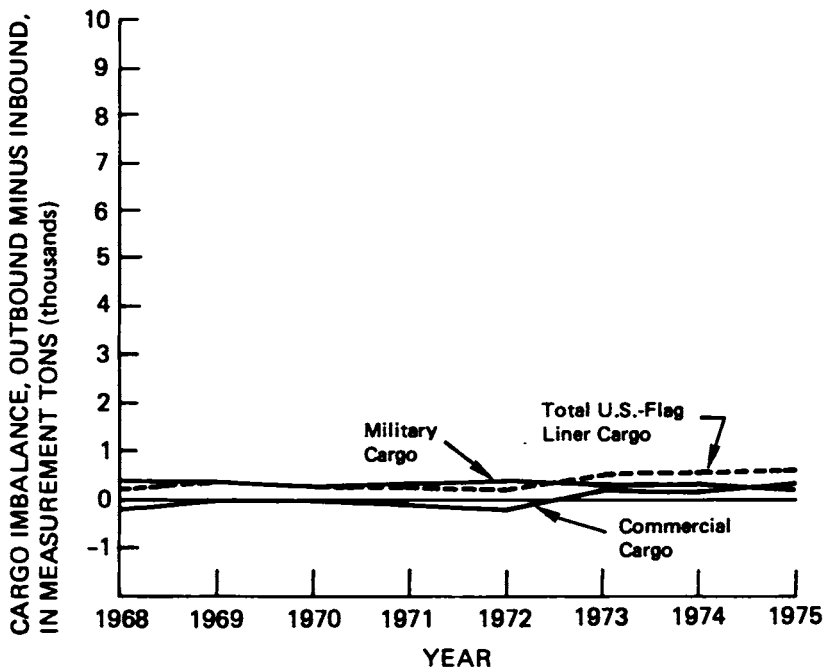
FIGURE B-1(B) Total Liner Carriage, U.S.-Flag Liner Carriage, and Total Non-Bulk Military Cargo in U.S. Oceanborne Foreign Trade, 1968-1975: U.S. North Atlantic-Mediterranean (Trade Route 10)

[a]Includes carriage by MSC Nucleus Fleet as well as by U.S.-flag liners.



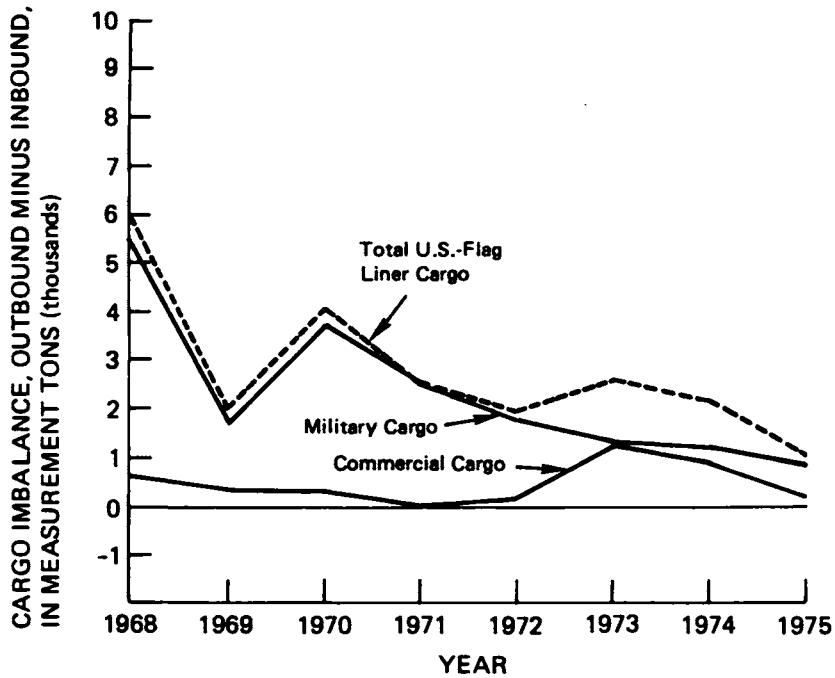
SOURCE: Table B-5.

