THE ECONOMIC IMPACT OF THE MARITIME INDUSTRY ON THE PACIFIC COAST STATES

Final Technical Report

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PREFACE

The purpose of this study is to assess the nature and magnitude of the economic benefits which the maritime industry brings to the Pacific Coast states--California, Oregon, Washington, Alaska, and Hawaii--and to the region's major port areas. Sponsored by the Pacific Merchant Shipping Association (PMSA), the analysis incorporates all segments of the maritime industry, from shipping companies to shipyards and from steamship agents to port authorities. Moreover, the study demonstrates the substantial impact of the maritime industry through its multifaceted economic ties with other industrial and service activities, on the economies of the Pacific Coast region. This study is expected to serve as a basis for future analyses of the maritime industry's economic impact, and its methodology has been designed to facilitate periodic updating.

Temple, Barker & Sloane, Inc. and Recht Hausrath & Associates would like to thank the President of PMSA, Mr. Michael M. Murphy, for his leadership and guidance during the course of the study. We would also like to extend our deepest appreciation to the members of the Steering Committee appointed by PMSA to provide technical oversight and industry input, particularly during the critical survey phase of the study effort. Members of the Steering Committee are as follows:

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PACIFIC MERCHANT SHIPPING ASSOCIATION

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S.- and foreign-flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

CURRENT PMSA MEMBERSHIP

American President Lines, Ltd.
CGM/Incotrans
Crowley Maritime Corporation
Hapag-Lloyd AG
Johnson ScanStar
Kawasaki Kisen Kaisha, Ltd.
Los Angeles Steamship Association
Lykes Bros. Steamship Co., Inc.
Matson Navigation Company
Maersk Line
Neptune Orient Lines, Ltd.
Polynesia Line, Ltd.
Sea-Land Service, Inc.
Showa Line, Ltd.
Star Shipping A/S
United States Lines, Inc.
Yamashita-Shinnihon Line

I. INTRODUCTION

PURPOSE OF THE STUDY

The primary objective of this study is to assess the benefits accruing from a strong maritime industry and its broad impact on the economies of the Pacific Coast states. The analysis traces the economic impact--in terms of revenues, payrolls, and employment--of the maritime industry (U.S. and foreign-flag) upon each of five states and four major port areas, and upon the Pacific Coast region as a whole:

States	Port Areas
California	San Francisco/Oakland Bay Area
Washington	Los Angeles/Long Beach Area
Oregon	Puget Sound Area
Alaska	Portland/Columbia River Area
Hawaii	

SCOPE OF THE STUDY

The types of economic impact which are considered include:

- Direct Impact--This comprises the activities of port traffic-related services (such as cargo handling, bunkering, steamship agencies, warehousing, and inland transportation), and of other maritime industry activities (such as the headquarters of a shipping company, or a shipbuilding yard) which are not directly related to traffic volumes through the port.

- Indirect and Induced Impact--This is composed of successive rounds of economic activity stimulated throughout the rest of the economy by the initial expenditures on maritime industry goods and services. Indirect impact refers to maritime industry purchases from other industries, while induced impact reflects household purchases of consumer goods and services by maritime industry employees.

- Port User Impact--The maritime industry provides benefits to users of maritime services. In the broadest sense, these users are the producers and consumers of goods which are transported via ships and ports. This includes foreign trade, coastwise domestic shipping, and transportation between Alaska, Hawaii, and the continental United States. Port users are thus located throughout the five Pacific Coast states, as well as in the major port areas.

A brief description of each impact category follows.

Direct Impact of the Maritime Industry

The maritime industry is defined as the group of activities directly related to waterborne transportation. This definition extends beyond the immediate providers of marine transportation--such as container shipping companies, tanker departments of oil companies, and steamship agents--to include the related services of tugboat operators, freight forwarders, connecting rail and trucking lines, shipyards, marine insurance and others. The intent is to capture within the maritime industry all activities essential to the transportation of goods in the foreign and domestic trades involving the Pacific Coast states.

For port traffic-related activities, the impact consists of income generated from vessel movements and from cargo expediting, specific to a cargo type and to an individual port. This includes:

1. Vessel Expenditures--tugboat and pilotage service, dockage and lighterage charges, stevedoring and other cargo-handling activities, marine fuel and supplies, and commission and agency fees.

2. Crew Expenditures--spending by crew members while ashore (excludes expenditures related to place of residence or by household).

3. Inland Transportation--rail or truck transportation between the port and the shipper or consignee.

4. Port Services--services such as export packing, crating and warehousing, vehicle handling and services, customs brokers and freight forwarders, marine insurance, international banking, and various professional services.

Other major maritime activities consist of maritime industry activities that are not directly related to traffic levels through a given port. They include:

1. Shipbuilding and ship repair--a key maritime industry generally located in a port area, but whose activity level is only partially linked to the traffic passing through a port. Repairs are not included under traffic-related activities since their volume is not predictable on a cargo tonnage basis.

2. Shipping company headquarters--a shipping company or major marine transportation department (e.g., of an oil company) is treated separately, since its level of employment and activity is not directly tied to the level of traffic in a single port. In order to avoid double-counting, however, expenditures by a shipping company for identifiable port traffic-related activities (included under item A above) must be assigned by cargo type and port area, and subtracted from the company's headquarters activity.[1]

3. Port capital expenditures--includes spending for maritime trade-related equipment, terminals, storage areas, dredging and other new construction or renovation of port facilities.

4. Public maritime activities--includes U.S. Coast Guard bases and offices, U.S. Army Corps of Engineers, and Customs Service activities.

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[1]Shipping company expenditures paid out in foreign ports are excluded from the headquarters activity level. Salaries of U.S. seagoing staff are allocated in accordance with survey findings to the vessels' home port.

This definition of the maritime industry focuses on commercial marine transportation, including ocean and coastwise navigation. It includes military cargoes carried by commercial vessels, but excludes Military Sealift Command vessels. Three major categories of activities related to the commercial maritime industry are excluded: naval and military base activities, commercial fishing, and recreational boating.

Naval shipyard or base activities, while often major employers (e.g., Mare island Naval Shipyard, or the Navy's San Diego base), are not considered in this analysis as they represent defense rather than commercial marine activities. However, support industries (such as shipyards) which serve both commercial and naval clients, are included in the maritime industry.

Commercial fishing, while closely related to the maritime industry, is considered to be a primary activity in its own right, rather than a transportation-oriented function. Certain marine supply services which sell to fishing vessel operators as well as to shipping companies are included in the maritime industry.

Recreational boating activities are considered part of the recreation industry; boatyards and marinas are thus excluded.

Indirect and Induced Impact of the Maritime Industry

The activities of the maritime industry described above induce further economic activities by their purchases of inputs and by the household expenditures made possible because of employment in the maritime industry. These indirect and induced effects are captured by applying multipliers to the direct impacts which quantify the extent of inter-industry purchases and household spending resulting from the initial maritime expenditures. Successive rounds of spending are captured by the multipliers, which are limited, however, by leakages of purchases outside the region of interest. This impact spans a wide range of industries and services, since it includes all the types of inputs used by the maritime industry (indirect impact) and by the households of maritime workers (induced impact).

Port and Shipping Users

The maritime industry creates economic benefits for the businesses that use its facilities and services. Some of these businesses are largely dependent upon convenient access to port and shipping services; these include processors of bulk commodities, such as petroleum, which are typically located within a port area with direct access to the water. Other economic activities which use ports and shipping as a means to access foreign markets or sources of supply for a portion of their output include agricultural, forestry, and manufacturing firms located throughout a state. The maritime industry is thus an important contributor to productive activities located in many areas of the Pacific Coast states.

STUDY APPROACH

The study approach was designed to suit specific requirements identified by the Pacific Merchant Shipping Association. First, the study covers the ten distinct geographical areas mentioned earlier. This implies an approach involving certain simplifications, as direct surveys of all maritime activities in these areas would be prohibitively time-consuming and expensive. It also indicates the usefulness of a consistent technique applied to each area; e.g., input-output multipliers derived from the same source. Second, the approach should be amenable to periodic updating on a straightforward basis. This implies the use of per-ton impact vectors that can be applied to updated cargo movement data as it becomes available. Third, the study encompasses the maritime industry, which is a broader concept than just the port industry, and implies consideration of activities not always included in other studies. Fourth, the study should be able to indicate the differences in impacts associated with different types of cargo and with U.S. flag and foreign vessel operators.

These considerations have guided the choice of an approach to the present study. In order to meet the requirements specified, the TBS/RHA team has selected the following approach:

- Review previous port economic impact studies. A review of earlier studies was performed to reveal data and methods that could be applied to the study. A group of eleven studies were analyzed (see Chapter II). In general, earlier studies were found to have only a limited applicability to the present effort.

- Conduct survey to obtain impact-per-ton estimates. A direct survey of shipping companies, steamship agents, port authorities, shipbuilding and repair yards, and Government maritime agencies was carried out in order to estimate direct economic impact of cargo-handling and other maritime activities. For cargo-related port and vessel activities, impacts were estimated on a per- ton-of-cargo basis to facilitate future updating. The procedures utilized are presented in Chapter III.

- Develop cargo tonnage data for the base year. This study was conducted during the first half of 1982, and despite some difficulties, the year 1981 was chosen as the base-year. Revenue tonnage data compiled by the Pacific Maritime Association (PMA) were utilized as the basic data source. [The PMA is an association of shipping, stevedoring and terminal-operating companies that negotiates and administers labor agreements with the International Longshoremen's and Warehousemen's Union (ILWU).] These data were supplemented by other federal, state and local port authority information to compile 1981 cargo data for each of the ten geographical areas and for each of six cargo sectors: container, breakbulk, automobiles, logs and lumber, dry bulk and liquid bulk (see Chapter III).

- Apply a regionalized input-output approach to estimate economic impact. A uniform set of regionalized input-output models, produced by the Regional Science Research Institute (Amherst, Massachusetts), were utilized to estimate the total economic impact stemming from maritime industry activities. Direct impacts (obtained from the survey data combined with the tonnage figures) were input into the

model, and total local impacts (direct, indirect, and induced) were computed (see Chapter IV).

- Assess the economic impact of port users. In addition to the economic impact caused by the maritime industry, the study investigated the impact of industries located in the Pacific Coast states which make use of the port and ocean shipping system. Selected industries which export and import goods through the ports have been identified, and their impact has been partially quantified. This analysis includes industries which make a significant contribution to the local economy, and which benefit significantly from maritime transportation. The port user analysis is a statement of economic relation, rather than an estimate of an industry's degree of dependence on the maritime industry (see Chapter V).

- Project economic impact for 1982 and 1983, and develop an updating methodology. Expected levels of traffic are developed, by port area and cargo sector, for 1982 and 1983. The per-ton impacts are then applied to these forecasts, with appropriate inflation adjustments, to estimate economic impacts for 1982 and 1983. For the non-cargo related maritime activities--shipbuilding and repair, port development, shipping company headquarters, and Government maritime services--simplified projections are developed. The multipliers determined from the analysis of base-year data are then applied to compute total economic impact. This methodology is then generalized to permit updating (e.g., on an annual basis) the base-year data over a period of several years (see Chapter VI).

The approach developed for this study, while similar in certain aspects to earlier studies, responds to unique requirements. It is believed to cover the largest number of geographical areas ever included in a single study of this type. The focus on the maritime industry--including several activities in addition to the port industry--is also broader than that contained in certain other studies. Our analysis of port users attempts to project the scope of the economic

activities that utilize ports, yet without making a determination of port dependency. These impacts are therefore not added directly to the results of the input-output analysis.

The broad scope of the study has necessarily resulted in limited detail for each port area considered. It is therefore important to bear the study's objective in mind when assessing the application of its results to specific issues affecting one or another port area. In terms of limitations, we would cite a selective survey approach which did not attempt to directly contact every maritime industry firm in an area; however, it is believed that a reasonable degree of accuracy has been achieved. Thus, while the detail of the analysis could be pursued further in response to specific needs, the current study presents a broad coverage of the economic impact of the maritime industry on the Pacific Coast states and major port areas.

II. REVIEW OF PREVIOUS PORT ECONOMIC IMPACT STUDIES

The purpose of this review of existing port economic impact studies is twofold: first, to assess the various methodologies used; and second, for studies of West Coast ports, to obtain baseline data that can be either updated or serve as a cross-check on estimates prepared by alternative means.

A number of studies have been reviewed, covering ports in California, Oregon and Washington as well as several East Coast ports. The methodology and major results obtained are assessed in terms of the measurement of direct impact and the estimation of indirect and induced effects. The reviews of individual studies are attached as Appendix A.

TYPES OF IMPACT CONSIDERED

The port economic impact studies analyzed share a number of common features. They all distinguish between certain types of impact, generally as follows:

- Direct impact--the revenues, value-added, employment and payroll associated with firms which make up the port industry. In some studies, direct impact is limited to activities directly required to move specific volumes of cargo through the port.

- Indirect and induced impact--most studies include the multiplier effect due to interindustry purchases by the port industry and due to consumption by households made possible by direct and indirect incomes. The basis for the multiplier varies from study to study, but it is often taken from a statewide input-output model.

- Port-dependent industry impact--there are a variety of definitions of what is port-dependent, port-related or a port user industry. All these categories indicate a forward linkage from the port to industries which purchase and make use of port services, as opposed to indirect effects which represent purchases by the port industry (backward linkages). Some studies adopt a spatial definition; any industry located on port authority land is considered port-dependent or related. Other studies rely upon survey respondents' own assessment of their degree of dependency on the port. The broadest definition considers port users to be any industry which ships or receives goods via the port, whether located nearby or not. Certain government services are considered part of this category in some studies, as their level of activity is not believed to be directly related to cargo volumes.

Another similarity observed is that every study employed questionnaires of some type to obtain impact data by survey. Usually the survey aimed to quantify the direct impact and the extent of port-dependent industry. Surveys were generally conducted by mail, with telephone follow-up.

DIRECT IMPACT MEASUREMENT

Our review revealed two very different approaches to the measurement of direct impact. The approach taken by most of the West Coast port studies was to conduct a thorough survey of all port industry firms, in order to add up all the direct impact revenues, employment and payroll. While the firms may have been organized by type of activity, there was no attempt in the survey itself to directly allocate revenues to tonnages of various cargo types. Rather, the emphasis was placed upon obtaining an accurate total impact. In cases where the total impact was subsequently apportioned to the cargo flows, the allocation procedures were often arbitrary and inaccurate, and the data ware often combined with port-dependent industry impact. Thus, from this type of study, it is not possible to obtain any sound estimates of direct impact per ton of cargo for the port in question. TBS reviewed studies of this type prepared for San Francisco, Los Angeles/Long Beach, Port Hueneme, Seattle, Washington State, and Southern California.

A second approach to the measurement of direct impact adopted in earlier studies was to orient the survey questionnaire toward gathering detailed expenditure data associated with an individual vessel call and the costs related directly to the vessel and cargo movements. Three studies of this type were found, for the ports of Portland, Baltimore, and Philadelphia; the formats for all three studies are quite similar, with the Baltimore study apparently serving as the model for the other two. The Portland study was subsequently updated and expanded to include all the ports in the State of Oregon.

The categories of expenditures measured by survey are generally vessel disbursements, crew expenditures, banking and insurance, inland transportation, and port services. Shipping companies, steamship agencies, stevedoring firms, freight forwarders and others are asked to detail the typical costs for handling a certain volume of freight, and a direct cost (or impact) per ton is computed.

Analysis of the direct impact per ton data from these three studies (see Exhibit II-1) indicates that the major differences lie in the type of cargo involved. Thus, breakbulk and automobile traffic generally have the highest impact (greatest dollar volume of expenditures per ton of cargo), and bulk cargoes such as petroleum have a very low impact. The variation according to cargoes is more striking than the variation among ports. In fact, many cost items do not appear to vary too much from port to port. A large part of vessel disbursements goes for steveodring, which is similar along an entire coast for a given type of cargo handling technology. Crew expenditures--a very small proportion of total impact--are mainly related to the number of days spent in port, which in turn is a function of the vessel type and cargo handling system employed. Banking and insurance are primarily a function of cargo value rather than volume, so are again higher for breakbulk, containerized and automobile cargo than for bulk commodities. There also appear to be wide variations in the estimates of banking services required for cargo shipments. Port services, aside from some definitional differences related to the fine line which must be drawn between direct and indirect impact, are again basically a function of cargo type.

Exhibit II-1

COMPARISON OF DIRECT ECONOMIC IMPACT PER TON
($ per short ton)

Port: Base Year:	Oregon 1977[a]	Philadelphia 1975[b]	Baltimore 1973[c]
Breakbulk			
Vessel and Term. Disb.	34.39	28.98	20.58
Land Transportation	25.71	5.87	7.95
Crew Expenditures	0.80	1.11	0.67
Port Services	10.99	2.03	4.15
Total	71.89	37.97	33.35
Containerized			
Vessel and Term. Disb.	16.29	16.09	5.96
Land Transportation	25.71	5.29	4.51
Crew Expenditures	0.31	0.16	0.15
Port Services	11.15	1.65	11.03
Total	53.46	23.19	21.65
Bulk			
Vessel and Term. Disb.	6.57	2.00	0.64
Land Transportation	2.80	4.20	4.30
Crew Expenditures	0.21	0.38	0.04
Port Services	0.33	0.97	1.50
Total	9.91	7.55	6.48

NOTES: Oregon--Land transportation throughout state; bulk is other dry bulk; combined insurance and banking into port services. Baltimore--port services includes steamship owners, operators.

Sources:
[a]Oregon Ports Study - 1980, by Ogden Beeman and Associates, July 1980.
[b]Port Facilities Study - City of Philadelphia, by Tippetts-Abbett-McCarthy-Stratton, July 1978,
[c]The Economic Impact of the Port of Baltimore on Maryland, by the University of Maryland, April 1975.

Inland transportation is one area where significant differences were observed between one port and another. This is partly because the size of the area considered varied between studies; where a large state was considered, the extent of inland transportation involved was much greater than in the case of a small state or an individual port area. Inland transportation also varies by cargo type, with bulk materials generally moving shorter distances from the port, especially in the case of domestic trades.

Under this approach to direct impact estimation, the expenditure categories are combined and a per-ton impact figure (for revenues, employment, payroll, etc.) is derived for each major cargo type (containerized, dry bulk, etc.). These figures are then applied to the tonnage statistics for each cargo type flowing through the port in order to arrive at an estimate of direct impact.

MULTIPLIERS

All the studies reviewed applied Type II multipliers (that is, multipliers combining both inter-industry and household expenditure effects) to the direct impact in order to derive total economic impact. The degree of refinement in the use of multipliers varied, with many studies using state input-output models. A consistent problem is that many such models were not designed specifically for port studies, and hence did not include enough detail to identify water transportation as a separate industry. A 500-sector model would generally be required to reach this level of detail, and the models used in past port studies have rarely exceeded 50 sectors. Though all the input-output models used incorporate the national input output tables prepared by the U.S. Department of Commerce (for which 1972 data are currently the most recent), there is little consistency between studies in terms of the manner in which local purchases and leakages out of the region were handled. There is also a distinction between studies which applied multipliers to total revenue (or output) and those which first reduced revenues to value-added in order to avoid double-counting and to reach a figure which could be compared with gross state product.

PACIFIC COAST PORTS BASELINE DATA

The review of previous studies revealed that, with the exception of Portland and the State of Oregon, data do not exist for West Coast ports that would be amenable to simple updating. Only those studies conducted on the basis of expenditures per ton of cargo can be easily adjusted by applying more recent cargo data and using price indices. For ports in California and Washington, existing studies provide an inadequate basis for updating; no studies appear to exist for Alaska and Hawaii ports.

Data which can serve as baselines, in addition to the per-ton direct impact data previously discussed, include multipliers and the total level of direct impact. The range of multipliers used in various past studies is shown in Exhibit II-2; it is apparent that they vary considerably, though revenue (output) multipliers of somewhat less than 2.0 for a port area and somewhat over 2.0 for a state appear to be common.

The total direct impact computed in earlier studies of West Coast ports is also of interest (Exhibit II-3). These figures can serve as a rough check on more accurate current estimates, by adjusting the total impact figure by the updated revenue tonnage and a suitable price index. It is not possible on this basis to account for the various cargo types, so the overall results should be considered indicative only.

IMPLICATIONS OF REVIEW FOR THE PRESENT STUDY

The review has clarified the need for a survey-based approach to determining valid per-ton direct impact values. While an exhaustive survey of all maritime industry firms is not considered essential, it is necessary to develop new direct impact "vectors" (representing the combination of purchases, or inputs, required to move a ton of cargo through a port and to its destination) for the various cargo types and ports. The approach utilized and results obtained from such a survey are presented in the following chapter.

The conclusion of this review, then, is that most existing port economic impact studies were not planned and executed with a view to facilitating future updating. On the other hand, the approach adopted in the PMSA study will fill an important need by providing baseline data and a methodology which permit straightforward adjustment in the future.

Exhibit II-2

MULTIPLIER VALUES FROM PREVIOUS STUDIES

A. Studies Presenting Multipliers by Impact Category

	Baltimore (value-added)	Portland (output)	Oregon (output)
Vessel disbursements	approx. 1.75	2.22	2.22
Crew expenditures	2.01	2.12	2.12
Land transportation	1.78	2.22	2.22
Insurance & banking	1.85	2.51	2.51
Port services	1.71	2.22	2.22
Manufacturing	-	2.30	2.30
Non-manufacturing	-	2.17	2.17
Agencies	-	2.41	2.41

B. Studies Presenting Less Detailed Multipliers

1. Philadelphia (output): Philadelphia 1.8; 11-county region 2.0; State of Pennsylvania 2.2.

2. Los Angeles/Long Beach (multipurpose): 5-county region 1.80; hinterland 2.49.

3. Washington State (employment): State of Washington 1.54.

4. Port of Seattle (for King County): employment 1.54; payroll 1.41; revenue 1.37.

5. Sea-Land

		Value-added	Employment
California	- Sea-Land	1.82	8.40
	- Trucking moves	2.95	2.38
	- Export products	3.77	4.01
SF Bay	- Sea-Land	1.36	4.89
LA Area	- Sea-Land	1.49	4.98

6. South Carolina (value-added): State of South Carolina 2.0

Source: Port economic impact studies reviewed in Appendix A.

Exhibit II-3

TOTAL DIRECT IMPACT FROM PREVIOUS
WEST COAST PORT STUDIES

Port Area	Base Year	Total Revenues	Value-Added	Payroll
		(in million dollars)		
San Francisco Bay Area[1]	1973	711.7	--	342.0
Los Angeles/Long Beach[2]	1974	3,546.0	--	1,198.0
Port Hueneme	1977	--	--	15.9
Oregon State[2]	1977	281.8	208.3	124.5
Portland Marine Terminals[2]	1975	65.3	47.6	28.9
Washington State[3]	1976	--	--	--
Seattle[4]	1969	365.9	--	119.5

[1]Includes water transportation, land transportation, marine cargo handling, administrative activities, and government agencies; excludes manufacturing, wholesale/retail, agriculture and military bases.
[2]Includes transport category only (excludes manufacturing and other).
[3]Study does not provide direct impact data for the maritime industry.
[4]Total transportation only (excludes manufacturing, wholesale).

Source: Port economic impact studies reviewed in Appendix A.

III. DIRECT ECONOMIC IMPACT OF THE MARITIME INDUSTRY

This chapter presents the methodology and the results obtained in computing the direct economic impact of the maritime industry. The approach distinguishes primarily between traffic-related activities (broken down into six cargo or vessel types) and non-traffic-related activities (shipbuilding and repair, shipping company administration, port capital investments, and Government maritime services). The traffic-related impact is presented first: approach utilized, cargo tonnage data, direct survey items, and results obtained. Next, the data obtained for maritime activities not directly linked to port traffic volumes are discussed. Finally, the various components are summed to provide the total direct economic impact. This section also includes a presentation of the typical expenditures by maritime industry households. The direct impacts developed in this chapter form the basis for the computation of total--direct, indirect, and induced--impact discussed in Chapter IV.

APPROACH

The direct economic impact of the maritime industry on the Pacific Coast states consists of expenditures and employment by maritime industry firms and organizations. Maritime activities are defined to include: (a) those directly involved in moving waterborne cargo (vessel, port and inland transport operations, commercial and financial maritime services), and (b) those which are maritime in nature but are not directly linked to the volume of traffic through a given port (shipbuilding, shipping company administration, port capital investments, and Government maritime services).

This distinction permits most of the maritime industry impact to be directly linked to cargo traffic, making it possible to update the impact estimate based on subsequent years' traffic figures. Due to the different handling and transport characteristics of various types of cargo, six cargo types have been specified:

- Container,
- Breakbulk,
- Automobiles,

- Logs and lumber,
- Dry bulk, and,
- Liquid bulk.

These cargo types were selected to represent the revenue tonnage breakdowns provided by the Pacific Maritime Association (PMA), which compiles statistics on all cargo handled in California, Oregon and Washington by unionized stevedores. We should add that these cargo types do not include the impact of passengers carried by water.

These cargo types are typically carried by specialized vessels designed with efficient transport in mind. It has been assumed that the specialized vessel in each case best reflects the overall expenditure pattern related to the given cargo type. That is, we assume that all containers move via containerships; all dry bulk cargo by dry bulk carriers; etc. This is a simplifying assumption; in practice, containers are also carried aboard breakbulk vessels, and so on. The bulk of these cargos now move by specialized vessels, though, and the cost characteristics of these vessels and handling modes are the most representative of the maritime expenditures involved.

Cargo moving costs also vary from port to port, depending on such factors as:

- Physical situation--tug and pilot fees are influenced by the distance and navigational complexity of the approach to the pier;
- Local cost of living--influences cargo handling, port services and inland transport costs;
- Gateway role--the importance of a port as a gateway for intermodal transport to/from distant interior points influences the value of inland freight associated with the port's cargo tonnage; and
- Size of metropolitan area--influences the value of maritime supporting services likely to be available in the port area.

The West Coast port areas selected for analysis include:

- Los Angeles/Long Beach,
- San Francisco Bay (as far inland as Carquinez Straits),
- Portland/Columbia River (ports in both Oregon and Washington, as far seaward as Astoria), and
- Puget Sound (Seattle, Tacoma and all ports in the Sound from Port Angeles inland).

The basic approach, then, is to develop--through a limited survey--typical expenditure patterns associated with the six representative vessel types calling at various ports, and to relate these expenditures to the cargo tonnage handled. Per-ton expenditure data (or direct impact vectors) can then be applied to the respective cargo tonnage figures.

CARGO TONNAGE DATA

Cargo tonnage data have been assembled in order to compute the traffic-related direct impact based on per-ton impact estimates. The PMA tonnage figures provide the cargo flow basis for ports in California, Oregon and Washington. These data underestimate total flows slightly, as they do not include movements at certain proprietary terminals where longshoremen are not employed. The data provide consistent and prompt coverage of movements in the three states, by cargo type and port area, for all cargo except liquid bulk.

Tonnage data for Alaska and Hawaii were obtained from alternative sources. Hawaiian data were supplied by the Harbors Division of the State Department of Transportation. Fiscal year 1981 (ending June 30, 1981) data were used for the 1981 base year. The data include inter-island movements. For Alaska, 1980 U.S. Army Corps of Engineers data were updated to 1981 (on the basis of cargo growth at the Port of Anchorage, available through 1981). Liquid bulk tonnage was obtained separately for 1981.

For all states and port areas, liquid bulk traffic was estimated based on the 1980 Army Corps data. As Alaskan oil production was virtually the same in 1981 as in 1980 and accounts for a large share of petroleum movements on the West

Coast, we assumed zero growth in domestic liquid bulk traffic for 1981. The 1981 foreign trade in liquid bulk cargos was obtained from the Bureau of the Census.