FIGURE B-2(A) Outbound-Inbound Imbalances in U.S.-Flag Liner Carriage of Commercial and Military Cargoes, 1968-1975: U.S. North Atlantic-Western Europe (Trade Routes 5-7-8-9)



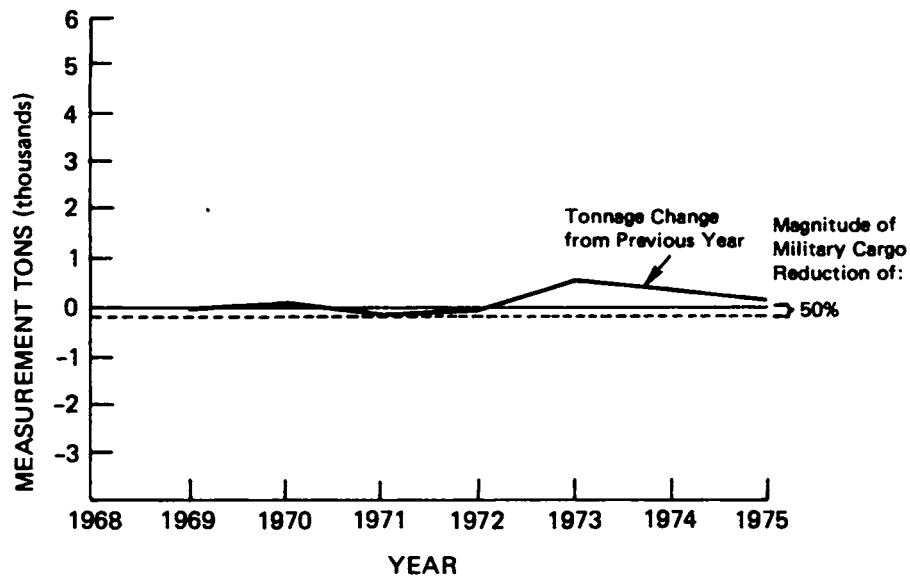
SOURCE: Table B-5.

FIGURE B-2(B) Outbound-Inbound Imbalances in U.S.-Flag Liner Carriage of Commercial and Military Cargoes, 1968-1975: U.S. North Atlantic-Mediterranean (Trade Route 10)



SOURCE: Table B-5.

FIGURE B-2(C) Outbound-Inbound Imbalances in U.S.-Flag Liner Carriage of Commercial and Military Cargoes, 1968-1975: U.S. Pacific-Far East (Trade Route 29)



SOURCE: Table B-4.

FIGURE B-3(B) Comparison of Year-to-Year Fluctuations in Outbound U.S.-Flag Liner Carriage of Commercial Cargo, 1968-1975, with Magnitudes of Postulated Reductions in Outbound Military Cargo Tonnages from 1975 Levels: U.S. North Atlantic-Mediterranean (Trade Route 10)

Appendix C

GLOSSARY

Cargo Types

In applying the definitions that follow, it should be noted that cargo category depends more on shipment size and choice of handling method than on the nature of the commodity. E.g., sugar may be transported in bags as break-bulk cargo (handled individually), palletized, or containerized; in bulk containers fitted with special liners; or as bulk in shipload lots.

Bulk cargo--cargo loaded and carried without wrappers or containers, and accepted and delivered by weight or measure (versus mark or count; see General cargo).

General cargo--cargo loaded and carried in wrappers or containers, and accepted and delivered by mark or count.

Break-Bulk cargo--general cargo that is handled piece by piece (but including, e.g., strapped bundles of lumber).

Reefer cargo--includes freeze, chill, and other cargoes that require controlled temperature and humidity. May be handled in reefer containers or (either as break-bulk or palletized) in special reefer compartments of general cargo ships or in full reefer ships.

Unitized cargo--general cargo handled in unit loads, of which the most common examples are containers and strapped pallets. (Even where bulk cargo is shipped in containers, the containers themselves are categorized as general cargo.)

Essential Trade Route--a route between ports in a U.S. coastal area or areas and a specific foreign coastal area or areas which has been determined by the Maritime Administration to be essential for the promotion, development, expansion, and maintenance of the foreign commerce of the United States. (For definitions of the

three specific trade routes of major interest in this report, see "Scope," Chapter 1.)

Military Cargo Categories

Military Sealift Command data for the period 1968-1975 distinguish among 10 cargo categories. These are listed below in descending order of total oceanborne military cargo tonnages (MT) in 1975 (see Table 2-9).

(1) General, Less HHG
(2) Special
(3) Privately Owned Vehicles (POV)
(4) Ammo and Hazardous
(5) Bulk
(6) Household Goods (HHG)
(7) Refrigerated (Reefer)
(8) Aircraft
(9) Radioactive Waste
(10) Cargo-Carrying Trailers

However, only 6 categories are listed in the tables of Chapter 3 and Appendix B.

Because the last 3 categories represented very small percentages of total military non-bulk cargo, even during the peak Vietnam Era years (see Table 2-9), they have been subsumed within other categories. The insignificant tonnages of Radioactive Waste (which is predominantly from commercial operations but is carried mainly on MSC-operated ships) are included in the "Ammunition and Hazardous" category. Cargo-Carrying Trailers (which move in very small volumes--and almost totally in Intra-Area movements, versus movements to or from the Continental United States) and Aircraft are included in the "Special" cargo category.

Bulk cargoes, which are outside the scope of this report, are included only in cargo summary Tables 2-10 and 2-11.

Of the 10 categories, formal definition seems required only for Special cargoes. This category includes wheeled and tracked vehicles, heavy lift cargoes (over 10,000 lb), and oversized cargoes (exceeding 35 ft in length).

Shipping Service

Liner Service--common-carrier service provided on a definite, advertised schedule over a specific route. Also known as berth or berthline service.

Non-Liner Service--service provided on an unscheduled basis, as cargo offers, generally for the movement of shipload lots or substantial portions thereof. Also known as irregular or tramp service.

Ship Types

Bulk Carriers--vessels designed to carry dry bulk cargo. Include combination ore-bulk-oil carriers (OBO's), bulk-oil carriers, and ore-oil carriers.

Combination Passenger-Cargo Ships (Combo's)--ships with capacity for 13 or more passengers, in addition to cargo.

Freighters--general cargo ships (versus bulk carriers and tankers, q.v.). Include break-bulk vessels (with or without refrigerated space), containerships, barge carriers, and roll-on, roll-off (RORO) vessels, and combinations of these types.

Tankers--ships designed to carry liquid bulk. Cargoes include crude oil, petroleum products, liquefied natural gas (LNG), liquefied petroleum gas (LPG), chemicals, wine, and molasses.

Tonnages, Stowage Factors, and TEU's

Bale Cubic--the maximum ship space available for general (i.e., "package" or non-bulk) cargo , in cu ft. The measurements are taken to the cargo battens (mounted on the insides of the frames) and to the underside of the beams.

Cargo Stowage Factor (S.F.)--the figure that expresses the number of cubic feet occupied by one long ton of cargo (cu ft per LT). It is computed by dividing 2,240 (lb per LT) by the cargo density (lb per cu ft).

Deadweight (dwt)--the ship's total lifting capacity (in LT), when loaded in salt water to her summer freeboard marks. It should be noted, however, that the deadweight reported in shipbuilding statistics represents the sum of cargo deadweight (the weight of cargo, in LT, that the ship can carry when loaded in salt water to her summer freeboard marks) and light displacement (the weight of the ship, in LT, when unloaded).

Gross Tonnage or Gross Register Tonnage (g.r.t.)--a crude measure of ship size, representing the ship's enclosed cubic capacity, expressed in units of 100 cu ft. It is computed according to methods and formulas

incorporated in the measurement rules of the leading maritime nations. These rules differ considerably, not only in the methods of measurement used but also in the definitions of "exempted spaces" (e.g., peak and other water ballast tanks; spaces above the uppermost continuous deck) that are excluded from measurement. Gross tonnage is used in computing canal tolls, port charges, classification and survey fees, and drydocking charges; determines the applicability of rules of regulatory bodies (which often exempt vessels below a certain gross tonnage); and, under the international Brussels Convention, determines maximum liability in marine casualty claims (which is specified in dollars per g.r.t).

Measurement Ton (MT)--a volumetric unit of 40 cu ft (1.133 cu m), used in ocean cargo measurement.

Long Ton (LT)--a weight unit of 2,240 lb (1,016 kg or 1.016 metric tons). (One metric ton equals 1,000 kg or 2204.6 lb.)