The traffic data for all the port areas and states are presented in Exhibit III-1 for the year 1981. These data indicate a total of 326 million revenue tons for the five-state region. Liquid bulk accounts for nearly two-thirds of this total, and the figures indicate that much of this consists of Alaskan crude oil shipments. Containerized traffic represents 13 percent of the total, which is significant given the high impact per ton (as we shall see later); approximately 60 percent of the region's containerized cargo is handled in California ports. Dry bulk is another major tonnage category (17 percent of total), distributed more evenly among the three West Coast states. Among the four major port areas, Los Angeles/Long Beach records the highest revenue tonnage, followed by Puget Sound, San Francisco Bay and Portland/Columbia River.

The remarkable growth in traffic recorded by the Pacific states emerges from two additional exhibits. Exhibit III-2 presents cargo flows by area for 1971, and Exhibit III-3 notes the percentage increase from 1971 to 1981. While the regional total has more than doubled over the decade, certain changes within states and cargo types are striking as well. The most dramatic increase occurred in Alaska's liquid bulk shipments, which grew from 2.1 million revenue tons in 1971 to 93.8 million revenue tons in 1981. This growth is a direct result of the Trans-Alaska Pipeline which began operations in the mid-1970s. The Northwest (Oregon, Washington and Alaska) has also enjoyed remarkable growth in containerized and automobile shipments. Generally, the container sector has grown the fastest, partially replacing the traditional breakbulk handling mode which has consequently declined slightly in tonnage over the 1971-1981 period.

SURVEY OF TRAFFIC-RELATED DIRECT IMPACT

The direct impact associated with the movement of the various cargo categories through the several port areas (and the five Pacific Coast states) was measured by a questionnaire developed by TBS. This questionnaire is included in Appendix C. The survey questionnaire was designed to record most vessel and cargo expenditures, for a given vessel type and

Exhibit III-1

MARITIME CARGO FLOWS FOR PACIFIC COAST STATES

1981

(thousands of revenue tons)

Port Area or State	Cargo/Vessel Type: Container	Breakbulk	Logs/Lumber	Autos	Dry Bulk	Liquid Bulk	Total
Port Area							
Los Angeles/Long Beach	16,186	4,295	271	3,582	13,554	42,911	80,799
San Francisco Bay	9,001	1,550	13	2,247	1,568	17,890	32,269
Portland/Columbia River	902	1,170	1,369	2,879	16,737	8,576	31,633
Puget Sound	9,133	1,347	1,604	2,256	11,256	31,192	56,788
States							
California	25,251	6,473	427	6,226	21,548	64,795	124,720
Oregon	874	828	939	2,549	13,134	4,659	22,983
Washington	9,161	1,801	3,298	2,586	17,829	31,356	66,031
Alaska	2,235	320	650	393	1,617	93,763	98,978
Hawaii	4,670	2,439	--	1,676	1,573	2,580	12,938
5-State Region	42,191	11,861	5,314	13,430	55,701	197,153	325,650

Source: TBS analysis of Pacific Maritime Association, U.S. Bureau of Census, and U.S. Army Corps of Engineers Data.

Exhibit III-2

MARITIME CARGO FLOWS FOR PACIFIC COAST STATES

1971

(thousands of revenue tons)

Port Area or State	Cargo/Vessel Type: Container	Breakbulk	Logs/Lumber	Autos	Dry Bulk	Liquid Bulk	Total
Port Area							
Los Angeles/Long Beach	2,692	4,624	221	1,824	4,685	30,059	44,105
San Francisco Bay	3,723	2,895	32	1,477	1,446	13,095	22,668
Portland/Columbia River	218	1,505	924	406	5,478	5,417	13,948
Puget Sound	1,528	1,503	1,394	477	2,995	15,259	23,156
States							
California	6,492	8,128	679	3,922	8,613	51,952	79,786
Oregon	192	898	1,294	382	5,627	4,534	12,927
Washington	1,553	2,256	2,417	501	5,523	15,831	28,081
Alaska	296	1,215	256	116	1,277	2,053	5,213
Hawaii	3,314	1,565	--	2,065	1,444	6,228	14,616
5-State Region	11,847	14,062	4,646	6,986	22,484	80,598	140,623

Source: TBS analysis of Pacific Meritime Association, U.S. Bureau of Census, and U.S. Army Corps of Engineers Data.

Exhibit III-3

SUMMARY OF HISTORICAL TRADE VOLUME GROWTH
BY CARGO SECTOR IN PACIFIC COAST REGION

1971-1981

(percentage increase, 1981 versus 1971)

Port Area or State	Cargo/Vessel Type						Total
	Container	Breakbulk	Logs/Lumber	Autos	Dry Bulk	Liquid Bulk	
Port Area							
Los Angeles/Long Beach	501.3	(7.1)	22.6	96.4	189.3	42.8	83.2
San Francisco Bay	141.8	(46.5)	(59.4)	52.1	8.4	36.6	42.4
Portland/Columbia River	313.8	(22.3)	48.2	609.1	205.5	58.3	126.8
Puget Sound	497.7	(10.4)	15.1	373.0	275.8	104.4	145.2
States							
California	289.0	(20.4)	(37.1)	58.7	150.2	24.7	56.3
Oregon	355.2	(7.8)	(27.4)	567.3	133.4	2.8	77.8
Washington	489.9	(20.2)	36.5	416.2	222.8	11.7	135.1
Alaska	655.1	(73.7)	153.9	238.8	26.6	4,467.1	1,798.7
Hawaii	40.9	55.8	--	(18.8)	8.9	(58.6)	(11.5)
5-State Region	256.1	(15.7)	14.4	92.2	147.7	144.6	131.6

Source: TBS analysis of Pacific Maritime Association, U.S. Bureau of Census, and U.S. Army Corps of Engineers Data.

port area; it was mailed to 25 shipping companies and steamship agents. Some 11 firms responded positively to the questionnaire (seven U.S.-flag operators and four major steamship agencies representing numerous foreign-flag operators), giving a 44 percent response rate.

Survey coverage by vessel type was quite good, with the following number of responses by vessel type:

container ship	30
breakbulk vessel	8
automobile carrier	5
log/lumber carrier	4
dry bulk vessel	8
liquid bulk vessel	7

These responses are considered adequate for the direct impact calculation, as each observation represented either a "typical" vessel port call or was an average based on a firm's total number of calls at a port in 1981. The coverage by port area focused on Los Angeles/Long Beach, San Francisco Bay, and Puget Sound for most vessel types; the fewest observations were for Alaska and Hawaii.

The approach adopted in this study was to apply standard per-ton direct impact data obtained from a limited survey to the total traffic flows. This approach was adopted in view of the large number of geographical areas covered (four port areas and five states). It must be recognized that this approach is inherently not as detailed as a complete survey of all firms in the industry would be. The results are likely to be conservative; that is, they may understate total impact slightly since certain maritime industry firms' activities may be inadvertently overlooked. However, the high response rates achieved and the quality of information submitted lead TBS to believe that the direct impact results are broadly accurate. Any assessment of economic impact on a wide scale is subject to inaccuracies at several stages of the analysis, and should be accepted as representative rather than as highly accurate.

The questionnaire was successful in obtaining data on vessel expenditures, cargo handling, and some port services. It did not measure inland transport, freight services (freight forwarders, customs house brokerage, banking and insurance, and other professional services), or crew expenditures because these items are difficult to estimate for a typical port call and are not always known to the vessel operator or steamship agent. These additional data items were obtained by telephone survey of firms in the individual industries, combined with TBS in-house knowledge and updating of previous studies.

The methods generally followed were:

Survey Items

The questionnaire items can be consolidated into about 17 expenditure categories. For cases where a sufficient sample of a given vessel type was available for each port area, different values for each category were computed by port area. This applies notably to containerships. For other vessel types, most expenditure categories were deemed essentially equal for all ports, but a few categories were varied to reflect local differences. In particular, inland transport tended to vary by port, depending on the modal split relevant to the area and the proportion of inland to local cargo handled. Certain other items also varied, while for one vessel type (logs and lumber carriers) all costs were deemed similar for the different ports. Averages were used in computing individual category costs. The determining criteria in selecting which items to vary by port were survey coverage, and the relative importance of the vessel type and cost category.

Inland Transport

This is the largest item not directly answered by the questionnaire, and is a major expenditure item in a typical vessel port call. Inland transport is defined, in terms of including it in our definition of the maritime industry, as transport to the dock from the final shipper or from the dock to the initial consignee. Subsequent moves are not included.

The approach adopted was to estimate the modal split of inland transport and then apply representative freight rates to each mode. The questionnaires provided estimates by the ocean carriers of the inland modal split, and estimates of the average distance moved by mode, for each vessel type and port area. In cases where the modal split information from the questionnaires appeared inadequate, secondary sources were used such as ISIS/EXIT for containers, Army Corps of Engineers' Waterborne Transportation data for dry bulk, and telephone follow-up surveys of vessel operators and port authorities. While no single reliable source exists for the modal split information, we believe that the estimates obtained (see Exhibit III-4) are broadly representative of the inland transport modes used.

Exhibit III-4

INLAND TRANSPORT MODES

(modal split in percent)

Port Area/Mode	Vessel/Cargo Type: Container	Breakbulk	Automobiles	Logs and Lumber	Dry Bulk	Liquid Bulk[a]
Los Angeles/Long Beach						
Rail	42	20	20		33	--
Truck	58	80	80	100	30	--
No Inland Transport	--	--	--	--	37	100
San Francisco Bay						
Rail	32	20	20		16	--
Truck	68	80	80	100	18	--
No Inland Transport	--	--	--	--	66	100
Portland/Columbia River						
Rail	7	30	60		50	--
Truck	70	60	40	100	20	--
Barge	23	10	--	--	30	--
No Inland Transport	--	--	--	--	--	100
Puget Sound						
Rail	35	30	60		65	--
Truck	65	70	40	100	25	--
No Inland Transport	--	--	--	--	10	100

[a]Inland transport is defined as to/from the initial consignee or final shipper. Since liquid bulk receiving facilities are generally located at water's edge, inland transport is nominal.

Source: See Vessel Expenditure Data (Appendix D).

The freight rates applied to inland transport are taken from several sources. In general, representative rates for the average distances involved were obtained from carriers. Information was also taken from up-to-date published sources, and from TBS in-house data sources. Major sources for some of the critical rate information were as follows:

- Container rail rates--rail divisions obtained from three major ocean carriers;
- Container and breakbulk trucking rates--representative rates obtained from motor carriers in the West Coast port areas;
- Barge rates on the Columbia River--typical rates obtained from barge operators;
- Automobile inland rates--local delivery from ocean carriers and vehicle processing firms; rail rates from Carload Waybill Statistics; and
- Log and lumber inland rates--from a major forest products company;

The combination of these rates with the estimated modal split gave average inland transport costs by vessel/cargo type and port area. In cases where the inland transport involved more than one state (generally rail shipments), 50 percent of the freight payment was generally assigned to the West Coast state. This allocation seems equitable, as freight costs are mainly incurred at one end or the other of the route. The inland freight figures (as well as all other direct impact components) were applied to the four port areas as well as to the five states. This results in some overestimation for the port areas, but is not considered a major problem since most of the inland transport does occur within the broad metropolitan areas as defined in this study.

Freight forwarders and customs house brokers

These charges were determined on the basis of telephone survey information and TBS calculations. Freight forwarder fees are based on a percentage of the freight (essentially container and breakbulk only) booked, so are directly related to ocean freight rates rather than to volume. On the West Coast, freight forwarders generally receive 1-1/4 percent of the value of freight. TBS utilized the 1981 average of the

Trans-Pacific conference rates as the representative freight cost on the West Coast. This figure ($89.66 per revenue ton) was then multiplied by 1-1/4 percent and assigned one-half to the West Coast, one-half to the overseas origin/destination to yield $0.56 per revenue ton.

Customs house brokerage fees were computed on the basis of industry-supplied estimates of total employment in each port area.

Agency Commissions

These apply to foreign-flag vessels calling at West Coast ports; U.S.-flag operators generally utilize their own staff. Questionnaires and other information received for foreign-flag vessels provided estimated agency commissions; these were multiplied by the ratio of foreign-flag to total liner carriage on the West Coast (71 percent for 1980) to the agency obtain commissions for containerships. For other vessel categories (which are mainly all foreign-flag), 100% of per- vessel fees were used. For liquid bulk U.S.-flag cargoes (mainly domestic movements), no agency commissions were assumed.

Banking and Insurance

This category covers the cost of issuing letters of credit and banker's acceptances for foreign trade, and the cost of marine cargo insurance. For these items, the Portland economic impact study (Community Economic Impact of the Marine Terminals of the Port of Portland, May 1976) results were utilized, by vessel/cargo type, and updated to 1981. The inflation factor utilized is the price index for all services in the U.S. (1.58 for 1975-1981).

Crew Expenditures

Expenditures of crew members ashore vary considerably, though they are generally related to crew nationality and length of time the vessel remains in port. Crew expenditure data were updated from the Portland study, using the same inflator mentioned above. These expenditures are only significant for vessels which spend considerable time in port, primarily breakbulk vessels.

RESULTS OF TRAFFIC-RELATED DIRECT IMPACT SURVEY

The results of the survey on direct impact related to maritime traffic indicate the substantial differences in impact between vessel/cargo types, and the differences between port areas (Exhibit III-5). The direct impact of a port call involving breakbulk cargo is estimated at $97 per ton revenue for Portland, whereas liquid bulk cargo provides an impact of only $3 per revenue ton (mostly for bunkers). On a revenue ton basis, the greatest impact is for breakbulk cargo, followed by container, logs and lumber, and automobiles, dry bulk liquid bulk. This order is somewhat different if placed on a short-ton basis (average of 2 revenue tons per short ton for container cargo and 7 revenue tons per short ton for automobiles).

The detailed results and underlying assumptions are presented in Appendix D. Some of the interesting factors which emerge are as follows:

- Stevedoring costs per revenue ton appear to vary somewhat by port area (for containerships), presumably as a result of the different volumes of cargo handled per vessel and certain differences in the load/discharge balance.

- Bunker costs are a large share of total costs for almost all categories.

- Inland transport costs are also important in total expenditures, and vary from port to port. This reflects the different modal splits--some ports handle more local cargo, others more long-distance intermodal cargo. The ports of Los Angeles/Long Beach, Seattle/Tacoma and San Francisco/Oakland are particularly active in intermodal container transport. The first two serve as gateways for inbound Asian cargoes and the third is primarily an export gateway.

- Crew expenditures are a minor part of the total vessel port call expenditures.

- Navigational services are predictably higher for Portland/Columbia River owing to the transit distance up the river.

Exhibit III-5

DIRECT VESSEL PORT CALL IMPACT PER REVENUE TON
BY VESSEL TYPE AND PORT AREA

(dollars per revenue ton)

	Vessel/Cargo Type					
	Container	Breakbulk	Automobiles	Logs and Lumber	Dry Bulk	Liquid Bulk
Port Area						
Los Angeles/Long Beach	49.49	91.47	21.90	28.81	13.40	2.88
San Francisco Bay	39.68	91.47	21.90	28.81	10.84	2.88
Portland/Columbia River	34.68	97.27	28.98	28.81	13.60	2.43
Puget Sound	39.35	93.87	27.73	28.81	14.55	2.88
State[a]						
Alaska	20.57	59.62	21.85	28.81	12.53	2.88
Hawaii	18.73	59.62	21.85	n.a.	12.53	2.88

[a]For California, the average (weighted by revenue tonnage) of Los Angeles/Long Beach and San Francisco Bay is used; for Oregon, the Portland/Columbia River figures are used; and for Washington, the Puget Sound figures are applied.

Source: TBS analysis (see Appendix D).

- For Alaska and Hawaii, the predominance of domestic trade as opposed to foreign trade leads to lower direct impacts. Lower proportions of certain port services are required for domestic shipments. The shorter shipping distance and relatively remote location minimize the quantities of bunkers sold to vessels in these states.

The direct impact survey results are broadly consistent with those of previous port economic impact studies. Based on data from the review of previous studies (Chapter II), a comparative table has been prepared showing direct impact per revenue ton by vessel/cargo type (see Exhibit III-6). The previous data have been converted to 1981 dollars. Vessel disbursements are generally higher in the TBS survey, which is due in large part to the greatly increased cost of bunker fuel in recent years. Inland transportation data lie between the levels estimated in previous studies. Port services, which vary greatly from one study to another, also appear comparable to those in other reports.

The direct impact of cargo-related activities is computed by multiplying the per-ton impacts and the cargo tonnage data. These results appear in Exhibit III-7, by vessel type and port area. The higher per-ton impact of containerized and break-bulk cargo is apparent, set against the lower unit impacts but greater tonnages of categories such as dry and liquid bulk. The total direct expenditures for the region amount to $4.5 billion, with containerized as the most important category and California (with 53 percent of the regional total) as the highest-impact state.

MARITIME ACTIVITIES NOT DIRECTLY LINKED TO PORT TRAFFIC VOLUMES

By focusing on the entire maritime industry rather than only on the port industry, the present study provides a broader definition than is found in some port impact studies. Port users, however, are presented in a separate analysis (Chapter V). The major maritime activities considered in this section, and not included in the traffic-related impact, are as follows:

Exhibit III-6

COMPARISON OF TBS SURVEY AND PREVIOUS STUDIES
DIRECT ECONOMIC IMPACT PER TON

(1981 dollars per revenue ton)[a]

Port Study: Base Year: Vessel/Cargo Category	TBS 4 Port Areas 1981	Oregon 1977[b]	Philadelphia 1975[c]	Baltimore 1973[d]
Container				
Vessel Disbursements	8.55-35.99	11.22	12.74	5.48
Port Service	6.31- 8.70	7.68	1.31	10.15
Inland Transportation	11.20-12.02	17.71	4.19	4.15
Crew Expenditures	0.21	0.21	0.13	0.14
Total	34.68-49.49	36.82	18.37	19.92
Breakbulk				
Vessel Disbursements	58.60	47.39	45.88	37.87
Port Services	10.96	15.14	3.21	7.64
Inland Transportation	20.80-26.60	35.43	9.29	14.63
Crew Expenditures	1.11	1.10	1.76	1.23
Total	91.47-97.27	99.06	60.14	61.37
Automobiles				
Vessel Disbursements	9.55-10.80	8.09		4.11
Port Services	7.18	13.73		5.17
Inland Transportation	5.05-10.88	7.07		6.36
Crew Expenditures	0.12	0.12		0.11
Total	21.90-28.98	29.01		15.75
Logs and Lumber				
Vessel Disbursements	18.26			
Port Services	3.94			
Inland Transportation	5.88			
Crew Expenditures	0.73			
Total	28.81			
Dry Bulk				
Vessel Disbursements	5.56-6.19	9.05	3.17	1.18
Port Services	1.02	0.46	1.54	2.76
Inland Transportation	3.31- 7.02	3.86	6.65	7.91
Crew Expenditures	0.32	0.29	0.60	0.07
Total	10.84-14.55	13.66	11.96	11.92
Liquid Bulk				
Vessel Disbursements	2.28-2.73	1.31		
Port Services	0.00	0.00		
Inland Transportation	0.10	0.00		
Crew Expenditures	0.05	0.05		
Total	2.43-2.88	1.36		

[a]Previous studies are in dollars of the base year and per short ton. Conversion made according to the Survey of Current Business GNP deflator for services (values: 1973 - 105.3; 1975 - 122.4; 1977 - 140.6; 1981 - 193.8); and assuming 1.0 RT/ST for breakbulk and bulk cargoes, 2.0 RT/ST for containers, and 7.0 RT/ST for automobiles.

[b]Oregon Ports Study - 1980, by Ogden Beeman and Associates, July 1980. Inland transport covers whole state. Petroleum is used for liquid bulk comparison. Insurance and banking are combined into port services. Dry bulk excludes grain, which is lower.

[c]Port Facilities Study - City of Philadelphia, by Tippetts-Abbett-McCarthy-Stratton, July 1978. All bulk used for dry bulk.

[d]The Economic Impact of the Port of Baltimore on Maryland, by the University of Maryland, April 1975. Port services include steamship owners and operators. Automobiles are imported only. All bulk used for dry bulk.

Exhibit III-7

DIRECT IMPACT OF CARGO-RELATED ACTIVITIES
(expenditures in million $)

Port Area or State	Cargo/Vessel Type						
	Container	Breakbulk	Automobiles	Logs/Lumber	Dry Bulk	Liquid Bulk	Total
Port Area							
Los Angeles/Long Beach	801	393	79	8	182	123	1,586
San Francisco/Oakland Bay	357	142	49	1	17	51	617
Portland/Columbia River	31	114	83	39	227	21	515
Puget Sound	359	126	62	46	164	90	847
State							
California	1,161	592	136	12	283	187	2,371
Oregon	30	80	74	27	179	11	401
Washington	359	169	72	95	259	90	1,044
Alaska	46	19	9	19	20	268	381
Hawaii	87	145	37	0	20	7	296
5-State Region	1,683	1,005	328	153	761	563	4,493

Source: TBS analysis.

- Shipbuilding and repair. This includes both civilian and naval work, but only in private shipyards.

- Shipping company administration. This includes the West Coast shoreside and seagoing activities of U.S. shipping lines, net of expenditures accounted for under vessel port calls in the U.S. and abroad.

- Port capital investments. This includes the maritime investments reported by public port authorities for 1981.

- Government maritime services. This includes the services provided by federal agencies in support of maritime shipping--U.S. Coast Guard, U.S. Army Corps of Engineers, and U.S. Customs Service.

These categories are included because they are considered key components of the Pacific Coast maritime industry. They are carefully defined to avoid double-counting with the traffic-related impact data. For instance, port authority current revenues and employment are not considered since it is assumed that current spending is passed through as charges to shipping companies and captured in the per-ton impact. Government services are not--as of 1981 at least--charged to users.

Shipbuilding and Repair

As Exhibit III-8 suggests, the shipbuilding and repair industry in the Pacific Coast states has a major direct economic impact. Nine major shipyards were surveyed by questionnaire (Appendix C) with eight (89 percent) responding positively. Data on a further 14 yards were obtained by telephone. The results indicate an industry with over $1.8 billion in revenues, employing over 31,000 persons. The industry's construction activities--with naval ships comprising a major share of total new construction--are concentrated in Puget Sound, San Diego, and Los Angeles/Long Beach. Ship repair activities are spread more uniformly among the ports, and serve commercial vessels requiring voyage or periodic repairs. Ship repair was not included under the cargo-related analysis.

Exhibit III-8

DIRECT IMPACT: SHIPBUILDING AND REPAIR YARDS

(1981 data)

	Revenues (millions $)	Payroll (millions $)	Employment
Port Areas			
San Diego	465.6	172.0	7,694
Los Angeles/Long Beach	343.4	148.6	6,230
San Francisco Bay	179.9	84.6	3,356
Portland/Columbia River	131.2	57.9	2,314
Puget Sound	729.7	281.4	11,487
States			
California	988.9	405.2	17,280
Oregon	131.2	57.9	2,314
Washington	729.7	281.4	11,487
Hawaii	19.1	9.0	300
Alaska	12.8	6.0	200
Region (5 states)	1,881.7	759.5	31,581

Source: TBS questionnaire and telephone survey of shipyards.

Shipping Company Administration

In order to distinguish the impact of U.S-based shipping companies, a shipping company administration category was created. Steamship agencies generally handle the administration work for foreign-based shipping lines, and that impact is included under traffic-related activities. U.S. shipping company administration includes the major West Coast offices of U.S. companies, whose ships may be calling in a number of other ports. San Francisco and Oakland are headquarters to a number of U.S. shipping firms, with a shoreside employment (excluding stevedoring personnel) of over 1,800 persons. The families of an estimated 800 seagoing personnel also make their homes in the Bay Area (the distribution of seagoing staff residences was indicated in the questionnaires). Altogether, shoreside and seagoing employment by Pacific Region U.S. shipping companies exceeds 5,500 persons (Exhibit III-9).

Port Capital Investments

Capital spending by public port authorities in the Pacific Coast states is also considerable (see Exhibit III-10). Questionnaires (Appendix C) were sent to 22 port authorities, of whom 19 (86 percent) responded. The results show capital expenditures of $218 million in 1981 (considered to be a typical year), concentrated in all four major port areas (especially Los Angeles/ Long Beach) and Alaska and Hawaii. These data are most likely underestimates of total port facility capital spending, as steamship companies and private shippers are also involved in this investment and are not included in this figure. Port capital expenditures are identified separately since they are not directly linked to trade levels; they are lumpy investments which may lead or lag the growth of cargo.

Government Maritime Services

The Federal Government provides important services related to commercial navigation in the Pacific Coast states. Exhibit III-11 summarizes these impacts. The U.S. Coast Guard constitutes the most important spending, accounting for over $300 million in 1981. It employs (based on TBS estimates) some 9,600 persons. A large portion of the Coast Guard's activities support commercial vessel navigation.

The Army Corps of Engineers also contributes to the maritime industry through its operation and maintenance expenditures for navigation. Some $15 million were spent on maritime activities in 1981, in California and Hawaii (survey questionnaires were not received for other areas).

Exhibit III-9

DIRECT IMPACT: SHIPPING COMPANY ADMINISTRATION, 1981

(million dollars)

	LA/LB	SF Bay	Portland/ C.R.	Puget Sound	CA	OR	WA	AK	HI	Total
Employment (no. persons)[a]										
--Shoreside	839	1,859	35	674	2,698	35	674	200	291	3,898
--Seagoing[b]	390	826	95	200	1,216	95	200	50	90	1,651
--Total	1,229	2,685	130	874	3,914	130	874	250	381	5,549
Estimated Payroll[c]	49.2	107.4	4.6	30.6	156.6	4.6	30.6	8.8	13.3	213.9

[a]All data refer to information from questionnaires submitted by seven U.S.-flag carriers. Data are thus not all inclusive.
[b]Seagoing staff allocated to different areas according to questionnaire information and TBS estimates.

[c]Payrolls (exclusive of benefits) are conservatively estimated, based on survey responses, at $40,000 per person for California, and $35,000 elsewhere. This figure is influenced by the level of seagoing earnings. In order to avoid any double-counting with cargo-related activities, value-added (computed as 1.5 times payroll) is used in place of revenue for the economic impact calculations.

Source: TBS analysis of survey results.

Exhibit III-10

DIRECT IMPACT: PORT CAPITAL EXPENDITURES, 1981

(million dollars)

	LA/LB	SF Bay	Portland/C.R.	Puget Sd.	CA	OR	WA	AK[a]	HI	Total
Capital Spending	76.3	21.6	37.1	25.6	109.7	20.0	42.7	26.2[a]	19.6	218.2
For reference only: Revenues from Maritime Activities	102.3	34.9	40.7	79.0	200.7	28.9	90.8	2.8[b]	16.2	596.3

NOTE: Represents 19 responses to 22 questionnaires mailed. Data are limited to those port authorities who responded to the TBS questionnaire; thus, provides partial coverage of public port authorities and does not include investments in private facilities or by other parties such as shipowners or shippers.

[a]Port of Anchorage questionnaire and estimate of Port of Valdez container terminal.
[b]Port of Anchorage only.

Source: TBS survey of port authorities.