Twenty-Foot Equivalent Unit (TEU)--Because container sizes vary, containership capacity is often expressed in terms of TEU's: the number of 20-ft containers (i.e., 20x8x8 ft in nominal external dimensions) whose volume equals the volume of containers actually carried.

Wilson-Weeks Agreement--a 1954 memorandum signed by the Secretary of Defense and Secretary of Commerce, which, inter alia, established priorities for utilization of merchant ships to meet ship requirements of the Department of Defense. (For further detail, see Chapter 1, Note 4.)

Appendix D

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Appendix E

CARGO DATA SOURCES AND LIMITATIONS

As noted in Chapter 1, the Panel obtained most of its data from primary sources: (a) military cargo volumes and related financial data from the Military Sealift Command (MSC); (b) commercial cargo flow data from the Maritime Administration (MarAd); and (c) overseas troop strengths from the Department of Defense (DOD). In addition, a limited amount of financial data (shipping revenues and net profit) was derived from corporate annual reports and, in some cases, from publicly available financial statements filed with the Interstate Commerce Commission (ICC).

The principal sources of MarAd and MSC cargo data are cited in the notes of Table 4-1, and supplementary MarAd sources are listed in the bibliography (Appendix D).

In its cargo data analysis, the Panel encountered four basic problems, each of which is summarized briefly below. (The question of data accuracy was not addressed).

TONNAGE BASIS

The MarAd data are on a weight basis, but the MSC data are on a volumetric basis. This reflects the heavy dependence of MarAd and other agencies upon Bureau of Census data on commercial cargo flows, which include shipment weight but not volume; and the reliance of MSC on shipping documents that reflect rates and charges based on cargo volume.

To derive a common basis for data analysis, the MarAd data in long tons (LT) of 2,240 lb were converted to measurement tons (MT) of 40 cu ft, assuming a cargo stowage factor of 76 cu ft per LT for cargoes carried by liner vessels and 40 cu ft per LT for cargoes carried by tankers and non-liner dry cargo vessels.

TIME BASIS

The MarAd data are compiled on a calendar year (CY) basis. In contrast, the MSC data, while published quarterly, are cumulative by fiscal year (FY). (See Financial and Statistical Report, MSC Report 7700-2, Parts I and II.)

To derive a common basis for analysis, it was necessary to convert the MSC data to a CY basis. This is a straightforward but cumbersome process. For example, to derive MSC cargo data for CY 1975 required that the data for the first half of FY 1975 (July-December 1974) be subtracted from the data for the full FY 1975 (July 1974-June 1975), and that the results then be added to the data for the first half of FY 1976 (July-December 1975).

SERVICE VERSUS COMMODITY BASIS

A more serious problem--from the Panel's viewpoint--stems from the manner in which the MarAd data are aggregated. The data (by trade route; outbound, inbound, and in total) are cumulated by type of service--liner, non-liner, and tanker--without regard to commodity category. Thus, e.g., dry or liquid bulk carried in the holds or tanks of liner vessels is included under "liner;" and bulk grain shipped on tank vessels is included under "tanker." The major problem, however, is that the "non-liner" category includes cargo carried by both dry bulk carriers and non-liner general cargo ships. Separating the two could be accomplished only through line-by-line examination of Bureau of Census data at the 7-digit level of commodity classification--a task well beyond the Panel's resources. For this reason, an analysis of non-liner general cargo, originally planned to closely parallel the analysis of liner carriage, could not be included in this report.

CONTAINERIZED CARGO DATA

Although containerized cargo carriage is treated only briefly in this report, it should be noted that the quality of the available data appears insufficient to support detailed analysis. One problem is that, while data on container movements (generally based on Customs Service data) are reasonably good, data on the cargo carried in the containers are notably deficient. A second problem is that container movement data often fails to distinguish among container sizes, so that it is difficult to reduce the data to the common basis of Twenty-Foot Equivalent Units (TEU).

Appendix F

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Cargo Movement	Foreign Trade Statistics
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Containerization	Trade Routes
Economic Analysis (Trade Forecasts)	Transportation Capacity

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This report assesses the effects of postulated overseas troop reductions on the U.S.-flag merchant marine. It examines the effect that reductions of military general cargo will have on commercial liner vessel carriage on major trade routes with respect to (a) historical fluctuations of traffic and (b) the time required to regain the pre-reduction level of traffic. It also includes a limited treatment of the financial significance of military cargoes to individual liner companies.