Exhibit III-11

DIRECT IMPACT: GOVERNMENT MARITIME SERVICES, 1981

(million dollars and persons)

	LA/LB	SF Bay	Portland/ C.R.	Puget Sound	CA	OR	WA	AK	HI	Total
U.S. Coast Guard										
Expenditures	55.5	111.3	20.0	69.0	166.8	29.4	72.6	22.8	41.7	333.3
Payroll (est.)	32.2	64.5	12.0	40.1	96.7	17.1	42.1	13.2	24.2	193.3
Employment (est.)	1,610	3,225	600	2,000	4,835	855	2,110	660	1,210	9,670
U.S. Army Corps of Engineers										
Expenditures	3.4	7.5			14.4				0.6	15.0
Payroll (est.)	0.2	0.1	a/	a/	0.6	a/	a/	a/	0.6	1.2
Employment	7	4			18				20	38
U.S. Customs Service										
Expenditures (est.)	5.7	3.8	0.9	5.1	11.2	0.9	5.1	0.1	1.2	18.5
Payroll (est.)	4.4	2.9	0.7	3.9	8.6	0.7	3.9	0.1	0.9	14.2
Employment	137	91	22	122	270	22	122	3	29	446
Total										
Expenditures	64.6	122.6	20.9	74.1	192.4	30.3	77.7	22.9	43.5	366.8
Payroll	36.8	67.5	12.7	44.0	105.9	17.8	46.0	13.3	25.7	208.7
Employment	1,754	3,320	622	2,122	5,123	877	2,232	633	1,259	10,154

a/ Questionnaires were not returned by these districts.

Source: TBS analysis of data supplied by Government agencies. Figures are estimated where noted.

Customs inspectors working in marine shipping are also considered part of the maritime industry. Some 450 inspectors serve the Pacific Coast states.

TOTAL DIRECT ECONOMIC IMPACT

The sum of all the maritime industry activities gives the total direct economic impact. This is presented in output (or sales) terms in Exhibit III-12. Maritime activities' combined sales were an estimated $7.2 billion in the five-state region in 1981. Among the states, California recorded the greatest impact ($3.9 billion), followed by Washington ($1.9 billion). The cargo-related activities (as defined earlier, this category is similar to the port industry definition used in port economic impact studies) account for approximately 62 percent of total direct impact. Shipbuilding and repair is the next most important maritime activity. Altogether, the direct economic impact is substantial, and is spread among all five states included in the analysis.

MARITIME INDUSTRY EMPLOYEE EXPENDITURE PATTERNS

A portion of the maritime industry's revenues are paid to its employees as wages, and an estimate has been made of the manner in which these households spend their income between major categories of goods and services (Exhibit III-13).

The most recent available data on household expenditure patterns are contained in the U.S. Bureau of Labor Statistics Consumer Expenditure Survey 1972-73. The survey is being updated, but the results will not be available until at least the end of 1982.

The survey publications show data for all U.S. households, for all U.S. "Wage- and Salary-Earning Households," and for all households by Standard Metropolitan Statistical Area (SMSA). This analysis assumed that the ratio between expenditures on each category of commodities by "all households" and by "wage- and salary-earning households" is constant throughout the U.S. The expenditures by households in each SMSA were adjusted accordingly, to approximate expenditures by "wage- and salary-earning households" in each SMSA. The resulting expenditure figures thus take into consideration the regional variations in prices and commodity purchases, and the characteristics of "wage- and salary-earning" households.

Exhibit III-12

TOTAL DIRECT ECONOMIC IMPACT
(revenues in million $)

Port Area or State	Cargo Related Activities	Shipbuilding	Port Development[a]	Shipping Company Administration[b]	Government Maritime Services	Total
----------Port Area----------						
Los Angeles/Long Beach	1,586	343	58	74	65	2,126
San Francisco/Oakland Bay	617	180	16	161	122	1,096
Portland/Columbia River	515	131	28	7	21	702
Puget Sound	847	730	19	46	74	1,716
----------State----------						
California	2,371	989	87	235	192	3,874
Oregon	401	131	16	7	30	585
Washington	1,044	730	32	46	77	1,929
Alaska	381	13	19	13	23	449
Hawaii	296	19	15	20	43	393
5-State Region	4,493	1,882	169	321	365	7,230

[a]Local direct impact (shown here) is 75 to 80 percent of total revenues, since a portion of port capital spending results in first-round expenditures outside the local area.
[b]Estimated from payroll data (see Exhibit III-9).

Source: TBS analysis.

Exhibit III-13

MARITIME INDUSTRY EMPLOYEE EXPENDITURES

1981 PAYROLL DISTRIBUTION ON MAJOR CONSUMPTION CATEGORIES, BY SMSA[1]

	Los Angeles/ Long Beach	San Francisco/ Oakland	California	Honolulu, Hawaii[2]	Anchorage, Alaska	Portland, Oregon	Seattle, Washington
All Items[3]	79%	78%	79%	64%	69%	70%	74%
Food	13%	12%	13%	13%	12%	10%	11%
Housing	26%	26%	26%	23%	22%	23%	23%
Clothing	3%	3%	3%	3%	3%	3%	3%
Transportation	15%	13%	14%	12%	12%	12%	15%
Medical Care	4%	4%	4%	3%	3%	4%	4%
Other[4]	18%	20%	19%	10%	16%	18%	18%

[1]CPI not available by state. State patterns can be represented by the appropriate SMSA, except for California, which is shown separately. Pacific Coast region expenditures are the weighted average of the five states.

[2]Percentages calculated for Honolulu were adjusted to reflect data published by the State of Hawaii Department of Planning and Economic Development.

[3]Current consumption expenditures. The residual is spent on taxes, insurance (all kinds), and savings.

[4]Includes alcohol, tobacco, gifts and contributions, recreation and entertainment, education, reading and personal care.

Source: RHA analysis of U.S. Bureau of Labor Statistics data.

The Consumer Price Index (CPI) was used to update the figures to 1981. A shortcoming of the CPI is that it represents only the increase in the price of a given basket of commodities, and not the substitution between commodities in response to price changes.

The Bureau of Labor Statistics publishes CPIs for some SMSAs for each major expenditure category. These indices were used to calculate the increase in price of each category between 1972-73 and 1981, for each region separately. Of necessity, it must be assumed that each region's basket of commodities did not change during that period. The method used in this analysis is based on the "basket" purchased in 1972-73 and incorporates regional variations in the 1972-73 price, in the rate of price increase and in the composition of the "basket."

Expenditure data are based on household incomes; no recent household wage and salary data are available. This analysis assumed that household income increased between 1972-73 and 1981 at the same rate as total expenditure on current consumption (as evidenced by the regional CPIs). This assumption is supported by the BEA Survey of Current Business data on personal income and expenditure (not available by region nor separately for wage- and salary-earners), which showed that expenditure on current consumption represented approximately the same portion of pre-tax income in 1972-73 and in 1981.

Based on the above assumptions and calculations, "wage- and salary-earning household" expenditures on major categories of goods and services in each SMSA were updated to reflect 1981 prices. The dollar figures were then converted into percentages of pre-tax income, for application to the industry payroll. Both the dollar figures and the percentages were carefully reviewed and considered to be realistic.

IV. DETERMINATION OF ECONOMIC IMPACT

This chapter presents the total economic impact of maritime industry activities in the Pacific Coast states, computed by applying input-output multipliers to the direct impact. The general use of the input-output approach, and the special aspects of the modeling system utilized, are discussed first. Next, the impact results are presented, including the economic impact data and the multipliers obtained. Finally, the impact results are assessed in the light of previous impact levels, multipliers, and other maritime industry indicators. Projections of the economic impact are contained in Chapter VI.

THE INPUT-OUTPUT APPROACH

Objective

The study goal is a description of the economic importance of the maritime industry to the Pacific Coast states and their subregions. Our charge is to provide this description for the current situation and to develop information which can be used for forecasts and updating over the next three to five years.

As with any industry, the economic activity supported by the maritime industry can be separated into the direct, indirect, and induced categories. The direct effect includes all the economic activities directly involved in handling and transporting waterborne commerce, plus the other activities defined as part of the industry (e.g., shipbuilding and repair). These direct activities have been identified and measured through surveys, as discussed in the previous chapter.

The indirect category includes the effect on industrial and service production caused by maritime industry activity. This includes the inter-industry economic activity supported by the local purchases of supplies, services, labor, and other local inputs. The induced effects include the local economic activity supported by the household expenditures made possible because of the incomes from the direct and indirect economic activities.

The indirect and induced economic activities may be very significant to the region of interest. They span a wide range of industries and services and are likely to be larger than the direct economic activity which supports them. They are the outcome of a series of successive transactions which occur as dollars injected into the economy as a result of maritime commerce move throughout the economy and stimulate further spending. It is this process which gives rise to the "multiplier."

Input-Output Model

A number of methods have been used for estimating the indirect and induced effects of the maritime industry. Although the approaches differ, they are all concerned with the interrelationships among sectors of the economy and with tracing the flows of dollars as they move through the economy. Of primary importance are the share of purchases which becomes payment to wages and salaries and the extent to which these dollars stay within the regional economy rather than become "leakage" to savings or to other economies outside the region.

The actual computation of multipliers is carried out accurately by two methods. One is the econometric or statistical correlation of the total production, employment, and so forth with independent factors such as employment in basic industries. This requires an extensive time series of data. Such data are available for the states and regions, but this method does not lend itself to ascertaining the impact of the maritime industry. The other method is input-output analysis, but, in this case, the multipliers are essentially a by-product of a much more comprehensive analysis.

An input-output model is a statistical representation of an economy which reveals the transactions among its industries and its sectors. It is based upon the assumption that the inputs to an industry are proportional to its output. It shows how various parts of the economy relate to the whole, recognizes the interdependence within the economy and provides a consistent framework within which all changes can be estimated. There is no question that input-output analysis is the most satisfactory approach for regional analysis that has been developed. The input-output coefficients ideally should be estimated from a survey of industry purchases and sales as well as those of households and governments. As a simplification, analysis of previous studies may be used, or national

input-output data may be adapted to the regional level. There have been input-output studies done for some of the five Pacific Coast states and regions, but they differ as to industry definitions. In particular, the maritime industry may not be broken out as a specific sector.

The National Input-Output Study and Its Adaption to a Region

The Bureau of Economic Analysis (BEA) has been conducting input-output studies of the U.S. economy about every five years since 1947. The number of sectors has grown to 500 for 1972 which is the latest available. This degree of detail allows considerable flexibility in constructing any aggregate industries which might be desired. However, while input-output analysis is a powerful technique, there are limitations on its accuracy resulting from the assumption that inputs are proportional to output and from the accuracy of the data. The technical coefficients are a composite of physical requirements of production and the purchasing patterns of industries. Also, even though 500 industries represent a relatively refined classification, each industry is a mix of more specific industries. Individual plants are classified by industry but, in fact, one plant may be producing several products in different industries. Therefore, although input-output analysis is clearly the best method available for regional analysis, it is still not perfect.

At the most fundamental level, technical coefficients represent the physical requirements of production. But since industries are necessarily aggregates, technical coefficients are weighted averages of those in the sub-industries. The technical coefficients may change over time as firms change techniques of production due to technological discoveries and respond to changes in relative prices of inputs. Simple across-the-board inflation should not affect the technical coefficients. Since the technical coefficients are a weighted average of those of the sub-industries, these coefficients may change over time as the mix of sub-industries changes. But the change is gradual and the use of technical coefficients based upon data from ten years ago poses no prohibitive difficulties concerning accuracy.

The adaption of national input-output information to regional economies must take into account that many industries may not exist in the regional economy. Further the national industry may be quite different from the local industry of the same name. For example, the steel industry of a region may be

entirely devoted to producing manganese steel alloy whereas this may be only a small share of the national steel industry. Even when the industries are the same on a regional and national level, the purchase of inputs may differ because of spatial factors important at the regional level. For example, a firm located near the border may buy inputs from outside the region even when those inputs are available within the region.

The biggest difficulty in adapting national input-output information to a region is that special factors may influence the choice of inputs and the national information is only an average of the nation's regions. For example, electricity may be generated using various fuels. In some regions, coal is used and in others fuel oil depending upon the relative costs. The national data should indicate that electrical power production requires inputs of both coal and fuel oil. It is impossible to mechanically adjust the national average to estimate what the input is for a region having unique access to some resource. This would be particularly true in transportation where the availability is a key factor in determining the use of different modes of transportation. This limitation on the use of national input-output analysis must be allowed for when using input-output information adapted from the national study.

The Regionalized Input-Output System of the Regional Science Research Institute

The present study utilizes an input-output modeling system developed by the Regional Science Research Institute (RSRI) of Amherst, Massachusetts. This system is comprehensive, competent, and flexible, though it reflects certain limitations inherent in its basic methodology. The national input-output coefficients are modified by multiplication by a regional purchase coefficient, identifying the share of demand in an industry which is satisfied by local production. The regional purchase coefficient can reflect the fact that some share of local demand in each industry must come from imports, but this method does not allow for differences in inputs which are due to regional availability. The national input-output figures represent national averages and cannot reflect unique regional circumstances. Any estimates of regional multipliers from national data will have similar problems of method and data. For instance, the Regional Industrial Multiplier Systems (RIMS), developed by the Bureau of Economic Analysis, is based on somewhat different assumptions but the same initial data.

RSRI has developed a statistical equation for predicting regional purchase coefficients. The proportions of a good produced in a state which were shipped to destinations in the same state were approximated from data in the Census of Transportation, Census of Manufactures, Consumer Expenditure Survey, and the U.S. Input-Output Study for 19 industries. These estimates were regressed on the regional levels of four variables compared to the U.S.: wage costs, employment in the industry, total employment in manufacturing, and geographic area. In addition, the total tonnages of the good shipped in the U.S. were used as a variable in the regression equation. The coefficient of determination (R2) indicates that 68 percent of the variation in the regional purchase coefficients was explained by variation in the relative wage rates, levels of employment, area, and the total tonnage shipped. This statistical method used by RSRI in estimating the regional purchase coefficients appears to be as sound as any alternative technique. And the real test is whether the method works overall.

The method was tested by comparing the input-output table derived from the RSRI approach for Washington with the state's input-output model constructed from survey data. A regression of the RSRI technical coefficients on the survey-based coefficients gives a reasonably good fit although there appears to be a downward bias in the estimates overall. The differences between the multipliers derived from the two appears to be less than the differences between the coefficients. Overall, the RSRI estimates seem to be satisfactory approximations of the impact multipliers.

Use of RSRI System

Use of the RSRI system for developing multipliers for the states and port areas of interest requires two types of information:

- Direct impact vectors of output levels or demands by the maritime industry; and
- Definition of geographic areas of interest.

Direct impact vectors are required to identify and describe the purchases of the maritime industry within the local area of interest. These have been developed on a per-revenue ton basis for each of the six cargo types, on an output or demand basis for four other maritime sectors, and for the different geographic areas. Given the direct impact

ECONOMIC IMPACT RESULTS

Impact Levels

The economic impact of the maritime industry on the economies of the five Pacific Coast states is substantial, as shown in Exhibit IV-1. Total sales (or output) attributable to direct, indirect, and induced effects of the maritime industry amount to $15.7 billion for the five states in 1981. Wages total $5.6 billion, with employment of 240,000 persons in the five-state region. California alone records an impact of $8.2 billion in sales. The state with the second-highest dollar-value of impact is Washington, with total sales of $3.2 billion. Oregon is next, followed by Hawaii and Alaska. State and local taxes paid on activities stimulated by the maritime industry total about $580 million for the region. On a sales basis, direct maritime activity accounts for 46 percent of the total, with other industries--stimulated by indirect or induced purchases--accounting for the remaining 54 percent.

Among the four port areas, the Los Angeles/Long Beach area records the largest economic impact ($4.5 billion in sales, employment of 68,000 persons). The differences in cargo volumes are generally reflected in the impact figures; thus, the Portland/Columbia River Area, which includes important port activities in Washington state, receives a greater impact than the state of Oregon.

The five-state region total exceeds the sum of the five individual states. The regional total was computed by combining the direct purchases for the three contiguous states (California, Oregon, and Washington) and running them through the input-output model, then adding the individual results for Alaska and Hawaii. Regional purchase coefficients are higher for this combination of states due to lower leakages of spending outside the region, and higher multipliers result.

Analysis of the individual maritime activity sectors (Exhibit IV-2) indicates that cargo-related services (i.e., the direct vessel port expenditures) are the largest single category, accounting for $10.2 billion in sales or 65 percent of the total impact for the region. Shipbuilding and repair is the next most important activity (23 percent of the regional sales), and its output actually exceeds that of cargo-related services in the state of Washington. U.S. flag shipping company headquarters and government maritime services are both major activities in the San Francisco Bay area. Port capital expenditures provide an additional economic stimulus (note that the current expenditures of port authorities on

Exhibit IV-1

ECONOMIC IMPACT OF THE MARITIME INDUSTRY BY AREA

1981

Port Area or State	Output	Value-Added	Wages	Taxes	Employment (persons)
	(millions of dollars)				
Los Angeles/Long Beach					
Maritime Industry	2,126	1,063	735	94	28,820
Other Industries	2,343	1,406	833	125	39,290
Total	4,469	2,469	1,568	219	68,110
San Francisco Bay					
Maritime Industry	1,096	640	452	56	17,230
Other Industries	1,035	740	480	65	20,860
Total	2,131	1,380	932	121	38,090
Portland/Columbia River					
Maritime Industry	702	344	249	34	9,670
Other Industries	606	351	225	34	11,090
Total	1,308	695	474	68	20,760
Puget Sound					
Maritime Industry	1,716	880	634	58	24,070
Other Industries	1,243	761	509	51	26,090
Total	2,959	1,641	1,143	109	50,160
California					
Maritime Industry	3,874	2,029	1,403	164	61,520
Other Industries	4,299	2,646	1,491	213	76,520
Total	8,173	4,675	2,894	377	138,040
Oregon					
Maritime Industry	585	292	210	25	9,880
Other Industries	401	231	150	19	9,300
Total	986	523	360	44	19,180
Washington					
Maritime Industry	1,929	982	698	48	29,110
Other Industries	1,302	782	498	38	26,040
Total	3,231	1,764	1,196	86	55,150
Alaska					
Maritime Industry	449	202	121	10	4,660
Other Industries	352	221	113	11	4,160
Total	801	423	234	21	8,820
Hawaii					
Maritime Industry	393	216	150	10	8,000
Other Industries	347	207	127	10	7,410
Total	740	423	277	20	15,410
Five-State Region					
Maritime Industry	7,230	3,721	2,611	241	104,780
Other Industries	8,475	5,063	2,939	338	135,310
Total	15,705	8,784	5,550	579	240,090

Note: Totals may not add due to rounding.

Source: TBS.

Exhibit IV-3

TOTAL CARGO-RELATED ECONOMIC IMPACT
BY CARGO SECTOR AND AREA
1981
(millions of dollars; employment in persons)

Port Area or State	Cargo Sector: Container	Breakbulk	Automobile	Logs & Lumber	Dry Bulk	Liquid Bulk	Total Cargo-Related Services
Los Angeles/Long Beach							
Output	1,745	864	168	17	391	270	3,455
Wages	564	284	57	5	131	71	1,112
Employment	24,010	12,160	2,440	230	5,510	2,950	47,300
San Francisco Bay							
Output	698	285	94	1	32	90	1,200
Wages	253	97	34	0	11	25	420
Employment	10,380	3,980	1,360	10	430	1,010	17,170
Portland/Columbia River							
Output	61	221	155	77	441	44	999
Wages	23	75	57	24	149	14	342
Employment	910	3,040	2,370	980	6,280	550	14,130
Puget Sound							
Output	675	238	112	86	288	145	1,544
Wages	248	82	42	28	101	39	540
Employment	9,560	3,130	1,580	1,050	3,820	1,500	20,640
California							
Output	2,562	1,336	293	28	615	428	5,262
Wages	799	415	94	8	195	106	1,617
Employment	40,810	21,150	4,860	410	9,740	5,250	82,220
Oregon							
Output	55	140	125	47	313	21	701
Wages	20	47	45	15	106	7	240
Employment	1,140	2,560	2,430	780	5,490	340	12,740
Washington							
Output	644	306	123	171	440	143	1,828
Wages	228	101	44	53	150	37	613
Employment	10,880	4,730	2,070	2,450	6,850	1,690	28,670
Alaska							
Output	81	34	15	34	35	494	693
Wages	29	11	5	10	11	113	179
Employment	1,030	420	170	370	380	4,490	6,860
Hawaii							
Output	169	292	64	0	34	12	571
Wages	61	97	22	0	11	3	194
Employment	3,690	5,700	1,270	0	680	170	11,510
Five-State Region							
Output	3,874	2,332	713	356	1,727	1,196	10,198
Wages	1,267	745	240	106	550	289	3,197
Employment	53,990	32,740	10,320	4,370	22,500	11,890	135,810

Note: Totals may not add due to rounding.

Source: TBS.

Exhibit IV-4

OUTPUT, PAYROLL AND EMPLOYMENT MULTIPLIERS
BY AREA

Port Area or State	Output	Payroll	Employment
----------Port Area----------			
Los Angeles/Long Beach	2.10	2.13	2.36
San Francisco Bay	1.94	2.06	2.21
Portland/Columbia River	1.86	1.90	2.15
Puget Sound	1.72	1.80	2.08
----------State----------			
California	2.11	2.06	2.24
Oregon	1.69	1.71	1.94
Washington	1.68	1.71	1.90
Alaska	1.78	1.93	1.89
Hawaii	1.88	1.85	1.93
Five State Region	2.17	2.13	2.29

Source: TBS analysis.

The study results seem broadly reasonable. Precise comparisons are unfortunately not possible since there are no recent comparable studies available of these areas. However, referring to the existing studies surveyed (Chapter II), an earlier analysis of Oregon is of interest. In the Oregon study, total direct, indirect, and induced impacts of $639 million (re-stated in 1981 dollars) in the 1980 study are similar to the present study's results ($701 million for cargo-related services impact; $986 million for total maritime industry impact). The similar results probably reflect offsetting differences. That is, despite higher volumes of container traffic and dry bulk tonnage in 1981 than in 1977 (the base year of the earlier study), logs and lumber shipments have declined since the earlier study. The higher inland transport costs determined in the previous study also offset increases in other maritime sectors.

The multipliers derived from the present study (Exhibit IV-4) fall within the normal range of multipliers utilized in previous studies. The output multipliers, ranging from 1.68 to 2.17, compare with other studies' multipliers ranging from 1.5 to 2.5, with many around 2.0 (see Exhibit II-2). Our multipliers are, however, lower than those developed in the Oregon study, which appear to be high in relation to other studies. The multipliers determined in the present study are similar in magnitude to those found in studies of Baltimore, Philadelphia, Washington State, and South Carolina.

V. PORT USER IMPACT

Maritime transportation provides benefits to users of maritime services. Port users are defined in this analysis as those industries which move commodities via marine transportation. This includes foreign trade, coastwise domestic shipping, and transportation between Alaska, Hawaii, and the continental United States. Maritime trade provides access to larger markets and to supplies of materials which benefit port user industries by enabling increased sales, production and employment. Historically, this is one reason why industrial and commercial centers have grown up around the ports.

Within each state and region addressed in this study, access to maritime transportation enables increased economic activity in some local industries. The maritime industry's impact on port user industries is in addition to the economic impact of the maritime industry itself (in Chapter III) and in addition to the production activity induced by maritime industry spending (in Chapter IV).

This chapter identifies the major port user industries. The approach is described first followed by a description of how to interpret the results. Then separate sections are presented to identify port user industries for each of the five Pacific Coast states. Selected port user industries for the four regions are described in subsections under the appropriate state.

APPROACH

There are three categories of port users: exporters, importers of consumer goods, and importers of production goods. To identify port user impact, commodities carried by marine transportation must be related to industry activity within the state or region of interest.

This is sometimes difficult since not all of the commodities shipped through the ports in a state or region contribute to the port user impact in that same area. Some of the cargo is in transit to or from other states or regions. Port user impact on the particular state or regional economy includes the economic activity of industries within that area which export or import goods and those involved in the local packaging and distribution of goods which are in transit through the area. (The reader is reminded that this packaging and distribution is separate from the economic activity involved in handling and transporting commodities in transit which is included in the maritime industry impact.)

The process of estimating port user impacts began with a review of government and industry data sources to identify the major industries within each state or region which are likely to export and/or import significant quantities. Identification of candidate industries was assisted by reference to cargo data. For these candidates attempts were then made to obtain information on local production and sales for export and on the local economic activity of major importing industries. Numerous industry sources, trade associations, and government data sources were consulted.

Data on production for export is available for certain key industries, but the figures are frequently out-of-date and rarely specify whether exports move by sea or by other modes of transportation. Compilers of the data were contacted where possible to obtain more recent statistics and data on mode of transport. Department of Commerce regional trade statistics by mode of transportation were consulted to determine the percentage of commodities which typically move by sea. While this is only an approximation for any specific industry, it was useful in cases where other information was not available.

There are fewer sources of information for relating imports to specific industries. Even when an import can be traced to a specific industry its contribution to the industry's activity is often difficult to evaluate.

The port user industries identified in this analysis are those which make a significant contribution to the local economy, and which benefit significantly from maritime transportation. Where recent data are available for major industries and for related commodity movements--usually exports--the port user impact is quantified. The impact is expressed as that portion of industry sales which is exported by sea, or that portion which involves maritime imports. Employment and income are pro-rated accordingly. The most recent figures for this analysis are for 1980.

In cases where it is known that an industry ships or receives significant quantities, but specific data are not available, the significance is explained qualitatively. This is particularly the case when commodities are shipped between states.

More complete information on port user industries was available for the five states. Data was more limited for the four port regions. Where sales and trade data were not available for industries within a region, port user impacts were estimated as proportional to the region's share of total state employment in that industry.

INTERPRETATION OF THE RESULTS

Because quantification is only partial, based on available and identifiable data on maritime users, total port user impacts cannot be presented. Instead, the estimates developed can be summed to identify port user impacts of at least the amount estimated for these selected port users. The actual figures, therefore, would be greater than the totals presented in this analysis.

Futhermore, this analysis describes only port use, and not port dependence. The existence of alternative modes of transportation and alternative routes makes it unlikely that most port user industries would cease to operate if maritime transportation were no longer available, although their original establishment in a location may have been due to the proximity of a port. The figures shown for selected port user impact may, therefore, be an overstatement of actual dependence on the maritime industry while at the same time being an understatement of port use. Primarily for this reason, this analysis does not apply a multiplier to the port user impact figures. The port user figures are simply a statement of economic relation.

The analysis of port user industries throughout the Pacific Coast is itself a very large task. The scope of the analysis included in this study was guided by three main purposes. One is to explain that there are economic impacts in addition to those of the maritime industry. Other studies do not always consider the port user component. A second purpose is to highlight the specific industries within a state or region that are port users. The wide range of port user industries is not well understood. And third, the analysis provides quantification for selected major port users as examples of the significant magnitude of economic activity involved.

The remaining sections of this chapter highlight port user impacts throughout the five Pacific Coast states. The list of sources consulted as a part of this effort is included in Appendix B.

CALIFORNIA PORT USER INDUSTRIES

The State

The State of California is a highly complex economic entity. As a nation, it would rank as the eighth wealthiest

in the world, with a gross product of $312 billion in 1980 (11.9 percent of U.S. gross national product with 10.5 percent of U.S. population).

Analysis of selected port user industries estimates that at least $23.8 billion of industry sales can be attributed to maritime trade (see Exhibit V-I). This includes at least 216,000 jobs and $3.5 billion in payroll in 1980. The actual totals for the State would be higher.

California's port user industries include primarily agriculture and manufacturing industries. In 1980, exports represented 23 percent of California's agricultural sales. Nearly all of these exports are carried by maritime transportation. The State's Office of International Trade estimates that in 1980 California's export-related employment accounted for 15.1 percent of all of the State's manufacturing jobs. This figure includes exports via all modes of transportation. The figures for selected industries which use marine transportation in this study represent about 7 percent of the State's manufacturing jobs.