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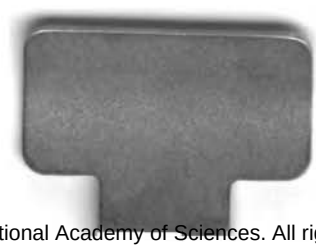

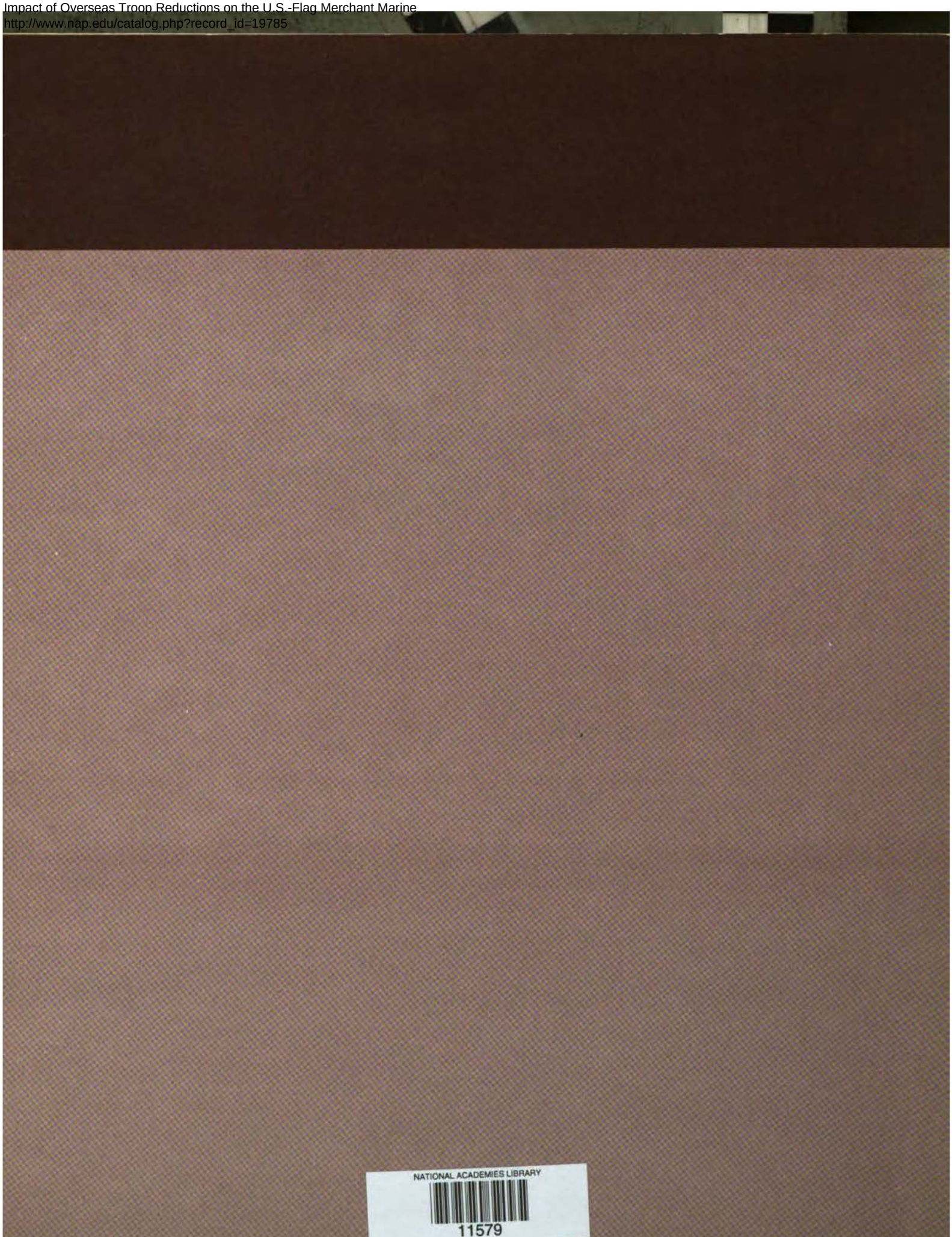

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