By virtue of its location, California is also a major center for the distribution of goods imported from across the Pacific and forwarded to destinations throughout the United States.

Agriculture is a major economic sector in California, employing 345,000 with farm sales of $13.7 billion. Exports utilized 36 percent of the harvested cropland in California in 1980. In dollars, exports accounted for 23 percent of California's agricultural sales and 5 percent of food processing sales. Foreign markets for California's produce are spread all over the world.

Cotton lint is California's leading agricultural export commodity with a farm value of exports of $1.0 billion in 1980 (88 percent of cotton lint production). Other major export crops are rice and wheat ($540 million or 79 percent exported), dried fruit and nuts (510 million or 42 percent exported), and citrus fruits ($107 million or 28 percent exported). On the import side, major port using activities are coffee roasting and sugar refining.

The port user impact in Exhibit V-1 is based on foreign trade data and would be higher if domestic cargos were included. For example, raw sugar receipts from Hawaii total 800,000 short tons each year for refining and packaging in California.

EXHIBIT V-1

SELECTED PORT USER INDUSTRIES IN CALIFORNIA, 1980

Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Industry
	Jobs	Payroll	Sales	
		--($ million)--		
Agriculture	77,000	780	3,060	23%
Food Processing	9,300	150	1,550	5%
Petroleum & Related Products	13,159	329	10,478	32%
Primary & Fabricated Metals	33,570	620	2,770	16%
High Technology: Machinery, Instruments & Related Products	56,250	1,030	3,540	9%
Textiles & Apparel	12,570	120	570	9%
Chemicals & Allied Products	10,000	190	1,400	16%
Forest Products	4,290	90	420	4%
Others: Wholesale Trade & Banking				

Source: RHA Estimates based on sources in Appendix B.

The State's petroleum refinery capacity is approximately 3 million barrels per day. A large share of the crude oil feedstock reaches the refineries by tanker from abroad, from Alaska, or from offshore rigs. Apart from crude oil movements, petroleum products move between ports within California, between California and other Pacific states, and some are exported such as petroleum coke which is a refinery by-product. Petroleum products are also inputs into the chemical industry.

Approximately half of the primary metals industry in California is involved in the production of iron and steel, despite increasing imports from the Pacific Rim. Imports of raw materials (approximately $1.5 billion in 1980) and exports of locally produced specialized goods such as sheet steel generated 16 percent of the industries' jobs and sales.

Machinery, instruments, and related products include the major growth industries of the 1980's, such as automatic data processing equipment, office machines, communications equipment, and semi-conductors. Currently almost 400,000 people are employed in these industries in California, producing 30 percent of the total U.S. output. The maritime industry's impact derives from the extensive movement of materials and parts between California and Asia, taking advantage of Asia's less expensive labor and production processes and California's technical expertise.

The textile and apparel industry in California is concentrated around San Francisco and Los Angeles. Historically, textiles, yarns and fabrics have been imported by sea from Europe and Asia, leading to the establishment of apparel manufacturers near the source of supply. Currently, a large amount of economic activity in distribution and administrative functions also exists in California because of the impact of large volumes of manufactured clothing from the Far East. Due to a lack of detailed import data, total U.S. imports have been pro-rated to estimate California's share, and the resulting figures for port-user impact are probably underestimated.

The impact of maritime trade on the forest products industry exceeds the figures shown here. Specific data are available only for foreign trade. The ports of Los Angeles and Long Beach receive approximately 270 million board feet of lumber each year from the northern coastal states, in addition to imports from Canada.

Relative to its population and wealth, the level of wholesale trade activity in California indicates that the State is a distribution center for other states and regions.

Although California has 11.9 percent of U.S. gross national product, and 10.5 percent of U.S. population, import merchant wholesalers in California handled 22 percent of U.S. import wholesale trade (almost $15 billion in sales in 1980), employing 24,000 people with a payroll of $360 million.

California banks have expanded their branch networks throughout the world, consistent with the growth of California's international trade. Six of the nation's largest commercial banking corporations have their headquarters in California. In addition, numerous industry trade associations dealing with international trade have offices in California as do foreign companies trading with the U.S.

Los Angeles - Long Beach Region

This region consists of five counties comprising a large portion of Southern California. The region is the second largest economic concentration in the U.S. Its employment exceeds 5 million jobs and includes 48 percent of California's total employment and 61 percent of the State's manufacturing employment.

The region's port user industries are primarily in the manufacturing sectors. At least 94,000 jobs and $18 million in industry sales can be attributed to maritime trade (see Exhibit V-2). This represents at least one in every 54 jobs in the region and one in every 13 manufacturing jobs.

Maritime trade accounts for almost one-half of the jobs in the region's petroleum industry, which is 58 percent of the statewide industry. Crude oil feedstocks reach the refineries by tankers. Petroleum coke and refined petroleum are the two leading outbound commodities. Both the region's chemicals and plastics industries use petroleum products as inputs.

The concentration of apparel manufacturing in the region has been influenced by trade with the Far East. In 1980, it contributed about 8 percent of regional manufacturing employment. Maritime trade (based on U.S.-wide figures) accounts for at least 10 percent of the apparel industry's activity in the region. In addition, a large administrative and distribution network exists within the region to package and distribute imported clothing throughout the country.

The transportation equipment industry in the region is large representing 16 percent of regional manufacturing employment. About 75 percent of employment is in aircraft and parts (which are exported by air) and missiles and space craft. The remaining 25 percent is in land and sea

EXHIBIT V-2

SELECTED PORT USER INDUSTRIES IN
LOS ANGELES - LONG BEACH REGION, 1980

Industry	Percent Of State Total For Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Regional Industry Attributable To Trade
		Jobs	Payroll	Sales	
			--($ million)--		
Petroleum & Related Products	58%	8,440	210	11,880	48%
Primary & Fabricated Metals	69%	25,370	390	2,040	16%
High Technology: Machinery & Instruments	57%	31,780	570	2,000	9%
Textiles & Apparel	71%	8,900	85	400	10%
Chemicals & Allied Products	58%	5,780	100	810	16%
Transportation Equipment	67%	9,910	320	770	5%
Food Processing	40%	3,370	60	130	5%
Others: Rubber & Plastics, Wholesale Trade, and Banking					

Source: RHA Estimates based on sources in Appendix B.

transportation equipment (such as mobile homes), which uses imported chassis and parts, and plywood from Asia and South America. Therefore, the port user impact is estimated as 5 percent of the transportation equipment industry, or 20 percent of the non-aerospace industry segment.

In addition, forest products and cement are brought into the region via maritime transportation for use in the local construction industry. Newsprint is imported from Canada for printing and publishing.

Inbound cargo not destined for use in the region also contributes to the local economy. Storage, packaging, processing and distribution to other areas provide jobs and revenue for the region. Banking and international trade-related companies also contribute to the local economy.

San Francisco - Oakland Bay Area

This nine-county region surrounding San Francisco Bay has employment of 2.4 million representing 23 percent of total employment in California. The region supports a thriving, diversified economy with manufacturing concentrated in the high technology industries. San Francisco has been a center of commerce, originating as a port, and continues as a West Coast center of banking and corporate headquarters.

The region's port user industries support at least 34,000 jobs and over $4.4 billion in industry sales (see Exhibit V-3). This represents one in every 71 jobs in the region and one in every 14 manufacturing jobs.

Electric and electronic machinery and instruments industries (high technology) include the most significant export commodities (by value) produced in the region. The employment attributable to port use within these industries represents about half of the regional port user total for the selected industries included in this analysis.

The primary and fabricated metals industry also produces for foreign export. Sheet steel is produced using some local and some imported raw materials. Domestic shipments of metal products to Alaska and Hawaii (such as oil rigs and pipelines) are also significant but detailed data are not available.

A major share of petroleum refining and related products is also included in the port user category. Crude oil is brought in by tanker and petroleum coke and other products are shipped out. The chemical industry also uses petroleum products as inputs.

EXHIBIT V-3

SELECTED PORT USER INDUSTRIES IN
SAN FRANCISCO - OAKLAND BAY AREA, 1980

Industry	Percent Of State Total For Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Regional Industry Attributable To Trade
		Jobs	Payroll	Sales	
			--($ million)--		
Petroleum & Related Products	32%	1,050	28	1,775	17%
Food & Related Products	22%	2,040	40	340	6%
Primary & Fabricated Metals	21%	7,435	150	630	18%
High Technology: Machinery & Instruments	32%	17,940	370	1,120	9%
Chemicals & Allied Products	25%	2,500	50	350	16%
Textiles & Apparel	11%	1,350	13	60	10%
Transportation Equipment	13%	1,990	50	150	5%
Others: Wholesale Trade and Banking					

Source: RHA Estimates based on sources in Appendix B.

In addition, salt produced in the region is exported for use in fish processing, lumber manufacturing, and the chemical industry.

Apart from food processing for local consumption sugar is produced within the region from raw sugar brought in from Hawaii. In addition, coffee is roasted from South and Central American beans.

The growing wine industry within the region exports to overseas markets. The quantity of wine exports has been increasing significantly each year.

Imports of textiles and fabrics from the Far East and a concentration of Asian immigrants within the region's center cities continues to support garment manufacturing within the region.

As a Pacific Coast commercial center, a portion of banking and international headquarters operations exists within the region because of trade throughout the Pacific Rim. This includes industry trade associations and offices of foreign trade companies.

WASHINGTON PORT USER INDUSTRIES

The State

Employment in the State of Washington totaled about 1.6 million in 1980. Historically the geography of the state, in particular its location on the Pacific Ocean and the natural deepwater access provided by Puget Sound, have done much to shape the development of the Washington economy. The Seattle-Tacoma region has developed around the ports as a major manufacturing area and serves as a trade and distribution center for the State, the Pacific Northwest, and for parts of the midwest and east coast.

The State itself is a net exporter of commodities. Many of the port user industries produce a large share of their output for foreign export. The major maritime exports are forest products, wheat and other grain and food products (particularly fish). Analysis of the selected port user industries estimates that at least $4.5 billion of industry sales can be attributed to maritime trade. This activity supported 48,600 jobs (one in every 33 jobs and one in every 8 manufacturing jobs) and nearly $1.0 billion in payroll in 1980 (see Exhibit V-4).

EXHIBIT V-4

SELECTED PORT USER INDUSTRIES IN WASHINGTON, 1980

Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Industry
	Jobs	Payroll	Sales	
	--($ million)--			
Agriculture & Food Processing	18,570	350	1,210	24%
Forest Products	15,250	300	1,680	24%
Primary Metals	5,550	140	1,040	33%
High Technology: Machinery & Instruments	6,640	120	340	19%
Transportation Equipment	2,580	65	290	3%

Source: RHA Estimates based on sources in Appendix B.

Trade with Alaska dominates coastwise traffic to and from Washington, including shipments of consumer goods, construction materials, modules and industrial machinery, and receipts of crude petroleum and fish products (for domestic sale and for export). However, maritime transportation within Puget Sound and along the navigable waterways accounts for most of Washington's domestic trade and is dominated by internal movements of logs and lumber.

Maritime exports account for one in every four jobs in agriculture and food processing in Washington state. Washington's major export crop is wheat. Growing conditions favor a strain of "soft white" wheat which is well suited to Asian and Middle-Eastern cooking methods. Ninety percent of the annual harvest (160 million bushels in 1980) is exported. Barley is the other major grain produced for export, with 1980 production of 31.4 million bushels valued at $100 million.

The State of Washington exports between 10 and 30 percent of its apple harvest, and accounts for 60 percent of U.S. apple exports. The apple harvest in 1980 was a record 52 million boxes. Dried peas, lentils, frozen peas, and french fried potatoes are also major export commodities.

Apart from frozen salmon and crab, Washington exports canned oysters and tuna. Employment in canneries was 11,400 in 1980, or 36 percent of food processing employment. (This includes canned fruit and vegetables in addition to fish products.) Fish processing accounted for 13 percent of processing employment. An additional 4,000 people are employed in the manufacture of metal cans valued at $260 million each year.

Maritime exports of forest products account for 5 percent of manufacturing jobs in the State of Washington. Weyerhaeuser representatives estimate that approximately one-third of the Washington lumber harvest is exported, and that the company derives one-third of its earnings from exports. The major exports are pulp, newsprint, logs and woodchips to Japan, and pulp, linerboard and plywood to Europe. Apart from exports, approximately 300 million board feet of lumber are shipped each year to California.

Maritime trade accounts for one in every three jobs in the primary metals industry. Primary metals manufacturing in Washington is concentrated in the production of aluminum, which accounts for two-thirds of employment and sales in the industry. Several million tons of alumina oxide are imported each year, mainly from Australia and Jamaica. Apart from domestic sales, alumina ingots are exported from Washington. Copper and iron and steel comprise most of the remainder of the industry, with copper concentrate imported from South America for smelting.

Foreign exports account for 19 percent of the machinery industry jobs and sales. In addition, significant amounts of machinery are shipped to Alaska, including entire processing plants. Because some exports travel overland to Canada, the figure for foreign exports is considered an approximation for foreign and domestic maritime shipments. The instruments industry in Washington is concentrated in optical scientific instruments.

The transportation equipment industry in Washington is dominated by aerospace manufacturing. Almost all aerospace exports are moved by air. However, imports by sea include parts and materials such as graphite and tail fuselage

sections from Italy and parts from Japan. This industry also includes road and rail transportation equipment some of which are exported or moved by sea to Alaska. The port user impact is probably an underestimation, because data are not available on imports, such as truck chassis and bodies, and other parts and materials used in the industry.

Puget Sound Region

The Puget Sound Region consists of twelve counties bordering the southern, eastern and western edges of Puget Sound in northwest Washington, dominated by the two urban centers of Seattle and Tacoma.

The Puget Sound region supports a diversified economy, as the trade and distribution center for the Pacific Northwest, and as the manufacturing center for the State of Washington. Almost three-quarters of the State's manufacturing activity is located in and around Seattle-Tacoma. In 1980 employment in the region totaled 1.12 million jobs and represented 70 percent of total employment in the State of Washington.

Because of the region's dominant position within the State, the port user industries for the region are similar to those for the State (see Exhibit V-5). The major differences are that large shares of agriculture and forest product activity occur outside the region. Overall, about 40 to 50 percent of the port user industry activity in the State occurs within the region. It represents one in every 60 jobs and one in every 12 manufacturing jobs.

The Puget Sound region supports a number of canneries and other food processing plants. In 1979, fish processing employed 3,200 people with a payroll of $55 million. In addition to local fish products, the industry processes Alaskan shipments (e.g. storing, labelling and distributing canned Alaskan salmon) for sale to Asia and within the U.S.A.

Inputs to the food-processing industry add to the port user impact. Approximately 3,000 people are employed in the manufacture of cans used in exports, and salt imports are used in fish processing.

EXHIBIT V-5

SELECTED PORT USER INDUSTRIES IN
PUGET SOUND REGION, 1980

Industry	Percent Of State Total For Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Regional Industry Attributable To Trade
		Jobs	Payroll	Sales	
			--($ million)--		
Food Processing	52%	3,980	82	630	24%
Forest Products	40%	6,160	120	680	24%
Primary Metals	43%	2,380	60	445	33%
Machinery	68%	3,710	70	190	19%
Transportation Equipment	98%	2,530	65	280	3%

Source: RHA Estimates based on sources in Appendix B.

As with the State as a whole, the manufacture of aluminum dominates the region's primary metals industry, with 69 percent of the industry's employment. Alumina is one of the leading dry bulk imports to the Puget Sound. Most of Washington's production of iron and steel is located in King County (Seattle). Imports of raw materials, and exports of finished products account for 33 percent of industry employment and sales.

The manufacture of machinery in the Puget Sound region developed to meet the needs of the agriculture and forestry industries. It has since diversified in line with the Washington economy, but has received a major boost from the development of Alaska. For example, complete modules (such as gas compressors) are built for shipment to Alaska's oil-fields in Prudhoe Bay. Other machinery exports include construction equipment and vehicles, and agricultural equipment. Foreign exports alone account for 19 percent of industry employment and sales.

Aerospace equipment (Boeing) comprises 81 percent of transportation equipment employment in the region, and an estimated 98 percent of exports. The impact of maritime transportation on exports is small, however, the major port user impact arises from imports of graphite and aircraft tail fuselages (for Boeing 767), aircraft parts, and truck and bus bodies, parts and chassis.

Most of Washington's petroleum refining capacity, employing 2,100 people, is located in Ferndale and Anacortes. Ninety-five percent of the crude oil feedstocks are brought by tanker to the refineries, and significant quantities of the processed product are transported by vessels from the refineries to users throughout the State.

Gypsum and cement, and other construction materials are brought by sea to the region.

The area around the Puget Sound also serves as a wholesale and distribution center for the Pacific Northwest.

OREGON PORT USER INDUSTRIES

The State

Oregon's economy employed 1.17 million persons in 1980. Manufacturing accounts for 18 percent of state employment. Despite diversification in recent years (and the current slump in the industry), the forest products industries represent

almost 40 percent of all manufacturing. Within the last decade, high technology industries have been established in the Portland metropolitan area to counteract the traditional dominance of forest and food products, and now represent 25 percent of manufacturing employment.

The commodities handled by Oregon's ports reflect the State's major industries. International traffic is mainly grain and forest products moving down the Columbia River; these same products account for most of Oregon's foreign export tonnage. Imports include consumer goods, petroleum, metal ores and manufactures of metal.

Analysis of selected port user industries indicates that at least 28,800 jobs, $520 million in payroll, and $2.7 billion in industry sales can be attributed to maritime trade (see Exhibit V-6). This represents one in every 40 jobs in the State and about one in every 8 manufacturing jobs.

EXHIBIT V-6

SELECTED PORT USER INDUSTRIES IN OREGON, 1980

Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Industry
	Jobs	Payroll	Sales	
		--($ million)--		
Agriculture & Food Processing	2,880	40	300	7%
Forest Products	11,580	220	1,280	15%
Primary & Fabricated Metal	7,300	140	630	31%
High Technology: Machinery & Instruments	3,940	65	197	8%
Transportation Equipment	3,100	55	255	5%

Source: RHA Estimates based on sources in Appendix B.

The major agricultural export commodity from Oregon is bulk grain (mainly wheat) with at least 70 percent of the total harvest being exported. In 1980, the wheat harvest reached 67 million bushels, valued at approximately $300 million. Other agricultural export commodities are barley, apples, cherries, vegetables, peppermint oil, grass seeds, lily bulbs (Oregon is the world's largest supplier) and filbert nuts.

Some of these commodities, in particular fruit, nuts and vegetables, have considerable value added by processing prior to shipment. Preserved fruit and vegetables (mainly frozen) accounted for 8,300 jobs in food processing in 1980. Canning and preserving all food products accounted for 13,700 jobs.

The Oregon fish harvest was worth more than $50 million in gross receipts to fishermen in 1980. Europe is the major market for frozen salmon, and canned or frozen tuna, ground fish, crab and shrimp are transported by sea to markets in California and Hawaii. Approximately 85 percent of the catch is sold out of the State.

In addition to exports, Oregon imports fertilizer (36,000 tons in 1980), tractors ($30 million in 1979), and molasses.

In 1980, the Oregon timber harvest was 5,784 million board feet, of which 463 million board feet were exported and another 400 million board feet were shipped to markets within the U.S. Maritime exports and domestic shipments account for 15 percent of the industy employment. These figures do not include waterborne movements of forest products within the State, which are extensive. Imports include salt and pulp and paper-making machinery ($35 million in 1979).

Of the 11,000 people employed in primary metals industries in Oregon in 1980, 6,400 worked in blast furnaces and iron and steel foundries, and almost half of the remainder worked in alumina processing. Iron ore is imported from Canada; maritime imports of aluminum and bauxite were 188,000 short tons in 1980. Maritime trade accounts for 31 percent of the industry employment and sales.

Maritime exports alone account for 9 percent of machinery industry sales. Much of the machinery industry in Oregon is fairly new, high-technology production by firms such as Intel and Hewlett Packard, making parts and whole units for electronic home equipment, productivity-inducing machinery and mini-computers.

Another recent arrival in Oregon, the instruments and related products industry is growing rapidly. Currently one firm making oscilloscopes for electricity measurement, employs most of the industry's workforce. Import and export data for Oregon were not specific enough to enable direct calculation of the maritime industry's impact, but proportional data for California's instruments industry were used to provide a reasonable estimate.

The major foreign import used to calculate the port user impact for the transportation equipment industry is truck bodies and chassis. With exports, these account for 30 percent of industry employment. Apart from the Swan Island Ship Repair Yard, much of the transportation equipment industry employment is in motor vehicles and equipment.

In 1980, the construction industry employed 45,700 people in Oregon. The industry imports sand, gravel and crushed rock (Canadian limestone) and uses waterborne transportation for movement of sand and gravel within the state.

Only 700 people were employed in petroleum processing industries in Oregon in 1980; however, 3 million short tons of petroleum are moved by waterborne transportation within the state to meet energy requirements throughout the manufacturing sector.

Portland - Lower Columbia River Region

This region consists of the nine couties in Washington and Oregon bordering the lower stretch of the Columbia River. The region supports a diversified economy including Oregon's major concentration of non-lumber and non-food manufacturing industries. In 1980, employment in the region totaled 583,000. Most of this employment is in Oregon and represents about 50 percent of total state employment.

The selected port user industries analyzed in this study represent just over 15,000 jobs and $1.5 billion in industry sales within the region (see Exhibit V-7). Port user employment represents at least one in every 39 jobs in the region and one in every 9 manufacturing jobs. Except for agriculture the regional port user industries are similar to those described for the State of Oregon.

Food processing for export is concentrated in fish and fish products, and frozen and canned fruit and vegetables. Foreign exports of these products account for 20 percent of the industry employment and sales.

EXHIBIT V-7

SELECTED PORT USER INDUSTRIES IN THE
PORTLAND - LOWER COLUMBIA RIVER REGION, 1980

Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Industry
	Jobs	Payroll	Sales	
		--($ million)--		
Food Processing	1,990	30	270	20%
Forest Products	4,740	90	520	19%
Primary & Fabricated Metals	3,400	80	440	24%
High Technology: Machinery & Instruments	4,320	70	240	11%
Transportation Equipment	580	10	55	5%

Note: Figures indicating the regional percentages of state industry totals are not included here because the region includes counties in two states.

Source: RHA Estimates based on sources in Appendix B.

More than one quarter of the machinery industry's employment is involved in the manufacture of electronic equipment, including 2,500 people employed in the manufacture of semiconductors. The port user impact is underestimated due to a lack of data on maritime imports to this industry.

Apart from the Swan Island Ship Repair Yard, much of the transportation equipment industry employment is involved in the manufacture of motor vehicles (Freightliner trucks) and in automobile imports processing and distribution. Because foreign trade data for the region have been pro-rated from Oregon and Washington statewide statistics, the port user

impact shown here is underestimated, since transportation equipment manufacturing in Washington is dominated by aircraft production near Seattle.

The region's instruments industy is dominated by one firm making oscilloscopes for electricity measurement. Maritime exports account for 7 percent of the instruments industry's sales and employment.

ALASKA PORT USER INDUSTRIES

The State

Alaska has a rapidly growing economy, following the discovery of vast mineral resources which current world prices are making economical to retrieve. In 1980, civilian employment was 170,000.

From its earliest days, Alaska has relied on the maritime industry for bringing essential raw materials and provisions. Consumption goods, construction materials and production goods are brought to the State, mostly from the Puget Sound region in Washington. Without such massive inflows of industrial equipment and supplies, it would be almost impossible to develop Alaska's abundant natural resources. Overall however, Alaska is a net exporter (foreign and domestic) due to outbound traffic in crude petroleum and petroleum products. In addition to ocean-going trade, intrastate traffic is heavily dependent on maritime transportation.

The port user analysis indicates that at least 11,700 jobs with $410 million in payroll can be attributable to maritime trade in Alaska (see Exhibit V-8). This represents one in every 15 jobs in the State and over three-quarters of the State's manufacturing employment.

EXHIBIT V-8

SELECTED PORT USER INDUSTRIES IN ALASKA, 1980

Industry	Estimated Economic Activity Attributable To Maritime Trade			Estimated Percent Of Industry
	Jobs	Payroll	Sales	
		--($ million)--		
Petroleum & Related Products	5,700	265	5,700	98%
Fish & Shellfish	3,650	70	650	60%
Forest Products	2,350	75	290	69%

Source: RHA Estimates based on sources in Appendix B.

Alaska's current production of crude petroleum is more than 500 million barrels per year. Almost all (98 percent) of the state's production moves through the TransAlaska Pipeline System to Valdez, where it is loaded in tankers for shipment to California, Washington, the Gulf and the East Coast. A small but growing portion is refined in Alaska for local use, or for petroleum-derived products.

The value of sales or shipments shown here is based on $11.40 per barrel at point of entry into the pipeline system. The market value of Alaska crude in 1980 has been given as $34 per barrel, increasing the value of maritime shipments to $17 billion. Futhermore, the port user impact does not include maritime receipts of machinery, equipment and drilling mud, without which the industry could not exist.

Natural gas (liquified) is a major by-product of petroleum extraction. The industry data are difficult to separate. Almost two-thirds of the retrieved gas is reinjected into the oil wells. In 1979, liquefied natural gas exports were valued at $122.5 million for 55 billion cubic feet. In the month of October 1980, Alaska produced 77.8 billion cubic feet of gas, of which 19 billion cubic feet were not reinjected. As a "clean" fuel, it is expected that sales of gas will increase, with a corresponding growth in use of the maritime industry.

Urea (nitrogen fertilizer) is another by-product of the petroleum industry. Exports were valued at $73.7 million (for 650,000 short tons) in 1979. Most of Alaska's production is shipped by sea to Japan.

The food-processing industry in Alaska is concentrated in fish and shellfish such as salmon, bottomfish, crab and shrimp. The number of people employed in fishing vessels is not known but, in 1979, there were 16,000 licenced vessels and 23,000 permits issued to Alaska residents. The portion of the catch processed in Alaska is almost exactly equivalent to the catch landed by U.S. fishing vessels. One in every four manufacturing jobs in Alaska is attributable to maritime shipments and exports of processed fish products.

Much of the fish harvest is frozen, canned, dried or otherwise preserved prior to shipment by sea. Apart from domestic sales throughout the U.S., Japan is the major market for Alaskan fish products. The calculated port user impact is based on direct export sales, excluding domestic sales and exports shipped via West Coast ports, and is therefore underestimated. In 1977, outbound fish products cargo exceeded 200,000 short tons valued at almost $900 million. Intrastate plus outbound traffic (some double-counting) in 1978 was 255,000 short tons valued at $4,560 per ton (totalling $1.2 billion).

The fishing and fish-processing industries are concentrated in the Southeastern and Western/Arctic regions of Alaska where many coastal settlements are isolated from overland transportation, and where most port facilities are inadequate for ocean-going vessels. The role of the maritime industry in collecting, consolidating and trans-shipping the products is considerable.

Apart from local consumption of forest products, Alaska exports hardwood and softwood logs, softwood lumber, wood chips and pulp. All exports move by sea, and almost all are destined for Japan. Maritime exports account for 69 percent of industry sales and employment. Intrastate shipments are also significant (2.8 million tons in 1977).

The forest products industry relies on maritime transportation not only to export its output, but also for imports of chemicals, minerals and machinery used in wood pulp manufacture. Most of these commodities are brought by barge from Seattle and Bellingham (Washington), and from Vancouver (British Columbia).

Alaska produces only a relatively small portion of its construction material requirements, confined mainly to sand, gravel and lumber. Cement, manufactures of metals and complete modules (residential, commercial, industrial and mining) are brought into the state, mostly by barge from the Puget Sound region of Washington. Employment in contract construction in 1980 totaled 10,300 jobs with payroll of $410 million.

VI. ECONOMIC IMPACT FORECAST

This chapter presents forecasts of maritime industry impact for 1982 and 1983, describes the growth estimates underlying these projections, and establishes a methodology for periodic updating of the study. The major requirement was to forecast cargo tonnages, to which the baseline direct impact vectors were applied together with allowances for inflation. Cargo projections were based on 1981 data by cargo sector, and on an updating of cargo sector analyses and forecasts prepared for the Pacific Maritime Association (PMA) by TBS during 1979 and 1980. The cargo forecast update involved a comparison of recent trends in cargo sector volumes with forecast volumes and an analysis of factors underlying observed variances. Adjustments to the PMA forecast reflected the variance analysis, current economic conditions and discrete commodity trends. The growth of non-traffic dependent maritime activities was also forecast. The updating methodology is based upon the availability of PMA revenue ton data and inflation statistics which provide a non-survey means of adjusting the impact estimates over the relatively short term.

FORECAST RESULTS

The economic impact of the maritime industry on the Pacific Coast states is forecast to increase significantly in terms of revenues and employment. For 1983, regional revenues are projected to total $19.2 billion dollars, or 22 percent greater than in 1981 ($15.7 billion). Employment in 1983 is projected to total 262,000 persons--an increase of 22,000 persons over the 1981 level. Exhibit VI-1 provides a summary of the projected economic impacts of the maritime industry on the four port areas and five states for 1982 and 1983.

The substantial increases in total revenues and employment forecast for the total Pacific Region are based on an aggregation of the individual port area economic impacts. The port area impacts in turn represent the sum of the individual cargo sector impacts and the non-traffic related impacts within each port area.

Exhibit VI-1

PROJECTED ECONOMIC IMPACT OF THE MARITIME INDUSTRY,
BY AREA
1982 AND 1983

Port Area or State	1982 --$ Millions-- Output	Wages	Employment (persons)	1983 --$ Millions-- Output	Wages	Employment (persons)
Port Area						
Los Angeles/Long Beach	4,855	1,706	71,210	5,531	1,940	76,110
San Francisco Bay	2,264	991	38,900	2,542	1,112	40,940
Portland/Columbia River	1,420	519	21,770	1,562	572	22,500
Puget Sound	3,193	1,236	51,720	3,589	1,388	54,570
State						
California	8,830	3,135	143,050	9,992	3,543	152,310
Oregon	1,094	401	20,430	1,190	435	20,860
Washington	3,513	1,302	56,950	3,949	1,462	60,180
Alaska	843	249	8,990	904	268	9,100
Hawaii	755	286	15,170	819	310	15,490
Five-State Region	17,040	6,033	248,230	19,187	6,781	261,870

Notes: 1. Projection is based on real growth assumptions presented in Exhibits VI-2 through VI-5.

2. Projection includes effect of inflation on output and wages, figures at 6.5 percent for 1982 and 6.4 percent for 1983 (Source: Data Resources Review of the U.S. Economy, July 1982--Implicit GNP Deflator). For cargo-related activities, inflation of 3.0 percent was used for 1982 since the 1981 data were obtained by survey conducted in early 1982, and refer to late-1981/early 1982.

3. Multipliers are assumed to be unchanged from 1981.

4. Five-state region exceeds sum of five states due to increased multipliers when considering California, Oregon and Washington jointly.

Source: TBS analysis.

Table VI-1 summarizes projected real growth rates of economic impact by area. The individual trends underlying these aggregate growth rates are discussed in the following sections. Perhaps most notably, the sharp rise in the Portland/Columbia River and Oregon growth rates in 1982 is due to heavy capital expenditures for coal terminal facilities which are presently taking place. The inflation rates applied to the real rates of economic growth to obtain nominal dollar figures were 6.5 percent for 1982 and 6.4 percent for 1983 (source: implicit GNP deflator from Data Resources Review of the U.S. Economy, July 1982).

Table VI-1

FORECAST REAL GROWTH RATES OF ECONOMIC IMPACT

(percentage increase over preceding year in constant prices)

	1982	1983
Port Area		
Los Angeles/Long Beach	4.5	6.9
San Francisco Bay	2.1	5.3
Portland/Columbia River	4.9	3.4
Puget Sound	3.1	5.5
State		
California	3.6	6.5
Oregon	6.5	2.1
Washington	3.3	6.5
Alaska	2.0	1.2
Hawaii	-1.6	2.1
Five State Region	3.4	5.7

Source: Exhibits IV-1 and VI-1.

CARGO FORECAST

Certain overall cargo trends are reflected in the forecasts for all West Coast ports. These include a gradual trend towards the containerization of general cargoes, the impact of voluntary restrictions presently in effect on automobile imports from Japan, the limitations of port capacity for coal exports, and the flat consumption trend for petroleum products. The most significant general effect, of course, is the current recession in the U.S., and the timing of an economic recovery. TBS has followed current economic forecasts in this regard (Data Resources, Inc., June 1982 Forecast for the U.S. Economy), which indicate a 1.5 percent decline in real GNP in 1982 and a recovery to 3.3 percent growth in 1983.

Cargo forecasts by area and cargo sector are presented in Exhibits VI-2 and VI-3. Key assumptions underlying these estimates are as follows:

Los Angeles/Long Beach

- There will be some recovery for container trade in 1982 (7 percent growth). Further increases in container trade are expected in 1983 (9 percent) as Pacific Rim economies recover from the current recession. A continued strong dollar will also help spur imports of Asian goods, much of which enter the U.S. through Los Angeles/Long Beach.

- For general cargo, increased iron and steel imports and fruit exports will be offset by recessionary declines and a continued shift to containers, resulting in modest increases in the total for 1982 and 1983.

- The auto import business will increase only slightly during 1982 due to continued voluntary restrictions on Japanese vehicles. In 1983, restrictions will expire and will most likely not be renewed. Combined with U.S. economic growth, an 8 percent increase should result.

- Sharp declines in logs and lumber in 1980 and 1981 reflect the depressed state of the domestic construction industry. Assuming an upswing in construction in the second half of 1982, there could be a recovery to approximately the 1980 level in 1982 (11 percent gain). In 1983, a 17 percent gain is forecast.

- In the dry bulk trades, coal facilities have now reached their capacity while grain exports continue to increase. By 1983, Long Beach will have increased coal capacity due to the Pier G expansion project. A one million ton increase in coal shipments as a result of this expansion, together with an estimated annual increase in grain exports of 3 percent, provides the main impetus for the growth in the dry bulk sector.

Exhibit VI-2

FORECAST MARITIME CARGO FLOWS FOR FOUR PORT AREAS

1981-1983

(thousands of revenue tons)

Port Area/Year	Cargo/Vessel Type: Container	Breakbulk	Autos	Logs/Lumber	Dry Bulk	Liquid Bulk	Total
Los Angeles/Long Beach							
1981	16,186	4,295	3,582	271	13,554	42,911	80,799
1982	17,333	4,425	3,700	300	14,000	43,000	82,758
1983	18,960	4,650	4,000	350	15,300	43,860	87,120
San Francisco Bay							
1981	9,001	1,550	2,247	13	1,568	17,890	32,269
1982	9,270	1,550	2,250	12	1,600	17,900	32,582
1983	10,200	1,575	2,350	12	1,600	18,260	33,997
Portland/Columbia R.							
1981	902	1,170	2,879	1,369	16,737	8,576	31,633
1982	930	1,200	2,980	1,275	17,440	8,580	32,405
1983	1,010	1,240	3,096	1,206	18,573	8,752	33,877
Puget Sound							
1981	9,133	1,347	2,256	1,604	11,256	31,192	56,788
1982	9,640	1,355	2,325	1,630	11,481	31,200	57,631
1983	10,570	1,400	2,460	1,700	11,940	31,824	59,894

Source: TBS analysis (1981) and TBS forecasts (1982 and 1983).

Exhibit VI-3

FORECAST MARITIME CARGO FLOWS FOR FIVE PACIFIC COAST STATES

1981-1983

(thousands of revenue tons)

State/Year	Cargo/Vessel Type: Container	Breakbulk	Autos	Logs/Lumber	Dry Bulk	Liquid Bulk	Total
CALIFORNIA							
1981	25,251	6,473	6,226	427	21,548	64,795	124,720
1982	26,740	6,620	6,400	437	21,920	64,800	126,917
1983	29,250	6,900	6,830	510	23,350	66,000	132,840
OREGON							
1981	874	828	2,549	939	13,134	4,659	22,983
1982	890	870	2,676	1,000	13,734	4,659	23,829
1983	960	910	2,810	974	14,371	4,752	24,777
WASHINGTON							
1981	9,161	1,801	2,586	3,298	17,829	31,356	66,031
1982	9,680	1,820	2,700	3,285	18,356	31,356	67,197
1983	10,620	1,880	2,850	3,397	19,452	31,980	70,179
ALASKA							
1981	2,235	320	393	650	1,617	93,763	98,978
1982	2,435	335	415	650	1,635	94,000	99,470
1983	2,500	335	425	663	1,650	94,000	99,573
HAWAII							
1981	4,670	2,439	1,676	--	1,573	2,580	12,938
1982	4,550	2,365	1,625	--	1,495	2,500	12,535
1983	4,700	2,365	1,675	--	1,450	2,550	12,740
5-STATE REGION							
1981	42,191	11,861	13,430	5,314	55,701	197,153	325,650
1982	44,295	12,010	13,816	5,372	57,140	197,315	329,948
1983	48,030	12,390	14,590	5,544	60,273	199,282	340,109

Source: TBS analysis (1981) and TBS forecasts (1982 and 1983).

- The liquid bulk trade on the West Coast is expected to remain static during 1982, with a 2 percent increase forecast for 1983. This is based on petroleum consumption forecasts which show an actual decline in 1982 for the U.S. as a whole and a 2 percent increase in 1983 as the projected economic recovery strengthens.

San Francisco Bay

- A 12 percent decline in outbound dry cargo volumes (a major portion of which is containerized) on Trade Route 29 due to the continued strength of the U.S. dollar and the economic recession in Pacific Rim countries, combined with a decline in Hawaiian trade, resulted in a 7 percent decline in 1981 containerized trade. Most inbound growth due to the projected U.S. economic recovery will occur in the Los Angeles /Long Beach and Seattle areas. A modest growth of 3 percent is thus foreseen for 1982. A substantial increase (10 percent) associated with an anticipated economic recovery throughout the Pacific Basin should occur during 1983.

- General cargo was very stable from 1978 to 1980. Declines in iron and steel and newsprint imports and a continued shift of general cargoes to containers led to a 9 percent decline in 1981 general cargo volumes. No growth is forecast for 1982 while a slight recovery is expected to occur during 1983.

- In the dry bulk trades, declining scrap and coke exports have offset gains in grain exports and domestic sugar receipts causing an overall tonnage decline from 1979 to 1981. No growth is forecast for 1982 and 1983.

- Liquid bulk cargoes are forecast to remain static in 1982 and to increase by 2 percent in 1983.

Portland/Columbia River

- Growth of 3 percent and 9 percent, respectively, in container volume is forecast for 1982 and 1983, closely paralleling the forecast for the rest of the West Coast.

- There was a 3 percent drop in general cargo trade for 1981. The major factors underlying Columbia River general cargoes are iron and steel imports, forest products (plywood, pulp and paper) and the China trade. Modest increases in trade are expected for 1982 and 1983. In aggregate, the general cargo trades are expected to increase annually at 3 percent during 1982 and 1983.

- Automobile imports continued to increase (by 22 percent) in 1981. The projection for 1982 and 1983 is a continuation of the TBS long-range forecast of 4 percent annual growth. Portland is a major gateway port for auto imports destined for the midwest, and it is likely that auto import operations will increasingly be centralized on the West Coast.

- The logs and lumber trade dropped from 1979 to 1981. The declines are attributable to the recession in the U.S. and overseas construction and paper markets. Further declines are foreseen in 1982 and 1983.

- The dry bulk trade has had steady increases from 1978 to 1981, mainly due to grain exports. Portland is the single largest grain port in the U.S. and Longview will start exporting sugar beet pellets and petroleum coke in 1982/1983. Gains of 4 percent in 1982 and 6 percent in 1983 associated with continued increases in grain exports and the commencement of new exports from Longview are forecast.

- The liquid bulk trade is expected to be flat in 1982, with a 2 percent increase forecast for 1983.

Puget Sound Area

- Container trade continued to rise slightly in 1981, following a 27 percent increase in 1980. A 6 percent gain for 1982 and a 10 percent gain for 1983 are forecast.

- A sharp drop in Seattle's general cargo trade for 1981 resulted from the containerization of the apple trade, and a likely drop in AID grain cargoes. Tacoma had a modest drop in 1981 (6 percent), but this tonnage was higher than TBS had previously forecast due to increases in "other general cargoes." A slight increase for Puget Sound is projected in 1982 (1 percent), with a 6 percent growth rate expected during 1983.

- The auto trade declined in 1981, due to voluntary import restrictions by Japanese producers. Future growth in auto imports will occur in Tacoma only, as Seattle's capacity to handle autos has been reached. Growth in Tacoma imports will be a function of the lifting of voluntary import restrictions, absolute growth in West Coast and Midwestern markets, and possible consolidation of U.S. import operations in the Pacific Northwest. Therefore, a 3 percent growth is expected in 1982 and a 6 percent growth in 1983, leading to a full recovery to the 1980 level.

- There was a sharp drop in logs and lumber shipments during 1980 and 1981. This is related to declines in the U.S. and overseas construction and paper industries. The trend towards the increasing use of U.S. dimensioned lumber in overseas construction markets will reduce revenue tonnage, since less volume of lumber is required than logs for the same level of construction. The combination of a slow recovery in the domestic and overseas construction and paper industries and the shift from logs to lumber exports is estimated to result in only minor increases (2 percent and 4 percent, respectively) in 1982 and 1983.

- Modest growth (2 percent and 4 percent respectively) is projected for the dry bulk trades in 1982 and 1983. This is significantly slower than the dramatic increases of trade from 1978 to 1980. The forecast reflects the combined impacts of a continuing strong dollar and record agricultural production levels outside the United States which will limit grain exports, and some growth in world trade in other dry bulk commodities such as cement, scrap and wood chips.

- The liquid bulk trade is expected to be flat in 1982, with a 2 percent increase forecast for 1983.

Hawaii

- Linked to the problems of Hawaii's sugar industry and its effects on the state economy, container traffic is expected to fall by 3 percent in 1982. The U.S. economic recovery anticipated for the second half of 1982 should then lead to growth of 3-4 percent in 1983, related to tourism, military increases and general consumer spending.

- For these reasons and due to increasing containerization, general cargo is projected to drop 3 percent in 1982 with no growth in 1983.

- Automobiles are also forecast to decline by 3 percent in 1982, with a 3 percent rebound in 1983.

- Dry bulk (sugar outbound, fertilizer and grain inbound to Hawaii) is projected to drop by 5 percent in 1982 and by a further 3 percent in 1983.

- Liquid bulk is forecast at the same growth rates as for the rest of the Pacific Coast in 1982, with a 2 percent rise in 1983 related to increased tourist activity and consumption.

Alaska

- Alaska's container traffic is largely northbound domestic trade. Following a sharp 19 percent growth in 1981 and only a slightly lower increase in the first half of 1982, a 9 percent rise for the full year 1982 is forecast. Alaska's lower oil revenues (due to lower prices) will then be reflected in a slowdown of imports to a 3 percent growth level in 1983.

- General cargo is projected to increase somewhat (5 percent) in 1982 as well, but will remain flat in 1983 as oil exploration work slows down.

- Logs and lumber are forecast to improve by 2 percent in 1983 in response to an economic recovery in the domestic and overseas construction and paper markets.

- Automobiles are forecast to rise in line with state economic trends, or at 5-6 percent in 1982 and at 2-3 percent in 1983.

- Alaska's dry bulk trades, consisting largely of fertilizers outbound and iron and nonferrous ores inbound, is projected to grow modestly in 1982 and 1983 (1 percent per year).

- Alaska's liquid bulk shipments (southbound petroleum) are projected to remain flat in 1982 and 1983, assuming that the pipeline will continue its output at current levels.

PORT DEVELOPMENT

Capital spending for the rehabilitation and expansion of port facilities has increased considerably at Pacific Coast ports in recent years. This investment has been spurred by the growth in Pacific Coast and mini-landbridge container traffic and the subsequent need for specialized intermodal container facilities, and by the substantial growth of grain and coal exports. Port development work is significant in local impact terms, since much of the construction work involves local firms, contractors and labor. Port authorities

surveyed during the study indicated capital spending for maritime facilities of some $218 million in 1981. Total spending was probably somewhat higher due to investments by shipping companies, private terminal operators, government agencies and smaller ports not covered by the survey.

Port construction plans already announced indicate continued development in 1982 and 1983. Based on information gathered on Pacific Coast port projects, it is estimated that expenditures will increase by 17 percent in 1982 and by 3 percent in 1983 (in constant prices). A summary of port development spending in the base year (1981) and projections for 1982 and 1983 are presented in Exhibit VI-4.

Major port development work in progress, planned, or recently completed includes the following projects by port:

Los Angeles

- Dredging of the main channel to deepen it from 35 to 45 feet was begun in March 1981, scheduled for completion in the fall of 1983. Cost: $61 million.

- Construction of a 100-acre container terminal for American President Lines was scheduled to begin in April 1982 for completion in the summer of 1983. This will include two 1,000 foot berths, four container cranes and backland development. Cost: $44 million.

- The OMNI Terminal at Berths 216-218 in the Port's East Basin, a 22-acre container operation, was scheduled to get underway in May 1982 with completion by July 1983. Cost: $14 million.

Long Beach

- A cement import facility was completed in 1981 for the Pacific Coast Cement Corporation. Cost: $17 million.

Exhibit VI-4

PORT DEVELOPMENT EXPENDITURE
FORECAST FOR 1982 AND 1983

Port Area or State	-$ Millions- 1981	Real Growth Rate Over --Previous Year, %--- 1982	1983
Port Area			
Los Angeles/Long Beach	76.3	10	5
San Francisco Bay	21.6	0	10
Portland/Columbia River	37.1	60	0
Puget Sound	25.6	10	5
State			
California	109.7	10	10
Oregon[a]	20.0	100	-20
Washington	42.7	10	5
Alaska	26.2	5	0
Hawaii	19.6	5	10
Five-State Region	218.2	17.2	3.3

[a]Oregon's sharp growth rate in 1982 is primarily caused by the construction of Pacific Coal's $60 million coal export terminal. The decline in 1983 is related to the completion of this work. A similar effect can be noted for the Portland/Columbia River port area.

Source: TBS survey of port authorities and TBS estimates.

- A new deepwater petroleum terminal began construction in 1981 for Arco and Shell Oil and is expected to open in November 1982. Cost: $23 million.

- Construction was also started on two new auto terminals north of Cerritos Channel.

- A 50-acre container facility for OOCL is being developed at Pier J. This will require two new container cranes.

- A $15 million expansion of the Pier G dry bulk terminal has begun.

- Plans are well along for construction of the Long Beach International Coal Project in Inner Harbor to increase coal export capacity from 5 million tons in 1985 to 30 million tons by 1990. Cost: about $150 million.

- Long Beach will also participate with Los Angeles to build a 104-acre Intermodal Container Transfer Facilities; studies are underway, with completion scheduled for 1983. Cost: about $64 million (in 1981 dollars).

San Francisco

- A $94 million, 5-year Capital Improvement Plan is being initiated to renovate several existing facilities. Construction is to begin in January 1983. Phase I ($57 million) will include two new container berths, four gantry cranes, a railyard and 54 acres of container storage in the Pier 94-96 area. The berths are to be ready by 1986-87. Another $10 million improvement is slated for the Army Street Terminal.

Oakland

- The new container facilities at Berths 5 and 6 in the Outer Harbor were dedicated in 1981 (cost $28 million). This involves 60 acres, a 40-ton gantry crane, and two 900-foot berths.

- Another major container project is underway: the $45 million, 43-acre Charles P. Howard Container Terminal in the Inner Harbor, due for completion in September 1982.

Stockton

- Coal handling facilities are being expanded by Metropolitan Stevedoring Company. Cost: $3 million.

- A $70-80 million channel dredging project was begun in 1982, to deepen the channel from 30 feet to 35 feet.

San Diego

- A new general cargo import storage warehouse is being built at the Port of San Diego, in National City. Cost: $4 million.

Portland

- Pacific Coal Corporation is building a $60 million coal export terminal at the Port of Portland's Rivergate Industrial District. It is slated to begin operations in July 1983, with a capacity of 12 million tons per year of western steam coal.

- The Terminal 6 container complex was completed in October 1981 ($18 million).

- A doubling of the capacity of Terminal 5's grain elevator, leased to Columbia Grain Company ($17 million), was started in December 1981.

- Renovation of Terminals 1 and 2 (general cargo) is planned.

- The Marine Terminals Master Plan foresees a total of $270 million in expansion and reconstruction.

Astoria

- Pan Ocean Bulk is renovating a grain export facility.

Seattle

- The new Terminal 46 container complex for American President Lines was dedicated in early 1982 (cost: $29 million).

- A renovation of Terminal 5 is planned, including the acquisition of land to expand the existing Sea-Land facility. Cost: $15 million.

- There are plans to expand Terminal 18 for handling additional containers (two new cranes). Plans have also been authorized to turn Terminal 20 into a 30-acre single berth container facility. Cost: $23 million.

- Seattle plans to spend $152 million on capital improvements to the waterfront over the 1981-1985 period.

Tacoma

- A container-handling railyard was completed in 1981. Cost: $0.7 million.

- A new three-berth facility is to be built for Sea-Land. Cost: $30 million.

- An engineering and construction budget of $21 million is foreseen for 1982. There are preliminary plans for a large container shipping area and intermodal railyard.

Port Longview

- A new sugar beet pellet export facility was completed in 1981 ($0.9 million).

- There are plans to convert alumina docks into a bulk coke loading facility ($20 million).

Valdez

- An innovative container/general cargo terminal is due for completion in 1982 ($48 million).

Seward

- A marine industrial park began construction in October 1981. The 100-acre park will cost $60 million over four phases, and will include seven dry berthing positions for 250-foot ships, a ship transfer area and ship repair facilities.

Homer

- Ocean berths, a barge berth and a new fishboat dock are planned.

Anchorage

- A 1,000-acre expansion at Fire Island is planned.

Hawaii

- Expansion of facilities to serve Oahu's long-range needs is planned at Barbers Point. The dredging and preliminary design and development of the facility will cost $60 million.
- Expanded container facilities are being developed at Sand Island in Honolulu Harbor, to provide 97 acres of container yard area and 1,400 feet of pier.
- Expansion of the commercial fishing vessel facilities in Honolulu Harbor is planned.
- Improvements are scheduled over the next several years to the state harbors of Hilo, Nawiliwili, Kawaihae, Kahului and Kaunakakai.

APPENDIX A

DETAILED REVIEWS OF PREVIOUS IMPACT STUDIES

- Ports of Los Angeles and Long Beach
- San Francisco Bay Area
- Port of Hueneme
- Port of Portland
- Oregon Ports
- Port of Seattle
- Washington Public Ports
- Sea-Land
- Port of Baltimore
- Port of Philadelphia
- Ports of South Carolina

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORTS OF LOS ANGELES AND LONG BEACH

Title: Economic Impact of Waterborne Commerce Through the Ports of Los Angeles and Long Beach, by Williams-Kuebelbeck and Associates, March 1976.

Base Year: 1974

Study Area: Five county area--Los Angeles, Orange, Riverside, San Bernardino and Ventura counties.

Study Objectives: To estimate the direct and indirect employment and revenues generated by the flow of waterborne cargo, by commodity classes, through the ports of Los Angeles and Long Beach.

Assessment of Study: The report generally provides very little detail. While the survey results can serve as a broad check on employment and revenue levels, the detail is not adequate to serve as a sound base for updating. Also, the per ton impact data is not particularly useful, since it aggregates direct and indirect impact. The multipliers are not refined to an industry basis, or differentiated by type of impact (e.g., employment, payroll, revenues).

Direct Impact: The study focused on a survey (850 questionnaires) of waterborne commerce-related firms. These firms are defined as providing goods or services related to the movement of waterborne cargo through the ports, or as largely dependent upon port cargo movement. In addition to typical maritime firms, certain manufacturing and distribution firms that import and export goods through the ports are included.

The direct impact was measured in terms of number of employees, revenue, payroll, residence of employees, proportion of revenue dependent upon waterborne commerce, tax payments, and purchases of goods and services.

Direct waterborne commerce-related impact (for 1974) can be summarized as follows:

Impact	Type of Activity: Transport	Manufacturing	Other	Total
Employment[1]	99.7	11.8	10.0	121.5
Revenue[2]	3,546	1,059	851	5,456
Payroll[2]	1,198	136	98	1,432
Local Purchases[2]	666	786	726	2,178
Taxes[2]	-	-	-	260

[1]In thousands.
[2]In millions of dollars.

Multiplier: The multiplier was developed by constructing, on a theoretical basis, a formula which yielded a single multiplier for the 5-county area, and another for the total hinterland of the ports. The formula was based on the average propensity to consume, and on the proportions of revenue paid out in payroll and for purchases of inputs. The results were:

5-county multiplier: 1.80
Hinterland multiplier: 2.49

For each area, the multiplier was used to determine total employment, revenue, payroll, purchases and taxes.

Impacts per Cargo Ton: On a short ton basis, the total (direct plus indirect) impact was allocated to cargo flows of about 54 million tons through the two ports. Key impacts were as follows (for 1974):

	Revenue, $ per ton	Payroll, $ per ton	Employment per thousand Tons
All general cargo	535	140	11.9
All liquid bulk	54	14	1.2
All dry bulk	234	61	5.2
Average per ton	183	48	4.1
Passengers (Per passenger)	249	65	5.6

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

SAN FRANCISCO BAY AREA

Title: San Francisco Bay Area In-Depth Study: Port Economic Impact Study, by the U.S. Army Corps of Engineers, August 1976 (preliminary draft).

Base Year: 1973

Study Area: 12 counties in the Bay and Delta areas: Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco Counties in the Bay area and San Joaquin, Sacramento and Yolo Counties in the Delta area. Port areas include San Francisco, Redwood City, Oakland, Alameda, Richmond, and San Pablo Bay/Carquinez/Mare Island Straits; and Stockton and Sacramento.

Study Objectives: To measure the direct and indirect contribution of ocean-going commerce to gross business receipts, employment and payrolls, and to identify the relative importance of major impact components, the incidence by county, and the per ton impact of different cargo types.

Assessment of Study: The study measures direct impact employment and payroll using state employment data, with telephone sample surveys limited to those firms which are only partially water transport related. No induced impact estimates are given. The allocation of direct impact by cargo type is done on an approximate basis.

Definition of Direct Impact: Defined as gross receipts, employment and payrolls attributable to water transportation and related services, and to activities which make direct use of deep-draft vessels in business and military operations. Direct impact of water transportation is not limited to shipping and cargo handling, but includes a broad range of industries which receive or distribute materials via large vessels, and military installations whose operations require deep-draft access.

Induced Impact: Not included in the preliminary draft.

Methodology: Employment and payroll data for all 100 percent waterborne commerce-related activities were obtained from the records of the California Employment Development Department.

Telephone sample surveys were then utilized to measure direct impact on partially-related industries. Gross receipts were derived from payroll data on the basis of county statistics by industry, and on the basis of estimated receipts-to-payroll ratios for certain industries (including water transportation).

Impact Results: Summary of direct impact (1973):

Activity	Employment	Payroll (million $)	Gross Receipts (million $)
Water transportation	11,970	197.0	400.0
Deep Sea, Foreign	6,100	123.0	246.0*
Deep Sea, Domestic	1,760	24.2	48.0*
Towing and Tugboat Services	200	3.1	6.0*
Shipbuilding and Repair	2,620	31.4	62.0*
Port Contract Construction	380	5.0	18.0
Miscellaneous Services	910	10.0	20.0*
Land Transportation	2,170	29.0	60.0
Marine Cargo Handling	5,430	63.0	120.7*
Administrative Activities	2,400	33.0	95.0*
Government Agencies	1,440	20.0	36.0
Manufacturing	17,290	218.0	469.0
Wholesale/Retail	10,120	120.0	1,726.0
Agriculture	7,800	32.0	159.0
Military Bases	29,120	321.0	417.3
Total	87,740	1,033.0	3,483.0

*Estimated.

Direct Impact by Cargo Type (1973; short tons):

Cargo Type	Jobs/ 1,000 tons	Wages $/ton	Gross Receipts $/ton
Containerized	4.24	55.5	335.6
Breakbulk	5.21	62.6	313.7
Dry bulk	2.32	23.0	59.6
Liquid bulk	0.24	3.5	7.1
Petroleum	0.20	2.9	5.7
Other	2.25	30.8	71.0
Total all cargo	1.21	14.6	63.1

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORT OF HUENEME

Title: The Economic Impact of the Port of Hueneme, by John J. McMullen Associates, Inc., January 1978.

Base Year: Survey conducted in late-1977.

Study Area: City of Port Hueneme, and Ventura County.

Methodology: Employment, payroll and local taxes were chosen as measures of economic impact. Direct and indirect impact were measured by survey, with induced impact computed using a theoretical approximation for the successive rounds of spending.

Assessment: This study does not relate impact to the cargo moving through the port, so there is no useful basis for updating the results. The exclusion of revenue data from the survey also limits the usefulness.

Impacts Considered: The employment and payroll impacts are divided into primary (direct and indirect) and induced components. Primary-direct impacts are those generated by businesses actually engaged in port-related activities; primary-indirect impacts are those generated by the purchases of materials and supplies made in the local economy by port-related businesses. Induced impacts are those which result from the local spending of wages paid to employees of both primary-direct and indirect activities.

The categories of direct port-related activities surveyed are:

- Offshore oil industry
- Ocean product harvesting/processing (fish and kelp)
- Lumber wholesaling/retailing
- Auto importation/processing, and
- Other direct port-related activities.

The indirect activities include, in addition to suppliers to the direct activities, the expenditures of crew members from ocean freight vessels, and the vessels' purchases of supplies.

The induced impact is computed using an estimate of the proportion of wages devoted to consumption, and an estimate of the proportion of consumption expenditures spent locally. The employment multiplier on locally-held (in Ventura County) primary jobs is 1.31.

Results - (see Summary of Findings, attached)

Table 1

SUMMARY OF FINDINGS

Impact	City of Port Hueneme	Balance of Ventura County	Total Ventura County	Other Areas	Total
Employment					
- Direct	140	686	826	220	1,046
- Indirect	*	*	145	39	184
- Induced	*	*	237	63	300
- Total	*	*	1,208	322	1,530
Payroll ($ million)					
- Direct	2.0	9.9	11.9	4.0	15.9
- Indirect	*	*	2.2	0.6	2.8
- Induced	*	*	3.1	1.0	4.2
- Total	*	*	17.3	5.6	22.9
Purchases ($ million)	*	*	8.9@	+	+
Taxes ($ million)	0.1	0.3	0.4	+	+

* Insufficient data was available to provide a breakdown of the split between the city of Port Hueneme and the balance of Ventura County.

\+ Not calculated.

@ Also used in calculating indirect employment and payroll.

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORT OF PORTLAND, OREGON

Title: Community Economic Impact of the Marine Terminals of the Port of Portland, by Economics Research Associates, 1976.

Base Year: 1975

Study Area: Direct impact--includes the four-county Portland-Vancouver SMSA (Multnomah, Clackamas and Washington Counties in Oregon, plus Clark County in Washington).
Indirect impact--State of Oregon.

Assessment of Study: The quality of the study appears good. A fair sample of firms was obtained, and the approach follows the 1975 University of Maryland study of the port of Baltimore. The greatest weakness is that the study was limited to the Port of Portland Marine Terminals, which excludes a number of private terminals and apparently covers only about one-third of total tonnage (according to the report). This one-third figure probably does not include tonnage handled at other area ports, such as Vancouver, Longview, etc.

Direct Impact per Ton (1975 data):

Cargo Type	Direct Impact per Short Ton
Autos	$120.23
Breakbulk	58.96
Containerized	44.43
Neo-bulk (logs, lumber, steel)	23.25
Liquid bulk	16.49
Dry bulk (excl. grain)	8.02
Grain	5.56

Multipliers

Source: Oregon Economic and Trade Structure, University of Oregon, 1969. Type II multipliers, from 68-sector I/O model.

Category	Multiplier (used for value-added
Vessel disbursements	2.22
Crew expenditures	2.12
Marine insur. & intl. banking	2.51
Inland transportation	2.22
Port Services	2.22
Manufacturing	2.30
Non-manufacturing	2.17
Governmental Agencies	2.41

Comparison of Study Tonnage Data with PMA Data

Category	ERA Study Tonnages short tons	PMA 1975 Portland revenue tons	PMA 1975 Oregon Total
Breakbulk	242	478	984
Containerized	375	560	588
Grain and dry bulk	1,379	4,567	13,269
Neo-bulk (lumber, logs, steel)	729	327*	2,440*
Autos	62	482	637
Liquid bulk	107	-	-
Total	2,892	6,413	17,918

*Includes logs and lumber only.

Type of Impact Measured

- Direct impact, measured by direct survey, discussions and estimates. Following categories: Vessel disbursements (tugs, pilotage, stevedoring, etc.); Crew expenditures (distinct for U.S. and foreign); International banking and ocean marine insurance services; Inland transportation (within State of Oregon); Miscellaneous port services.

Includes only public-owned terminals in Portland representing about one-third of total tonnage handled by the port. Vessel disbursements and inland transportation are the largest cost categories.

- Induced impact, computed by applying University of Oregon I/O model multipliers to value-added figures (estimated as percentage of gross revenues) of direct impact and port user impact. Calculated in terms of value-added, payrolls, and employment.

- Port user impact, measured by direct survey and estimates, includes manufacturing and non-manufacturing firms located in the Portland area. No attempt made to determine degree of dependence on port. Only final shippers and initial consignees are included so state of Oregon data is not much higher than just Portland SMSA. Agriculture and forestry are not included, except to the extent that trading companies in Portland handle such goods. Category also includes government port services (U.S. Army Corps of Engineers, U.S. Coast Guard, Portland Fire Department).

Impact Elements

Gross revenues, value-added, employment, payroll, taxes.

Taxes are measured in terms of state and local taxes; customs duties are also mentioned.

REVIEW OF PORT ECONOMIC IMPACT STUDIES:

OREGON PORTS

Title: Oregon Ports Study - 1980, by Ogden Beeman and Associates, Manalytics, Inc., and Benkendorf-Evans Ltd., July 1980.

Base Year: 1977

Study Area: State of Oregon. Database for direct impact includes Clark County, Washington State.

Methodology: The measurement of economic impact is based on the Economics Research Associates study of the Port of Portland, which used 1975 as the base year. The Portland study followed the approach of quantifying inputs per ton of cargo, so it was possible to update the coefficients, apply new tonnages, and extend the results to other ports in the state.

Assessment of study: This study presents a sound methodology and useful results. Direct impact data per ton are computed for nine cargo categories.

Impacts considered:

Direct impact--revenues generated by vessel movements and by the cargo carried in oceanborne (foreign and domestic) trade. Consists of vessel disbursements, crew expenditures, inland transportation, marine insurance and banking, and port services.

Indirect impact--the value-added by port users and by governmental and private agencies whose activities are port-related.

Induced impact--income produced in the state of Oregon by the successive rounds of consumption expenditures resulting from the value-added generated at the direct and indirect levels of impact.

Direct Economic Impact:

Revenues--$281.8 million;
Value-added--$208.3 million;
Payrolls--$124.5 million;
Jobs--7,522.

DIRECT ECONOMIC IMPACT PER TON
(dollars per short tons)

Commodity Group	Vessel Disbursements	Crew Expenditures	Inland Transportation	Marine Insurance & Banking	Port Services	Total
General Cargo						
--Breakbulk	34.39	0.80	25.71	3.04	7.95	71.89
--Container	16.29	0.31	25.71	3.04	8.11	53.46
Grain	2.02	0.25	3.52	0.38	0.46	6.63
Vehicles	41.11	0.61	35.94	9.65	60.09	147.40
Petroleum	0.95	0.04	(1)	(2)	(2)	0.99
Wood Chips	0.68	0.03	4.19	0.08	0.10	5.08
Other Dry Bulk	6.57	0.21	2.80	0.15	0.18	9.91
Other Liquid Bulk	4.99	0.20	12.35	0.93	1.13	19.60
Other Neobulk	19.86	0.53	7.24	0.41	0.50	28.55

1) Imports and domestic offshore receipts are direct movements to consignee facilities at tidewater. Therefore there is no direct impact for inland transportation.
2) It is assumed that these transactions are intra-company and that insurance and banking are handled at company headquarters out of state and that port services, as defined are not required.

Source: Oregon Ports Study - 1980.

Updating Factors Employed: Vessel disbursements and port services--adjusted by the hourly cost of longshore labor, as published in the Annual Report of the Pacific Maritime Association.

Crew expenditures--adjusted by the consumer price index for the Portland area.

Inland transportation--adjusted by the rail, truck and inland water rates.

Insurance and banking--adjusted by the producer price index.

Multipliers for Induced Impact: Taken from the University of Oregon input-output model (68 sector matrix). Multipliers used were as follows:

Direct

Vessel disbursements	2.22
Crew expenditures	2.12
Inland transportation	2.22
Insurance, banking	2.51
Port services	2.22

Indirect

Manufacturing	2.30
Non-manufacturing	2.17
Agencies	2.41

Total Impact (million $):

	Value-Added	Induced	Total
Direct	208.3	255.7	464.0
Indirect	573.9	737.8	1,311.7
Total	782.2	993.5	1,775.7

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORT OF SEATTLE

Title: Seattle Maritime Commerce and Its Impact on the Economy of King County, by Port of Seattle Commission, Planning and Research Department, 1971.

Base Year: 1969.

Study Area: Seattle Port District (King County).

Study Objectives: To evaluate the impact of Seattle maritime commerce upon the economy of King County.

Assessment of Study: First, the study is quite out of date (1969); containerized cargo was just beginning. Second, the direct impact was thoroughly surveyed (4,500 questionnaires). Third, the presentation of results is so aggregated that it is not possible (unless detailed back-up data exist) to accurately allocate direct impact to cargo volumes. Finally, the brochure is nicely laid out, with excellent graphics and tables.

Direct Impact: Includes categories of water transportation, surface transportation, transportation services, and manufacturing. For each category, number of jobs, gross annual payroll and sales and/or revenues are given. Manufacturing included in direct impact relied upon the survey respondents' own evaluation of how important proximity to the harbor was in the conduct of their business. Selected categories include (1969 data):

	Number of Jobs	Payroll ($ million)	Revenues ($ million)
Steamship companies - afloat staff	678	8.4	130.0
Tug/barge companies - afloat staff	1,047	9.8	48.0
Pilotage and berthing services	35	0.5	0.9
Ship chandlers, vessel suppliers	254	2.4	5.7
Ship construction and repair (commercial)	1,527	13.0	24.0
Commercial fishing	675	6.5	15.0
Water Transportation	4,216	40.6	223.6
Rail	967	9.0	18.4
Truck	457	5.0	13.1
Air	10	0.1	0.5
Surface Transportation	1,434	14.1	32.1
Marine construction	189	1.6	4.7
Stevedoring, drayage, warehousing	2,585	24.5	45.8
Administrative activities-private	1,704	14.4	8.2
Administrative activities-public	2,111	20.5	47.1
Other waterfront activities	242	3.8	4.4
Transportation Services	6,831	64.8	110.3
Total Transportation	12,481	119.5	365.9
Total Direct (including manufacturing, wholesale)	25,400	227.6	754.5

Induced Impact: the 1967 Washington State input/output tables were used to estimate induced and total impact. The implicit total multipliers are as follows (for King County):

	Employment	Payrolls	Revenues
Multiplier	1.54	1.41	1.37
Direct Impact	25,400	$227.6	$ 754.5
Total Impact	39,087	$322.0	$1,036.5

Impact per ton: The impact per ton data is not useful, since the direct impact category includes such items as fishing, ship construction, and manufacturing activities. The allocation of impact to cargo volumes is done on an aggregate basis, and details are not provided.

Taxes: Customs duties, federal income and excise taxes, and state and local taxes are given, with no discussion of the estimation procedures.

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

WASHINGTON PUBLIC PORTS

Title: Washington Public Ports Economic Study, by Williams-Kuebelbeck and Associates, Inc., Dec. 1978.

Base Year: 1976

Study Area: Port-related impact was measured by survey in the 18 public port districts of Washington State, with induced impact computed for the state as a whole.

Objective of Study: Assess the economic impact on Washington State accruing from the public ports. Assess funding sources and alternatives, and compare with state and local taxes generated by public port district activities.

Assessment of Study: Study addresses impact of port users, defined as firms located on port district land. There is no attempt to assess the direct impact of the maritime industry, or to link impact to cargo tonnages. The definition of port-related firms relies on close physical proximity to the port, and does not correspond to our proposed definitions of the maritime industry or of port users. Considerable emphasis is placed on state and local taxes generated by the port districts.

Impact: 99,100 port-related jobs in Washington State. Payrolls of $1.4 billion. Gross output of $4.5 billion.

Taxes generated:

$90 million	-	property taxes
88 million	-	sales taxes
34 million	-	business, occupation and public utilities taxes
$212 million	-	total taxes

Definition of Firms Surveyed

Port-related business and employment is defined as companies and their employees who depend on the facilities of a port in order to carry out their operations. This includes firms engaged in shipping, receiving or storing goods through

port facilities; tenants of port industrial parks; employment in marinas, charter boats and boat repair. Generally, these businesses had to be located on port property.

Multipliers: Based on the 1972 51-sector Washington State input/output model, and on an update for 1976 aggregating data to a 7-sector level. Steps followed in measuring impact: employment in port-related firms determined by survey; employment multiplier (1.54) used to obtain total state employment generated; from total employment, multipliers are used to obtain final demand, gross output, and payroll, based on the input/output model; final demand is about 53 percent of gross output.

Estimation of Taxes:

- Property taxes estimated per employee, using Washington State Department of Revenue data.
- Sales tax computed based on payroll.
- Other taxes based on gross output.

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

SEA-LAND

Title: The Impact of Sea-Land on the Economy of California, by SRI International, April 1979.

Base Year: 1977

Study Area: State of California, San Francisco Bay Area, and Los Angeles County.

Methodology and Assessment of Study: This study appears to be unique in that it measures the impact of a shipping company's operations on the economy. The direct impact is based on detailed expenditure data and converted to total impact using multipliers. There is no attempt to compute per-ton impact. The port user treatment focuses on exports of goods from California; the impact of imported goods is not assessed.

Impacts Considered:

- Direct, indirect and induced impacts are computed, in terms of value-added and employment.
- Sea-Land operations, shipper/consignee truck moves within California, and the products exported via Sea-Land from California are considered.

Source of Multipliers:

- State of California impacts were computed using the State of California Water Resources Agency's input-output model, with the distribution of impacts among sectors developed from the Lawrence-Berkeley Laboratory's 87-sector California input-output table for 1972.
- San Francisco Bay Area impacts were estimated using the input-output model produced by the University of California at Berkeley (published in July 1978, for the years 1967 and 1974).

- Los Angeles Area impacts were estimated by modifying an existing export base model to create a 4-sector model benchmarked to 1976.

Multiplier Values: (Total = Direct plus Indirect plus Induced)

	Value-Added	Employment
California		
Sea-Land operations	1.82	8.40
Shipper/consignee truck moves	2.95	2.38
Export products	3.77	4.01
San Francisco Bay Area		
Sea-Land operations	1.36	4.89
Los Angeles Area		
Sea-Land operations	1.49	4.98

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORT OF BALTIMORE

Title: The Economic Impact of the Port of Baltimore on Maryland, by Stanley J. Hille et. al., University of Maryland, April 1975.

Base Year: 1973

Study Area: State of Maryland

Methodology: The direct impact arising from traffic handled at the port was measured by survey questionnaires, as was the impact of port-dependent industries. The survey approach developed by the University of Maryland in a 1969 study of the Port of Baltimore is similar to that adopted by the later studies of Philadelphia and Portland. Total impact was calculated using estimated multipliers.

Assessment of study: The measurement of direct impact appears to be well done, with an accurate allocation to various cargo types. The multipliers appear to be estimates only; no source is given in the report. The per-ton impact data for breakbulk, containerized, automobile and bulk vessels are useful for comparison.

Impacts considered:

Direct impact--The value-added arising directly from the traffic handled by the port. Components are: vessel disbursements, surface transportation, crew expenditures, marine insurance and international banking, and port services.

Indirect impact--The value-added by activities which are dependent on the port but not directly related to the traffic handled by it. The components of indirect impact are port-dependent primary metals processing, shipbuilding, other port-related manufacturing, and government agency expenditures.

Induced impact--The value-added arising in other components of the state's economic system because of the existence of the primary impacts.

Direct Impact per Short Ton

Category	General Cargo	Bulk Cargo	Container[1]	---Automobiles[2]-- Import	Export
Vessel Disbursements	20.58	0.64	5.96	15.63[3]	16.81
Services	(2.27)	(0.16)	(0.61)	(2.81)	(1.91)
Government Requirements	(0.14)	(0.02)	(0.07)	(0.25)	(0.26)
Loading, Discharging	(15.08)	(0.19)	(3.57)	(12.65)	(13.60)
Supplies	(0.52)	(0.12)	(0.04)	(0.14)	(0.15)
Bunkering	(2.57)	(0.15)	(1.68)	(0.82)	(0.88)
Crew Expenditures	0.67	0.04	0.15	0.40	0.40
Surface Transportation	7.95	4.30	4.51	24.19	13.09
Insurance and Banking	0.79	0.08	0.79	1.70	1.70
Port Services	3.36	1.41	10.24	17.96	15.30
Direct Impact per Ton	33.35	6.48	21.65	59.81	47.30
Average:				55.48	

[1]Average weight of 11.9 short tons per container.
[2]Average weight of 1.35 short tons per auto; 1.2 tons import, 1.75 tons export.
[3]Detailed data for vessel disbursements do not equal the total in the study.

Definitions of Direct Impact Categories:

Vessel disbursements: Services (tugs, consular, radio/radar, pilotage, launch, surveyors, line running); Government requirements (overtime for quarantine, immigration, and customs, entrance or clearance, and fumigation); cargo handling (stevedoring, checking, clerking, watching, cleaning, fitting, and equipment rentals for cargo loading and/or unloading); supplies (ship chandlering, laundry, dunnage, medical services); bunkering (water and fuel).

Crew expenditures: Estimated expenditures by vessel crews on food, drink, entertainment, and personal supplies.

Surface transportation: Rail and truck movements within the state of Maryland.

Insurance and international banking: Insurance premiums and direct loss payments; total income of the international divisions of banks operating in Baltimore (including net income from foreign loans, profits on foreign exchange, commissions on drafts and letters of credit, etc.).

Port services: Export managers, customs house brokers and foreign freight forwarders; export packaging, crating, warehousing and grain storage facilities; automobile and truck servicing; cargo weighing, sampling and inspection analysis; steamship owners and operators; and all other (dredging services, divers, fumigation, cooperage, communications, etc.). Double-counting was avoided by eliminating payments included elsewhere. The value-added by steamship common carriers was taken as that portion of revenue exceeding what was computed as vessel disbursements.

Multipliers: The multipliers used to convert direct impact into total impact are as follows:

Vessel Disbursements:	
Services	1.78
Government Requirements	1.85
Loading, discharging	1.71
Supplies	1.78
Bunkers	0.85
Crew expenditures	2.01
Surface transportation	1.78
Insurance and banking	1.85
Port services	1.71

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES

PORT OF PHILADELPHIA

Title: Port Facilities Study: City of Philadelphia, by Tippetts-Abbett-McCarthy-Stratton and Regional Science Research Institute.

Base Year: 1975

Study Area: City of Philadelphia, the 11-county Ports of Philadelphia region, and the State of Pennsylvania.

Methodology: Direct impact was measured by survey of expenditures related to a typical vessel call at the port, similar to the Baltimore study. The multipliers are based on the Philadelphia Region Input-Output Model, updated using information from the Economic Censuses of 1972 and adapting the model to the city, region and state.

Assessment of Study: Sound measurement of direct impact for breakbulk, containerized, and bulk cargoes. Multipliers developed from input/output model. The per-ton impacts are a useful source of comparative data.

Impacts Considered:

- Port complex activities--involved in getting the ships in and out, loaded and discharged.
- Port-related public sector services--government services whose level of operation is only marginally affected by the amount of cargo handled.
- Strongly port-dependent manufacturing firms--industries which are so highly dependent on the port that it is hard to imagine their existence without the port.

For each type of impact, the direct effect was measured by survey and the total effect obtained by applying the appropriate multiplier from the input-output model.

Direct Impact of Port Complex Activities per Cargo Ton
($ per short ton)

Category	Breakbulk	Containerized	Bulk
Vessel and Term. Expends.	28.98	16.09	2.00
Land Transportation	5.87	5.29	4.20
Crew Expenditures	1.11	0.16	0.38
Other Services	2.03	1.65	0.97
TOTAL	37.97	23.19	7.55

Definitions of Port Complex Activity Categories

- Vessel and terminal expenditures--pilotage, docking, lighterage, customs, line running, launch, quarantine, entrance/clearance; stevedoring, clerking, checking, cleaning/fitting, watching, equipment rental; wharfage, warehousing, storage, export packing, container stuffing; chandlering, laundry, water, repairs, medical, dunnage, oil, fumigation, radio/radar, surveyors.

- Land transportation--motor and rail freight.

- Crew expenditures--spending by crew members ashore, based on number of days ashore and spending estimates per day furnished by steamship agents.

- Other services--steamship agents, freight forwarders, banking, and insurance.

Multipliers: The results obtained from the input-output model indicate revenue or output multipliers of:

City of Philadelphia	1.8
11-county region	2.0
State of Pennsylvania	2.2

REVIEW OF EXISTING PORT ECONOMIC IMPACT STUDIES:

PORTS OF SOUTH CAROLINA

Title: Impact of the State Ports Authority Upon the Economy of South Carolina, by David R. Pender and Ronald P. Wilder, University of South Carolina, October 1974.

Base Year: 1973

Study Area: State of South Carolina

Methodology: Direct impact determined by survey of port service and port-dependent firms. The estimated portion of port services revenue remaining in the state was added to the value-added by the port related activities of industries dependent upon the port to give direct impact. A rough multiplier of 2.0 was assumed, using an economic base model. The report also includes an analysis of proposed new port facilities.

Assessment of study: This study does not contain any items of methodological interest to the PMSA study.

APPENDIX B

SOURCES CONSULTED FOR PORT USER ANALYSIS

GENERAL SOURCES

U.S. Department of Commerce:

1980 Census of Population
1977 Census of Manufactures
1977 Census of Mining
1978 Census of Agriculture
1980 Annual Survey of Manufacturers - Origin of Exports of Manufactured Goods
1979 County Business Patterns
1980 Foreign Trade Reports

International Trade Administration

U.S. Department of Labor
(Workforce and Employment Statistics)

U.S. Environmental Protection Agency

U.S. Department of Agriculture
Forest Service Regional Station (Pacific States)
Crop + Livestock Reporting Service

U.S. Bureau of Economic Analysis - Regional Economic Information System

Western Wood Products Association, Portland, Oregon

National Forest Products Association, Washington, D.C.

Chevron Shipping Company

ALASKA

State of Alaska: Department of Labor

Department of Commerce and Economic Development

Division of Budget and Management

Department of Transportation

University of Alaska, Institute of Social and Economic Research, Anchorage, Alaska

Seattle First National Bank, Seattle, Washington

CALIFORNIA

State of California: Department of Finance

Department of Economic and Business Development
(Office of Economic Policy, Planning & Research)
(International Trade Office)

Southern California Association of Governments

Security Pacific Bank

Bank of America

Semiconductor Industry Association

West Coast Metal Importers Association

American Apparel Manufacturers' Association

California Dried Fruit Export Association

HAWAII

State of Hawaii: Department of Planning and Economic Development

Hawaii Chamber of Commerce

Bank of Hawaii

Pineapple Growers Association

Sugar Planters Association

OREGON

State of Oregon: Department of Economic Development
(Research Library)
(Ports Division)
(International Trade Division)

Department of Commerce

Department of Human Resources

Port of Portland

Oregon State University (Extension Service) Corvallis, Oregon

University of Oregon (Bureau of Government Research)

"Grain Market News", Portland, Oregon

U.S. National Bank, Portland, Oregon

"Community Economic Impact of the Marine Terminals of the Port of Portland" prepared by Economics Research Associates

WASHINGTON

State of Washington: Department of Commerce and Economic Development

Department of Revenue

Office of Financial Management

University of Washington

Economic Development Council of Puget Sound

Puget Sound Council of Governments

Seattle Chamber of Commerce

Seattle First National Bank

Washington Apple Commission

Weyerhaeuser Company

Washington Public Ports Association

Port of Tacoma

"1980 Port System Study for the Public Ports of Washington State" prepared by CH2M Hill

APPENDIX C

SAMPLE SURVEY QUESTIONNAIRES

Questionnaire for Shipping Companies and Steamship Agents

- Part I
- Part II

Questionnaire for Port Authorities

Questionnaire for Shipyards

* * * CONFIDENTIAL * * *

(information will not be disclosed except in a consolidated form)

PACIFIC COAST MARITIME INDUSTRY STUDY

Temple, Barker & Sloane, Inc.
33 Hayden Avenue
Lexington, Massachusetts 02173

in association with

Recht Hausrath & Associates
155 Bovet Road
San Mateo, California 94402

PART I.
DESCRIPTION OF MARITIME BUSINESS ACTIVITIES

The purpose of Part I is to obtain a general description of the nature of the firm's maritime activities and to allocate expenditures and employment by port, as far as possible. Please fill in the requested data for each port served. Estimates should be given in cases where precise information is difficult to obtain. All information should be for calendar year 1981; please indicate period covered (_____ to _____) if your data refers to a different period.

Name of Firm _____

PART I. DESCRIPTION OF MARITIME BUSINESS ACTIVITIES

A. Type of Business/Activity by Port (Enter name of port on first line, then check appropriate items)	Port:	Port:	Port:	Port:
	_____	_____	_____	_____
Shipowner/operator	_____	_____	_____	_____
Steamship agent	_____	_____	_____	_____
Terminal operator	_____	_____	_____	_____
Tug/barge operator	_____	_____	_____	_____
Other (specify)	_____	_____	_____	_____

B. Location of West Coast Headquarters (city): _____

C. Revenues (1981)

Corporate revenues _____

Revenues from maritime activities _____

D. Employment (1981)

Total number of employees _____

Total payroll (salary, wages, benefits) _____

Number of seagoing staff _____

Payroll of seagoing staff _____

E. Employment by Port	Port:	Port:	Port:	Port:
Number of shoreside employees working in each port area (1981), excluding headquarters staff	_____	_____	_____	_____
	_____	_____	_____	_____
Payroll for these employees	_____	_____	_____	_____

F. Residence of Seagoing Staff
(For U.S.-Flag Steamship Companies Only:)

Please estimate the percentage of seagoing staff that resides in the metropolitan area of your company headquarters: _____

G. Expenditures

The purpose of these questions is to determine expenditures by port area, including corporate expenses which would not be covered in the detailed questions of Part II. List amounts in thousands of dollars, spent by port area, for 1981. Amounts which cannot be allocated by port should be included under the port area of company headquarters.

	Port: ___	Port: ___	Port: ___	Port: ___	Pacific Coast States Total	Total Outside Pacific States	Grand Total
Bunkers							
Supplies, repairs, materials, and Services							
Capital charges (interest, depreciation, lease payments)							
Federal income tax							
State income tax							
Local income tax							
Sales tax (state/local)							
Property tax							
Other taxes (specify)							
Total Expenditures							
New investment in Vessels, Containers							
New investment in Shoreside Facilities							

H. Number of Vessel Calls Handled in 1981

	Port:	Port:	Port:	Port:
Breakbulk vessels				
Containerships				
Automobile carriers				
Log and lumber carriers				
Dry bulk carriers				
Liquid bulk carriers				

I. Inland Transportation

Please provide your best estimate of the proportion of freight handled which arrives from/moves to inland points by each mode of transportation, and the average distance of the inland move. Please make separate estimates for the two vessel types you most often handle, using the six vessel types listed above (breakbulk, container, automobile, logs/lumber, dry bulk and liquid bulk vessels).

	Port:	Port:	Port:	Port:
1. Vessel Type _____	___	___	___	___
Inland move, by transport mode, %				
o Rail	___	___	___	___
o Truck	___	___	___	___
o Barge	___	___	___	___
Total	100.0	100.0	100.0	100.0
Inland move average distance, miles				
o Rail	___	___	___	___
o Truck	___	___	___	___
o Barge	___	___	___	___
2. Vessel Type _____				
Inland move, by transport mode, %				
o Rail	___	___	___	___
o Truck	___	___	___	___
o Barge	___	___	___	___
Total	100.0	100.0	100.0	100.0
Inland move average distance, miles				
o Rail	___	___	___	___
o Truck	___	___	___	___
o Barge	___	___	___	___

J. Comments

Please provide any additional comments, clarifications or information below:

_____

_____

_____

_____

Name and Title of Respondent _____

Telephone Number _____ Do you wish us to return this form to you? ____Yes ____No

Thank you for your cooperation. If you have any questions, please feel free to call Mr. Jim Brennan (until March 25th) or Mr. David Bovet (after March 25th) at Temple, Barker & Sloane, Inc. (617/861-7580).

Please return Parts I and II of the completed questionnaire form to Temple, Barker & Sloane, Inc. in the enclosed postage-paid envelope.

* * * CONFIDENTIAL * * *

(Information will not be disclosed except in a consolidated form)

PACIFIC COAST MARITIME INDUSTRY STUDY

Temple, Barker & Sloane, Inc.
33 Hayden Avenue
Lexington, Massachusetts 02173

in association with

Recht Hausrath & Associates
155 Bovet Road
San Mateo, California 94402

PART II.
TYPICAL PURCHASES FOR A VESSEL PORT CALL

Please complete the Part II information once for a typical visit at each port served, and for each type of vessel involved; e.g. for a typical call at Long Beach, once for a representative containership and once for a typical breakbulk vessel, if your firm handles both types. This may require filling out Part II several times; we appreciate your patience.

The intent of this section is to obtain representative data on transportation costs directly attributable to a ton of cargo, by vessel type and by port. Estimates should be made in cases where precise information is difficult to obtain. For steamship agents handling several shipping lines, please select a typical vessel which is representative of the ship type indicated.

Name of Firm _____

Part II. TYPICAL PURCHASES FOR A VESSEL PORT CALL

A. Port: _____

B. Type of Ship

Breakbulk _____ Container _____ Auto carrier _____

Logs/Lumber _____ Dry bulk _____ Liquid bulk _____

Other (please specify) _____

Deadweight tonnage _____

TEU (container) or vehicle capacity (auto carrier): _____

Registry of vessel _____

Number of crew members _____

C. Type of Trade

Foreign _____ or Domestic _____

D. Port Activity

Terminal used _____

Typical Hours in Port: Loading and Unloading _____ Other _____

Please provide the following typical data in revenue tons or long tons, as appropriate:

Total revenue tons discharged	_____	Total revenue tons loaded	_____
--Breakbulk cargo	_____	--Breakbulk cargo	_____
--Containerized cargo	_____	--Containerized cargo	_____
--Autos	_____	--Autos	_____
--Logs & Lumber	_____	--Logs & Lumber	_____
--Dry Bulk	_____	--Dry Bulk	_____
Total long tons discharged	_____	Total long tons loaded	_____
--Liquid Bulk	_____	--Liquid Bulk	_____
--Dry Bulk	_____	--Dry Bulk	_____

E. Vessel Disbursements (please specify typical dollar amounts, 1981)

Navigational Services:

Tugs	$_____	Launch	$_____	Dockage	$_____
Pilotage	$_____	Radio/Radar	$_____	Lighterage	$_____
Line Running	$_____	Surveyors	$_____	Other	$_____
				Total	$_____

Expenses to meet government requirements:

Quarantine	$_____	Entrance/Clearance	$_____
Immigration	$_____	Customs	$_____
Fumigation	$_____	Miscellaneous	$_____
		Total	$_____

Loading/Discharging Expenses:

Stevedoring	$_____	Cleaning/Fitting	$_____
Clerking & Checking	$_____	Equipment Rental	$_____
Watching	$_____	Other	$_____
		Total	$_____

Banking and insurance expenses:	Inbound Cargo	Outbound Cargo
Letters of credit	$_____	$_____
Bankers' acceptances	$_____	$_____
Marine Cargo Insurance	$_____	$_____

Supplies:

Chandler	$_____	Dunnage	$_____
Laundry	$_____	Provisions	$_____
Medical	$_____	Other	$_____
		Total	$_____

Bunkers:

Oil $_____ Water $_____ Total $_____

Other:

Minor Repairs	$_____	Other (specify)	$_____
Certificates & Fees	$_____	Total	$_____

F. Terminal Expenses (please specify typical dollar amounts, 1981)

In-Transit Storage:

Wharfage	$_____	Grain Storage	$_____
Warehousing	$_____	Refrigerated Storage	$_____
Auto & Truck Storage	$_____	Other	$_____

Cargo Packing:

Export Packing $_____ Container Stuffing $_____

Other Services (please specify nature and cost): _____

_____

_____

G. Comments

_____

_____

_____

_____

_____

Name and Title of Respondent _____

Telephone number ( ) _____.

Do you wish us to return this form to you? Yes_____ No_____

Thank you for your cooperation. If you have any questions, please feel free to call Mr. Jim Brennan (until March 25th) or Mr. David Bovet (after March 25th) at Temple, Barker & Sloane, Inc. (617/861-7580).

Please return the completed questionnaire form to Temple, Barker & Sloane, Inc. in the enclosed postage-paid envelope.

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PACIFIC COAST MARITIME INDUSTRY STUDY

Temple, Barker & Sloane, Inc.
33 Hayden Avenue
Lexington, Massachusetts 02173

In association with

Recht Hausrath & Associates
155 Bovet Road
San Mateo, California 94402

This questionnaire is designed to provide information on the contribution of port authorities to the economies of the Pacific Coast states. Data provided will be aggregated by broad port areas.

Name of port authority: _____

	1981
Annual Revenues (dollars)	_____
Estimated % of Revenues Related to Port Maritime Activities	_____
Payroll (dollars)	_____
Estimated % of Payroll Related to Port Maritime Activities	_____
Number of Employees (total)	_____
Estimated % of Employees Related to Port Maritime Activities	_____
Purchases of Materials, Supplies and Services	_____
Percentage Purchased Locally	_____
Taxes, or Payments in Lieu of Taxes (dollars)	
To State	_____
To Locality (_____)	_____
Capital Expenditures	
Maritime Facilities	_____
Other	_____

	Loaded	Discharged
Cargo Tonnage Handled (1981)		
Revenue Tons	_____	_____
Long Tons	_____	_____
Value (dollars)	_____	_____
Passengers Handled (number)	_____	_____

Name and Title of Respondent_____ Telephone No. _____

We would also appreciate receiving, under separate cover, copies of available descriptive information concerning the port's physical facilities, traffic handled in recent years, your latest annual report, and any marketing publications which describe port activities.

Thank you for your cooperation. If you have any questions, please feel free to call Mr. Jim Brennan or Mr. David Bovet (617/861-7580) of Temple, Barker & Sloane, Inc. Please return this form to Temple, Barker & Sloane, Inc. in the enclosed postage-paid envelope.

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PACIFIC COAST MARITIME INDUSTRY STUDY

Temple, Barker & Sloane, Inc.
33 Hayden Avenue
Lexington, Massachusetts 02173

in association with

Recht Hausrath & Associates
155 Bovet Road
San Mateo, California 94402

This questionnaire is designed to provide information on the contribution of shipyards to the economies of the Pacific Coast States. Data provided by individual firms will not be released except in a consolidated form.

Location of shipyard (city) _____

Annual Revenues, $	1981	1980
Commercial new construction and conversion	____	____
Commercial overhaul and repair	____	____
Naval new construction and conversion	____	____
Naval overhaul and repair	____	____
Total revenues	____	____
Employment	**1981**	**1980**
Total payroll, $	____	____
Number of employees	____	____
Taxes, $		
Federal income taxes	____	____
State income taxes	____	____
Local income taxes	____	____
Sales taxes	____	____
Property taxes	____	____
Other taxes (specify)	____	____

Purchases of Materials and Services

Percentage purchased within metropolitan area _____%

Percentage purchased within state _____%

Comments and Explanations:

_____

_____

_____

_____

_____

Name and Title of Respondent _____

Telephone number ( ) _____.

Firm Name _____

Thank you for your cooperation. If you have any questions, please feel free to call Mr. Jim Brennan or Mr. David Bovet of Temple, Barker & Sloane, Inc. (617/861-7580).

Please return the completed questionnlare form to Temple, Barker & Sloane, Inc. in the enclosed postage-paid envelope.

APPENDIX D

VESSEL EXPENDITURE DATA

This appendix presents vessel expenditure data (direct impact figures) for each vessel type and port area. Survey results and special assumptions are discussed, and expenditure data are tabulated by vessel type. The data are organized as follows:

- Container vessels;
- Breakbulk vessels;
- Automobile carriers;
- Logs and lumber carriers;
- Dry bulk vessels; and
- Liquid bulk vessels.

These are given for each major port area when the survey data justified detailed differences. When the data did not permit differentiation, the same expenditures were applied to all port areas. Puget Sound figures were used for Washington State, Portland/Columbia River data were used for Oregon, and the Los Angeles/Long Beach and San Francisco data were blended (weighted by relative cargo tonnages) for the California impact vector. The final exhibit presents the vessel expenditure vectors utilized for Alaska and Hawaii.

CONTAINER VESSEL EXPENDITURE DATA

SURVEY RESULTS

Los Angeles/Long Beach: 10 vessels, 9 operators
San Francisco Bay: 8 vessels, 8 operators
Portland/Columbia River: 3 vessels, 3 operators
Puget Sound: 6 vessels, 6 operators
Hawaii: 1 vessel, 1 operator
Alaska: 2 vessels, 2 operators

SPECIAL ASSUMPTIONS:

1. Agency commissions--data reported by foreign-flag operators were multiplied by 0.71, representing the proportion of foreign-flag to total liner tonnage on the West Coast in 1980.

2. Freight forwarders--calculated as 1 1/4 percent of the freight charge, with half paid on the West Coast. Using average 1981 conference freight rates on the Trans-Pacific run ($89.66/RT), this becomes $0.56/RT.

3. Customs house brokerage--fees based on estimates provided by the industry of the number of people employed in each port area. The major importing ports (LA/LB and Puget Sound) have more activity than the other two port areas. Comparing fees to total container and breakbulk revenue tonnage, the figures are $1.75/RT for LA/LB and Puget Sound, $1.25/RT for SF Bay and Portland/Columbia River.

4. Banking and insurance--updated from the Portland economic impact study, using a factor of 1.58 (inflation of services from 1975 to 1981), gives $2.16/RT (assuming 2.0 RT/ST)

5. Other professional services--assumed as $0.50/RT for three port areas and $0.40/RT for Portland/Columbia River (naval architects, admiralty lawyers, etc.).

6. Crew expenditures--updated from Portland economic impact study (1.58 inflation factor), giving $0.21/RT.

7. Bunkers--survey results indicate that most containerships bunker in Los Angeles/Long Beach, presumably due to the lower cost.

8. Inland Transportation

Rail Rates: Based on extensive minilandbridge and microbridge data obtained from three operators, a weighted average rail rate per box for inland moves is $1,200. At an average cargo load of 35 RT/box, this is $34.30/RT. Applying half to the West Coast port area, we obtain $17.15/RT.

Truck Rates: Discussions with West Coast trucking firms indicate that, for the average distances reported by shipping companies, $350/box is representative for Portland and $240/box for the other West Coast ports. From shipping company data, SF ay and Portland local (truck) cargo is around 25 RT/box, while for all other ports a figure of 30 RT/box may be used. This gives rates of $14.00/RT for Portland, $9.60/RT for SF Bay, and $8.00/RT for LA/LB and Puget Sound.

Barge Rates: For the Columbia River (Pasco to Portland), a representative rate for containers is $4.28/RT (based on a $107 freight rate and 25 RT/box).

Modal Split: Based on an overall figure of 36% of West Coast marine containers moving by rail on the inland leg, and discussions with port authorities, TBS estimates the rail split as shown below. Barge proportion for Portland /Columbia River based on port authority estimates.

		Port Area (%)			
Mode	Rate	LA/LB	SF Bay	Portland	Puget Sound
Rail	17.15	42	32	7	35
Truck	[a]	58	68	70	65
Barge	4.28	--	--	23	--
Average		11.84	12.02	11.98	11.20

[a]LA/LB - $8.00; SF Bay - $9.60; Portland - $14.00; Puget Sound - $8.00.

BREAKBULK VESSEL EXPENDITURE DATA

SURVEY RESULTS

Eight vessels, of which two in Los Angeles, Long Beach, one in San Francisco, one in Stockton, one in Portland, and three in Seattle/Tacoma.

SPECIAL ASSUMPTIONS:

1. Agency commission figured as $10,000 average per vessel port call.

2. Freight forwarders' commission figured as 1 1/4 percent on half of the value of freight (assuming other half paid overseas). Using average 1981 conference freight rates for the transpacific ($89.66/RT), works out to $0.56/RT.

3. Customs house brokers fees based on estimates of the number of people employed in the field in each port area, and the total revenue tonnage of container and breakbulk traffic. Average figure is $1.50/RT.

4. Banking and insurance based on Portland economic impact study, updated from 1975 to 1981 using an inflation factor of 1.58 and an estimate of 1.0 RT per ST to give $4.31/RT.

5. Other professional services--naval architects, admiralty lawyers, etc.--estimated at $0.75/RT.

6. Crew expenditures based on Portland study, updated from 1975 to 1981, giving a figure of $1.11/RT for breakbulk vessels.

7. Inland transport calculated as follows:

   Modal Splits--from estimates by port autorities, shipping companies and steamship agents, and TBS estimates.

   Rates--Rail rates from the Carload Waybill Statistics 1980, inflated to March 1982; average of California to U.S. (4.07¢/ton-mile) and U.S. to California (3.90¢/ ton-mile) gives $4.00¢/ton-mile; times 2,000 miles

(average from TBS questionnaire) and allocating half of the amount to port area, gives $40.00/RT

Truck Rates--average haul distances (from questionnaire) combined with rates obtained from West Coast trucking firms give an average of $240 per load for Seattle, LA/LB and SF Bay, with $350 for Portland (longer haul distance). At average of 15 RT per load gives $16.00/RT and $23.33, respectively.

Barge Rates--based on rate quote for PSCO-Portland for 1,000 tons, all freight, of $6.00/RT

Computation of inland transport costs:

		Port Area (percent)			
Mode	Rate	Portland	Puget Sound	LA/LB	SF Bay
Rail	40.00	30	30	20	20
Truck	16.00/23.33	60	70	80	80
Barge	6.00	10			
Average		26.60	23.20	20.80	20.80

AUTO CARRIER EXPENDITURE DATA

SURVEY RESULTS

Five vessels; two in Portland, one in Los Angeles/Long Beach, and one in San Francisco Bay. All expenditure categories per survey, with following exceptions:

SPECIAL ASSUMPTIONS

1. Auto/truck storage assumed to apply to all vessels, even though only two of five questionaires reported this expense.

2. The following conversions were used for autos: One short ton per unit, seven revenue tons per unit.

3. Insurance and banking figured at 0.35% of shipment value, based on 0.25% figure for banking only reported in New York Port Impact Study, 1978. Value estimated at $5,000 per vehicle.

4. Auto processing includes taking car from storage area near dock to the cleaning facility where the protective coating is removed, preparations made for adding accessories, and cars marshalled into loads by dealer.

5. Navigational services represent higher pilotage fees for Portland/Columbia River than for other ports.

6. Inland transport computed as a blend of inland rail and local trucking costs as follows:

   - Rail cost: 7.80¢/ton-mile for 1,500 miles (source: Carload Waybill Statistics, 1980, updated to end 1981.

   - Local towing or trucking cost: $15 per vehicle.

LIQUID BULK VESSEL EXPENDITURE DATA

SURVEY RESULTS

Seven vessel/port calls from two operators, including ports in all five Pacific Coast states

SPECIAL ASSUMPTIONS:

1. As no data were provided on the cargo loading/discharging expenses, a figure of $0.10 per ton was assumed. These costs are very low, as generally refinery workers assist with line running, and shore supervision is limited to one or two persons.

2. Banking and insurance figures--assumed to be negligible.

3. Crew expenditures--based on TBS staff members experience, a figure of $0.05 per ton was assumed.

4. Inland transportation--a figure of $0.10 per ton was aused, based on waterside refineries and storage facilities. A consignee is defined as the oil company receiving facility; thus, tank trucking distribution operations are not included in the maritime industry impact.

5. Navigational services--Portland/Columbia River costs are higher due to the distance from the ocean.

6. Bunkers--survey results indicate that tankers generally do not bunker at Portland/Columbia River.

VESSEL EXPENDITURE DATA FOR ALASKA AND HAWAII

In most cases, the Alaska and Hawaii data were based on vessel type information obtained from the survey for major port areas. This is due to the limited data obtained for Hawaii (one operator) and Alaska (two operators), which might have exposed company-confidential data. Where cost items were clearly different in Alaska and Hawaii, appropriate modifications were made to the major port survey data.

In the absence of detailed information concerning inland (and inter-island) transportation, expenditures were assumed for these categories at levels consistent with those obtained in other ports.

Table E-1

SAMPLE INPUT DATA

CONTAINER CARGO---PUGET SOUND

SECT	NAME	$/1000 TONS
1	DAIRY FARM PRODUCTS, POULTRY, & EGGS	.45
6	FRUITS, NUTS, AND VEGETABLES	2.06
28	MEAT PACKING PLANTS	5.48
29	SAUSAGES & OTH PREP MEATS	.06
30	POULTRY DRESSING PLANTS	.99
32	CREAMERY BUTTER	.23
33	CHEESE, NATURAL & PROCESSED	.23
34	MILK, CONDENSED&EVAPORATED	.23
35	ICE CREAM AND FROZEN DESSERTS	.49
36	FLUID MILK	1.71
37	CANNED & CURED SEA FOODS	.27
38	CANNED SPECIALTIES	.24
39	CANNED FRUITS & VEGETABLES	1.29
40	DEHYDRATED FOOD PRODUCTS	.42
41	PICKLES, SAUCES, SALAD DRESS	.45
42	FISH, FRESH OR FROZEN PKGD	.61
43	FROZEN FRUITS & VEGETABLES	.37
44	FLOUR & OTH GRAIN MILL PROD	.23
45	CEREAL PREPARATIONS	.82
46	BLENDED & PREPARED FLOUR	.38
48	PREPARED FEEDS, N.E.C.	.23
50	WET CORN MILLING	.76
51	BREAD, CAKE, & RLTD PRODS	.99
52	COOKIES & CRACKERS	.41
53	SUGAR	.29
54	CONFECTIONERY PRODUCTS	.41
55	CHOCOLATE & COCOA PRODS	.05
56	CHEWING GUM	.36
57	MALT LIQUORS	2.09
59	WINES BRANDY & BRANDY SPIRITS	.27
60	DISTILLED LIQ, EXC BRANDY	.89
61	BOTTLED & CANNED SOFT DRINKS	.41
62	FLAVOR EXTRACTS & SIRUPS, NEC	.02
68	SHORTENING & COOKING OILS	.27
69	MANUFACTURED ICE	.02
71	FOOD PREPARATIONS, N.E.C.	1.49
180	PETROLEUM REFINING	5744.00
209	POTTERY PRODUCTS, N.E.C.	.09
262	CUTLERY	.02
263	HAND & EDGE TOOLS, NEC	.02
264	HAND SAWS & SAW BLADES	.02
265	HARDWARE, N.E.C.	.02
389	RAILROADS & RELATED SERVICES	3920.00
391	TRUCKING & WAREHOUSING	8750.00
392	WATER TRANSPORTATION	10720.00
395	TRANSPORTATION SERVICES	4940.00
400	WATER SUPPLY,SANITARY SERVICES	1.60
410	WHLSALE: GROCERIES, GENERAL LINE	.60
411	WHLSALE: DAIRY PRODUCTS	.39
412	WHLSALE: POULTRY	.11
413	WHLSALE: CONFECTIONARY	.02
414	WHLSALE: FISH & SEAFOODS	.91
415	WHLSALE: MEATS	.45
416	WHLSALE: FRESH FRUITS & VEGETABLES	.28
417	WHLSALE: GROCERIES, N.E.C.	.65
422	WHLSALE: HARDWARE	.01
430	WHLSALE: PETROLEUM & PETRO PRODUCTS	1436.00
432	WHLSALE: MISC., N.E.C.	.93
435	RETAIL: HARDWARE & FARM EQUIPMENT	.03
436	RETAIL: DEPARTMENT STORES	.16
437	RETAIL: MAIL ORDER: VENDING MACHINES	.01
440	RETAIL: MISC. GENERAL MERCH. STORES	.03
441	RETAIL: GROCERY STORES	15.02
442	RETAIL: MEAT AND FISH MARKETS	.16
443	RETAIL: FRUIT & VEGETABLE STORES	.01
444	RETAIL: CANDY,NUT, CONFECTIONARY STORES	.00
445	RETAIL: BAKERIES	.01
446	RETAIL: MISC. FOOD STORES, N.E.C.	.04
459	RETAIL: FURNITURE,HOME FURNISH.,EQUIP.	.00
463	RETAIL: LIQUOR STORES	2.82
466	RETAIL: JEWELRY STORES	.00
469	BANKING	1080.00
472	INSURANCE CARRIERS	1080.00
476	HOTELS & LODGING PLACES	23.00
477	PERSONAL & REPAIR SERVICES	43.00
479	MISC BUSINESS SERVICES	900.00
481	MISC PROFESSIONAL SERVICES	500.00
482	EATING & DRINKING PLACES	69.00
484	MOTION PICTURES	23.00
485	AMUSEMENT & RECREATION SERVICES	23.00
486	DOCTORS & DENTISTS	23.00
490	NONPROFIT ORGANIZATIONS	23.00
TOTAL		39347.00

Table E-2

SAMPLE OUTPUT DATA

CONTAINER CARGO 9.133M TONS THROUGH PUGET SOUND

	EMPLOYMENT[a]	OUTPUT	WAGES	VALUE ADD
AGRICULTURE	8.8	1.188	.371	.546
DAIRY PROD., POULTRY, & EGGS	0.0	.578	.157	.181
MEAT ANIMALS & MISC. LIVESTOCK	0.0	.014	.002	.003
COTTON	0.0	0.000	0.000	0.000
GRAINS, & MISC. CROPS	0.0	.029	.009	.016
TOBACCO	0.0	0.000	0.000	0.000
FRUITS, NUTS, & VEGETABLES	0.0	.455	.159	.272
FOREST PROD.	0.0	0.000	0.000	0.000
GREENHOUSE & NURSERY PROD.	0.0	.104	.043	.074
AGRI. SERV., FORESTRY, & FISH	12.0	.327	.137	.168
AGRI. SERVICES (07)	10.8	.272	.119	.132
FORESTRY (08)	.5	.023	.008	.015
FISHING, HUNTING, & TRAPPING (09)	.7	.032	.011	.021
MINING	12.9	2.203	.388	1.439
METAL MINING (10)	.0	.000	.000	.000
ANTHRACITE MINING (11)	0.0	0.000	0.000	0.000
BITUM. COAL & LIGNITE (12)	.5	.026	.010	.016
OIL & GAS EXTRACTION (13)	10.0	2.041	.246	1.343
NONMETAL MIN.-EX. FUELS (14)	2.5	.135	.043	.081
CONSTRUCTION	295.5	18.535	4.616	5.184
GENERAL BLDG. CONTRACTORS (15)	0.0	0.000	0.000	0.000
HEAVY CONST. CONTRACTORS (16)	0.0	0.000	0.000	0.000
SPECIAL TRADE CONTRACTORS (17)	295.5	18.535	4.616	5.184
MANUFACTURING	245.7	82.656	4.609	15.271
FOOD & KINDRED PROD. (20)	13.5	1.016	.200	.556
TOBACCO MANUFACTURES (21)	0.0	0.000	0.000	0.000
TEXTILE MILL PROD. (22)	1.4	.058	.013	.022
APPAREL & OTHER PROD. (23)	3.0	.134	.027	.048
LUMBER & WOOD PROD. (24)	1.0	.123	.023	.047
FURNITURE & FIXTURES (25)	.7	.041	.008	.015
PAPER & ALLIED PROD. (26)	1.7	.166	.027	.060
PRINTING & PUBLISHING (27)	7.7	.394	.103	.196
CHEMICALS & ALLIED PROD. (28)	5.0	.547	.071	.239
PETROLEUM & COAL PROD. (29)	182.6	57.517	3.670	13.273
RUBBER & MISC. PLASTICS (30)	.5	.016	.003	.007
LEATHER & LEATHER PROD. (31)	.2	.007	.001	.002
STONE, CLAY, & GLASS (32)	5.7	.371	.080	.185
PRIMARY METAL PROD. (33)	.3	.021	.005	.009
FABRICATED METAL PROD. (34)	1.7	.116	.025	.051
MACHINERY, EXCEPT ELEC. (35)	.7	.030	.010	.019
ELECTRIC & ELEC. EQUIP. (36)	.4	.026	.005	.011
TRANSPORTATION EQUIPMENT (37)	15.8	1.133	.306	.470
INSTRUMENTS & REL. PROD. (38)	.5	.041	.008	.025
MISC. MANUFACTURING IND'S (39)	1.9	.091	.016	.034
TRANSPORT. & PUBLIC UTILITIES	7591.3	346.703	127.392	186.288
RAILROAD TRANSPORTATION (40)	873.9	36.822	15.884	22.653
LOCAL PASS. TRANSIT (41)	25.4	.511	.234	.335
TRUCKING & WAREHOUSING (42)	2518.0	95.329	42.728	61.246
WATER TRANSPORTATION (44)	1823.7	139.916	35.419	50.770
TRANSPORTATION BY AIR (45)	43.7	2.502	.988	1.416
PIPE LINES-EX. NAT. GAS (46)	3.7	.121	.064	.086
TRANSPORTATION SERVICES (47)	1929.7	49.796	25.588	34.714
COMMUNICATION (48)	275.9	11.277	4.795	9.207
ELEC., GAS, & SANITARY SERV. (49)	97.1	18.509	1.772	5.862
WHOLESALE	782.0	24.941	14.324	14.469
WHLSALE-DURABLE-GOODS (50)	199.1	7.074	3.588	5.580
WHLSALE-NONDURABLE GOODS (51)	582.8	17.868	10.736	13.888
RETAIL TRADE	2582.6	36.867	21.419	23.962
BLDG. MAT.-GARDEN SUPPLY (52)	44.0	.723	.438	.553
GENERAL MERCH. STORES (53)	392.4	4.351	3.135	3.484
FOOD STORES (54)	319.6	4.876	3.492	3.895
AUTO. DEALERS-SERV. STAT. (55)	457.7	6.408	4.858	5.397
APPAREL & ACCESS. STORES (56)	178.8	2.077	1.544	1.605
FURNITURE & HOME FURNISH. (57)	113.9	1.877	1.294	1.449
EATING & DRINKING PLACES (58)	806.6	12.453	4.836	5.373
MISCELLANEOUS RETAIL (59)	143.7	2.818	1.878	2.206
FINANCE, INS., & REAL ESTATE	2057.1	99.812	28.578	51.830
BANKING (60)	856.6	18.666	10.905	13.417
CREDIT AGENCIES EX. BANKS (61)	65.2	16.806	.982	1.209
SECURITY, COMM. BROKERS (62)	22.4	.987	.556	.685
INSURANCE CARRIERS (63)	683.5	24.994	9.844	12.112
INS. AGENTS, BROKERS (64)	304.8	18.294	4.771	5.871
REAL ESTATE (65)	99.7	22.702	1.208	17.522
COMB. REAL ESTATE, INS. (66)	4.0	.912	.049	.704
HOLDING-CTH. INV.. OFF'S (67)	16.9	4.369	.254	.313
SERVICES	3276.3	71.231	39.651	45.099
HOTELS & OTHER LODGING (70)	243.5	4.230	1.701	2.269
PERSONAL SERVICES (72)	214.3	4.276	1.858	2.603
BUSINESS SERVICES (73)	1186.7	28.213	16.435	18.261
AUTO REPAIR, SERV., GARAGES (75)	166.0	7.111	3.809	3.339
MISC. REPAIR SERVICES (76)	167.7	3.456	1.798	2.113
MOTION PICTURES (78)	37.8	.803	.306	.339
AMUSEMENT & RECREATION (79)	153.8	2.731	1.423	1.591
HEALTH SERVICES (80)	485.9	6.282	4.086	4.550
LEGAL SERVICES (81)	94.4	2.936	1.977	2.197
EDUCATIONAL SERVICES (82)	171.6	2.191	1.328	1.475
SOCIAL SERVICES (83)	29.3	.528	.164	.192
MUSEUMS, BOTAN-ZOO, GARDENS (84)	2.3	.027	.015	.017
MEMBERSHIP ORGANIZATIONS (86)	112.2	1.272	.724	.805
MISCELLANEOUS SERVICES (89)	230.7	7.176	4.831	5.368
GOVERNMENT	0.0	2.988	0.000	2.294
ADMIN. AUXILIARY	448.7	16.409	8.463	11.378
TOTAL	17229.1	679.851	247.858	362.927
MULTIPLIERS	2.161	1.879	1.918	1.964

TOT ST TAX= 12.285 TOT LOC TAX= 12.857

[a]All employment data must be divided by 1.801 to convert from 1975 to 1981 wage levels; total becomes 9,561 persons.

THE ECONOMIC IMPACT OF THE MARITIME INDUSTRY ON THE PACIFIC COAST STATES

Final Brochure Contents

Prepared for:

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September 24, 1982

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THE CARGO

California's waterborne trade has grown by 56 percent since 1971. Containerized trade grew by 289 percent reflecting major changes in cargo handling technology.

CALIFORNIA'S WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	6.5	8.5	64.8	79.8
1981	25.3	21.6	77.8	124.7

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, California ports handled foreign trade valued at $49.5 billion, representing 16 percent of U.S. foreign trade. Exports include raw materials, agricultural products, and manufactured goods; imports include petroleum, other inputs to U.S. industries, and consumer goods such as automobiles.

U.S. flag vessels carried approximately 28 percent of California's commercial overseas liner trade in 1981.

CALIFORNIA'S OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	22%	$12.8 Billion
Imports	32%	$20.8 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND CALIFORNIA

Not all the cargo handled by California ports originates or remains in the State. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other states to use California's services. A significant portion of the foreign trade handled by California is "passing through" from or to other states.

Whatever its origin and destination, maritime trade handled by California ports means jobs and income for the State. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in California generates 1 in every 76 jobs.

THE BENEFITS TO CALIFORNIA IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	61,520	76,520	138,040
Earnings ($M)	1,400	1,490	2,890
Sales ($M)	3,870	4,300	8,170
Taxes Paid ($M)	165	215	380

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	61,520	3,870
Cargo Handling & Services	33,800	2,370
Shipbuilding & Repair	17,280	990
Port Development	1,400	90
U.S. Flag Shipping Company Headquarters	3,920	230
Government Maritime Services	5,120	190

165,000 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$180 Million
Transportation	$195 Million
Housing	$365 Million
Medical	$ 55 Million
Clothing	$ 40 Million
Education, Recreation etc.	$270 Million

The remaining $295 million goes to taxes, insurance, and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the California economy. Every dollar received by the maritime industry is worth $2.11 to the State.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many California industries benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
Agriculture	3,060	77,000	23%
High Technology	3,540	56,300	9%
Petroleum	10,480	13,200	32%
Metals	2,770	33,600	16%
Textiles & Apparel	570	12,600	9%
Food Processing	1,550	9,300	5%
Chemicals	1,400	10,000	16%

Together, port user industries in California can attribute at least 212,000 jobs and $23 billion of their sales to maritime trade. This represents at least one in every 48 jobs and one in every 14 manufacturing jobs in California.

And even inbound cargo not destined for use in California contributes to the state economy. Storage, packaging, processing and distribution to other states provide jobs in California.

INDUSTRY IMPACT AT A GLANCE

CALIFORNIA

MARITIME INDUSTRY CONTRIBUTION TO STATE ECONOMY	
1981	$8.2 Billion Sales Transactions
1982	$8.8 Billion Sales Transactions
1983	$10.0 Billion Sales Transactions

In addition, port user industries had sales of at least $23 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO STATE EMPLOYMENT		
	Jobs	Earnings
1981	138,000	$2.9 Billion
1982	143,000	$3.1 Billion
1983	152,000	$3.5 Billion

Port user industries contributed an additional 212,000 jobs in 1980.

MARITIME TRADE THROUGH CALIFORNIA PORTS	
1981	125 Million Revenue Tons
1982	127 Million Revenue Tons
1983	133 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of California with all its related and supporting activities, represents a vital part of California's economy. It provides 138,000 jobs, contributes $8.2 billion to state gross sales, and pays $380 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the State's industries, enabling expansion and contributing to the economic health of California.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

PMSA

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MARITIME INDUSTRY

A $4.5 BILLION BENEFIT TO THE

LOS ANGELES - LONG BEACH REGIONAL ECONOMY

LOS ANGELES - LONG BEACH REGION

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

The ports of Los Angeles and Long Beach are among the busiest in the world. The Port of Long Beach is one of the world's top 10 container ports. These ports provide access to the nation's major trading partners. Some 63 shipping lines, including eight U.S. flag operators, provide regularly scheduled liner service to the Los Angeles - Long Beach harbors.

THE CARGO

Waterborne trade through Los Angeles - Long Beach has grown by 83 percent since 1971. Containerized trade grew by 501 percent reflecting major changes in cargo handling technology.

LOS ANGELES - LONG BEACH WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	2.7	4.7	36.7	44.1
1981	16.2	13.6	51.0	80.8

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, the ports of Los Angeles - Long Beach handled foreign trade valued at $34.0 billion, representing 11 percent of U.S. foreign trade. Exports include agricultural products, raw materials, and manufactured goods; imports include petroleum, iron ore, textiles, lumber, other inputs to U.S. industries, and consumer goods.

U.S. flag vessels carried approximately 26 percent of the commercial overseas liner trade through the region in 1981.

LOS ANGELES - LONG BEACH OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	20%	$6.8 Billion
Imports	29%	$16.5 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND LOS ANGELES-LONG BEACH REGION

Not all the cargo handled by the ports of Los Angeles and Long Beach originates or remains in the region. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other regions to use these services. A significant portion of the foreign trade handled by the ports is "passing through" from or to other regions.

Whatever its origin and destination, maritime trade handled by the ports of Los Angeles and Long Beach means jobs and income for the region. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in Los Angeles - Long Beach generates 1 in every 79 jobs in the five-county Southern California region.

BENEFITS TO LOS ANGELES - LONG BEACH REGION IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	28,820	39,290	68,110
Earnings ($M)	740	830	1,570
Sales ($M)	2,130	2,340	4,470
Taxes Paid ($M)	95	125	220

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	28,820	2,130
Cargo Handling & Services	18,820	1,590
Shipbuilding & Repair	6,230	340
Port Development	790	60
U.S. Flag Shipping Company Headquarters	1,230	75
Government Maritime Services	1,750	65

78,680 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$ 95 Million
Transportation	$110 Million
Housing	$190 Million
Medical	$ 30 Million
Clothing	$ 20 Million
Education, Recreation etc.	$130 Million

The remaining $165 million goes to taxes, insurance, and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Los Angeles - Long Beach regional economy. Every dollar received by the maritime industry is worth $2.10 to the region.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many industries in the Los Angeles - Long Beach region benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
High Technology	2,000	31,780	9%
Metals	2,040	25,370	16%
Petroleum	11,880	8,440	48%
Textiles & Apparel	400	8,900	10%
Transportation Equipment	770	9,910	5%
Chemicals	810	5,780	16%
Food Processing	130	3,370	5%

Together, port user industries in the Los Angeles - Long Beach region can attribute at least 94,000 jobs and $18 billion of their sales to maritime trade. This represents at least one in every 54 jobs in the region and one in every 13 manufacturing jobs.

And even inbound cargo not destined for use in the region contributes to the local economy. Storage, packaging, processing and distribution to other areas provide jobs and revenue for the region.

INDUSTRY IMPACT AT A GLANCE

LOS ANGELES - LONG BEACH REGION

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL ECONOMY	
1981	$4.5 Billion Sales Transactions
1982	$4.9 Billion Sales Transactions
1983	$5.5 Billion Sales Transactions

In addition, port user industries had sales of at least $18 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL EMPLOYMENT		
	Jobs	Earnings
1981	68,000	$1.6 Billion
1982	71,000	$1.7 Billion
1983	76,000	$1.9 Billion

Port user industries contributed an additional 94,000 jobs in 1980.

MARITIME TRADE THROUGH LOS ANGELES-LONG BEACH REGION	
1981	81 Million Revenue Tons
1982	83 Million Revenue Tons
1983	87 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry within the region and its related and supporting activities represents a vital part of the regional economy. It provides 68,000 jobs, contributes $4.5 billion to gross sales, and pays $220 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the region's industries, enabling expansion and contributing to the economic health of the Los Angeles - Long Beach region.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

PMSA

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MARITIME INDUSTRY

A $2.1 BILLION BENEFIT TO THE

SAN FRANCISCO - OAKLAND BAY AREA ECONOMY

SAN FRANCISCO - OAKLAND BAY AREA

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

The ports of the San Francisco Bay Area are among the busiest in the world. The port of Oakland is one of the world's top 10 container ports. The region's manufacturing and commercial activities have grown up around the ports, providing access to the nation's major trading partners. Some 60 shipping lines, including eight U.S. flag operators, provide regularly scheduled service to the Bay Area ports.

THE CARGO

Waterborne trade through the region's ports has grown by 42 percent since 1971. Containerized trade grew by 142 percent reflecting major changes in cargo handling technology.

WATERBORNE TRADE THROUGH BAY AREA PORTS
(Millions of Revenue Tons)

	Container	Liquid Bulk	Other	Total
1971	3.7	13.1	5.9	22.7
1981	9.0	17.9	5.4	32.3

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, the ports of the San Francisco - Oakland Bay Area handled foreign trade valued at $14.2 billion, representing 4 percent of U.S. foreign trade. Exports include agricultural products, raw materials and manufactured goods; imports include petroleum, other inputs to U.S. industries, and consumer goods.

U.S. flag vessels carried approximately 32 percent of the commercial overseas liner trade through the region in 1981.

SAN FRANCISCO BAY AREA OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	25%	$6.0 Billion
Imports	43%	$4.2 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND THE SAN FRANCISCO BAY REGION

Not all the cargo handled by Bay Area ports originates or remains in the region. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other regions to use the ports' services. A significant portion of the foreign trade handled by the San Francisco - Oakland Bay Area ports is "passing through" from or to other regions.

Whatever its origin and destination, maritime trade handled in the Bay Area means jobs and income for the region. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in the San Francisco - Oakland Bay Area generates 1 in every 65 jobs in the nine-county region.

THE BENEFITS TO THE SAN FRANCISCO BAY REGION IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	17,230	20,860	38,090
Earnings ($M)	450	480	930
Sales ($M)	1,100	1,030	2,130
Taxes Paid ($M)	55	65	120

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	17,230	1,100
Cargo Handling & Services	7,660	620
Shipbuilding & Repair	3,360	180
Port Development	210	20
U.S. Flag Shipping Company Headquarters	2,680	160
Government Maritime Services	3,320	120

44,450 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$ 55 Million
Transportation	$ 60 Million
Housing	$120 Million
Medical	$ 20 Million
Clothing	$ 15 Million
Education, Recreation etc.	$ 90 Million

The remaining $90 million goes to taxes, insurance and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the San Francisco - Oakland Bay Area economy. Every dollar received by the maritime industry is worth $1.94 to the region.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many industries in the San Francisco - Oakland Bay Area region benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
High Technology	1,120	17,940	9%
Metals	630	7,440	18%
Petroleum	1,770	1,050	17%
Chemicals	350	2,500	16%
Food Products	340	2,040	6%
Textiles & Apparel	60	1,350	10%

Together, port user industries in the San Francisco - Oakland Bay Area region can at least attribute 35,000 jobs and $4.4 billion of their sales to maritime trade. This includes one in every 70 jobs in the region and one in every 14 manufacturing jobs.

And even inbound cargo not destined for use in the region contributes to the local economy. Storage, packaging, processing and distribution to other areas provide jobs and revenue for the region.

INDUSTRY IMPACT AT A GLANCE

SAN FRANCISCO - OAKLAND BAY REGION

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL ECONOMY	
1981	$2.1 Billion Sales Transactions
1982	$2.3 Billion Sales Transactions
1983	$2.5 Billion Sales Transactions

In addition, port user industries had sales of at least $4.4 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL EMPLOYMENT		
	Jobs	Earnings
1981	38,000	$ 930 Million
1982	39,000	$ 990 Million
1983	41,000	$1,110 Million

Port user industries contributed an additional 35,000 jobs in 1980.

MARITIME TRADE THROUGH BAY AREA PORTS	
1981	32 Million Revenue Tons
1982	33 Million Revenue Tons
1983	34 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of the San Francisco - Oakland Bay Area, with all its related and supporting activities, represents a vital part of the regional economy. It provides 38,000 jobs, contributes $2.1 billion to the gross sales, and pays $120 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the region's industries, enabling expansion and contributing to the economic health of the San Francisco - Oakland Bay Area.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

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MARITIME INDUSTRY

A $3.2 BILLION BENEFIT TO THE

WASHINGTON ECONOMY

WASHINGTON

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

Washington's ports are among the largest and busiest in the world. The State's commercial centers have grown up around them, with the ports providing access to the nation's major trading partners. Some 46 shipping lines, including nine U.S. flag operators, provide regularly scheduled liner service to Washington's port.

THE CARGO

Washington's waterborne trade has grown by 135 percent since 1971. Containerized trade grew by 490 percent reflecting major changes in cargo handling technology.

WASHINGTON'S WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	1.6	5.5	20.9	28.0
1981	9.2	17.8	39.0	66.0

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, Washington ports handled foreign trade valued at $21.1 billion, representing 7 percent of U.S. foreign trade. Exports include logs and other forest products, grain, fresh fruit and vegetables, fish products and manufactured goods; imports include alumina oxide, other inputs to U.S. industries, and consumer goods such as automobiles.

U.S. flag vessels carried approximately 52 percent of Washington's commercial overseas liner trade in 1981.

WASHINGTON'S OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	35%	$2.4 Billion
Imports	58%	$7.5 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND WASHINGTON

Not all the cargo handled by Washington ports originates or remains in the State. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other states to use Washington's services. A significant portion of the foreign trade handled by Washington is "passing through" from or to other states.

Whatever its origin and destination, maritime trade handled by Washington means jobs and income for the State. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in Washington generates 1 in every 33 jobs.

THE BENEFITS TO WASHINGTON IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	29,100	26,050	55,150
Earnings ($M)	700	500	1,200
Sales ($M)	1,930	1,300	3,230
Taxes Paid ($M)	50	40	90

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	29,100	1,930
Cargo Handling & Services	14,050	1,045
Shipbuilding & Repair	11,490	730
Port Development	460	30
U.S. Flag Shipping Company Headquarters	870	45
Government Maritime Services	2,230	80

75,950 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$ 75 Million
Transportation	$105 Million
Housing	$160 Million
Medical	$ 30 Million
Clothing	$ 20 Million
Education, Recreation etc.	$125 Million

The remaining $185 million goes to taxes, insurance, and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Washington economy. Every dollar received by the maritime industry is worth $1.68 to the State.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many Washington industries benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
Forest Products	1,680	15,250	24%
Agriculture & Food Processing	1,210	18,570	24%
High Technology	340	6,640	19%
Primary Metals	1,040	5,550	33%

Together, port user industries in Washington can attribute at least 48,000 jobs and $6.5 billion of their sales to maritime trade. This represents at least one in every 33 jobs in the State and one in every 8 manufacturing jobs.

And even inbound cargo not destined for use in Washington contributes to the State economy. Storage, packaging, processing and distribution to other states provide jobs in Washington.

INDUSTRY IMPACT AT A GLANCE

WASHINGTON

MARITIME INDUSTRY CONTRIBUTION TO STATE ECONOMY	
1981	$3.2 Billion Sales Transactions
1982	$3.5 Billion Sales Transactions
1983	$3.9 Billion Sales Transactions

In addition, port user industries had sales of at least $6.5 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO STATE EMPLOYMENT		
	Jobs	Earnings
1981	55,000	$1.2 Billion
1982	57,000	$1.3 Billion
1983	60,000	$1.5 Billion

Port user industries contributed an additional 48,000 jobs in 1980.

MARITIME TRADE THROUGH WASHINGTON PORTS	
1981	66 Million Revenue Tons
1982	67 Million Revenue Tons
1983	70 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of Washington with all its related and supporting activities, represents a vital part of Washington's economy. It provides 55,000 jobs, contributes $3.2 billion to state gross sales, and pays $90 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the State's industries, enabling expansion and contributing to the economic health of Washington.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

PMSA

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MARITIME INDUSTRY

A $3.0 BILLION BENEFIT TO THE

PUGET SOUND REGIONAL ECONOMY

PUGET SOUND

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

The natural deepwater harbors of Puget Sound are among the largest and busiest in the world. The region's manufacturing and commercial activities have grown up around them, with the ports providing access to the nation's major trading partners. Some 46 shipping lines, including nine U.S. flag operators, provide regularly scheduled liner service to the Puget Sound ports.

THE CARGO

Waterborne trade through Puget Sound has grown by 145 percent since 1971. Containerized trade grew by 498 percent reflecting major changes in cargo handling technology.

WATERBORNE TRADE THROUGH THE PUGET SOUND
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	1.5	3.0	18.7	23.2
1981	9.1	11.3	36.4	56.8

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, the Puget Sound ports handled foreign trade valued at $19.5 billion, representing 5 percent of U.S. foreign trade. Exports include logs and other forest products, grain, fish products, fresh fruit and vegetables and manufactured goods; imports include alumina oxide, other inputs to U.S. industries, and consumer goods.

U.S. flag vessels carried approximately 54 percent of the region's commerical overseas liner trade in 1981.

PUGET SOUND OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	37%	$2.3 Billion
Imports	59%	$7.4 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND THE PUGET SOUND REGION

Not all the cargo handled by Puget Sound ports originates or remains in the State. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other regions to use the Puget Sound services. A significant portion of the foreign trade handled by the ports is "passing through" from or to other regions.

Whatever its origin and destination, maritime trade handled by Puget Sound ports means jobs and income for the region. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in the Puget Sound region generates 1 in every 25 jobs in the surrounding twelve-county region.

THE BENEFITS TO THE PUGET SOUND REGION IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	24,070	26,090	50,160
Earnings ($M)	630	510	1,140
Sales ($M)	1,720	1,240	2,960
Taxes Paid ($M)	60	50	110

MARITIME INDUSTRY

A $990 MILLION BENEFIT TO THE

OREGON ECONOMY

OREGON

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

Oregon's ports are among the busiest on the Pacific Coast. The State's commercial centers have grown up around them, with the ports providing access to the nation's major trading partners. Some 32 shipping lines, including four U.S. flag operators, provide regularly scheduled liner service to Oregon ports.

THE CARGO

Oregon's waterborne trade has grown by 78 percent since 1971. Containerized trade grew by 355 percent reflecting major changes in cargo handling technology.

OREGON'S WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	0.2	5.6	7.1	12.9
1981	0.9	13.1	9.0	23.0

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, Oregon ports handled foreign trade valued at $5.1 billion, representing 1.6 percent of U.S. foreign trade. Exports include lumber and other forest products, grain, fish products and manufactured goods; imports include iron ore, alumina oxide, other inputs to U.S. industries, and consumer goods such as automobiles.

U.S. flag vessels carried approximately 9 percent of Oregon's commerical overseas liner trade in 1981.

OREGON'S OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	13%	$637 Million
Imports	3%	$370 Million

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND OREGON

Not all the cargo handled by Oregon ports originates or remains in the State. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other states to use Oregon's services. A significant portion of the foreign trade handled by Oregon is "passing through" from or to other states.

Whatever its origin and destination, maritime trade handled by Oregon ports means jobs and income for the State. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in Oregon generates 1 in every 63 jobs.

THE BENEFITS TO OREGON IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	9,880	9,300	19,180
Earnings ($M)	210	150	360
Sales ($M)	585	400	985
Taxes Paid ($M)	25	20	45

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	9,880	585
Cargo Handling & Services	6,270	400
Shipbuilding & Repair	2,310	130
Port Development	290	20
U.S. Flag Shipping Company Headquarters	130	5
Government Maritime Services	880	30

25,690 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$20 Million
Transportation	$25 Million
Housing	$50 Million
Medical	$ 9 Million
Clothing	$ 6 Million
Education, Recreation etc.	$40 Million

The remaining $60 million goes to taxes, insurance and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Oregon economy. Every dollar received by the maritime industry is worth $1.69 to the State.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many Oregon industries benefit from maritime trade. Access to larger markets and to supplies of material enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
Forest Products	1,280	11,580	15%
Metals	630	7,300	31%
High Technology	197	3,940	8%
Agrigulture and Food Processing	300	2,880	7%
Transportation Equipment	255	3,100	5%

Together, port user industries in Oregon can attribute at least 28,000 jobs and $2.7 billion of their sales to maritime trade. This represents one in 40 jobs in the State and one in 8 manufacturing jobs.

And even inbound cargo not destined for use in Oregon, such as automobiles, contributes to the State economy. Storage, packaging, processing and distribution to other states provide jobs in Oregon.

INDUSTRY IMPACT AT A GLANCE

OREGON

MARITIME INDUSTRY CONTRIBUTION TO STATE ECONOMY	
1981	$990 Million Sales Transactions
1982	$1.1 Billion Sales Transactions
1983	$1.2 Billion Sales Transactions

In addition, port user industries had sales of at least $2.7 billion in 1981.

MARITIME INDUSTRY CONTRIBUTION TO STATE EMPLOYMENT		
	Jobs	Earnings
1981	19,000	$360 Million
1982	20,500	$400 Million
1983	21,000	$435 Million

Port user industries contributed an additional 28,000 jobs in 1980.

MARITIME TRADE THROUGH OREGON PORTS	
1981	23 Million Revenue Tons
1982	24 Million Revenue Tons
1983	25 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of Oregon with all its related and supporting activities, represents a vital part of Oregon's economy. It provides 19,000 jobs, contributes $990 million to state gross sales, and pays $45 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the State's industries, enabling expansion and contributing to the economic health of Oregon.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

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MARITIME INDUSTRY

A $1.3 BILLION BENEFIT TO THE

PORTLAND - LOWER COLUMBIA RIVER AREA ECONOMY

PORTLAND - LOWER COLUMBIA RIVER REGION

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

The ports of the Lower Columbia River are among the busiest on the Pacific Coast. The region's manufacturing and commercial activities have grown up around them, with the ports providing access to the nation's major trading partners and to the hinterland. Some 32 shipping lines, including four U.S. flag operators, provide regularly scheduled liner service to the Lower Columbia River ports.

THE CARGO

Waterborne trade through the Lower Columbia River ports has grown 127 percent since 1971. Containerized trade grew by 314 percent reflecting major changes in cargo handling technology.

WATERBORNE TRADE THROUGH THE LOWER COLUMBIA RIVER
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	0.2	5.5	8.2	13.9
1981	0.9	16.7	14.0	31.6

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, the Lower Columbia River ports handled foreign trade valued at $6.2 billion. Exports include logs and other forest products, grain, fish products, fruit and vegetables and manufactured goods; imports include minerals, other inputs to U.S. industries, and consumer goods.

U.S. flag vessels carried approximately 10 percent of the region's commercial overseas liner trade in 1981.

LOWER COLUMBIA RIVER OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	14%	$719 Million
Imports	3%	$399 Million

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND THE PORTLAND-LOWER COLUMBIA RIVER REGION

Not all the cargo handled by Lower Columbia River ports originates or remains in the region. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other states to use the Lower Columbia River ports. A significant portion of the foreign trade handled by the ports is "passing through" from or to other regions.

Whatever its origin and destination, maritime trade handled by the Lower Columbia River means jobs and income for the region. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in the Portland-Lower Columbia River generates 1 in every 32 jobs in the adjacent nine counties in Oregon and Washington.

THE BENEFITS TO THE PORTLAND-LOWER COLUMBIA RIVER REGION IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	9,670	11,090	20,760
Earnings ($M)	250	225	475
Sales ($M)	700	610	1,310
Taxes Paid ($M)	35	35	70

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	9,670	700
Cargo Handling & Services	6,230	515
Shipbuilding & Repair	2,320	130
Port Development	370	30
U.S. Flag Shipping Company Headquarters	130	5
Government Maritime Services	620	20

25,045 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$25 Million
Transportation	$30 Million
Housing	$57 Million
Medical	$10 Million
Clothing	$ 8 Million
Education, Recreation etc.	$45 Million

The remaining $75 million goes to taxes, insurance, and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Portland-Lower Columbia River area economy. Every dollar received by the maritime industry is worth $1.86 to the region.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many industries in the Portland-Columbia River region benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
Forest Products	520	4,740	19%
Metals	440	3,400	24%
High Technology	240	4,320	11%
Processed Foods	270	1,990	20%

Together, port user industries in the Portland - Lower Columbia River region can attribute at least 15,000 jobs and $1.5 billion of their sales to maritime trade. This represents at least one in every 39 jobs in the region and one in 9 manufacturing jobs.

And even incoming cargo not destined for use in the region, such as automobiles, contributes to the local economy. Storage, packaging, processing and distribution to other states provide jobs in the region.

INDUSTRY IMPACT AT A GLANCE

PORTLAND-LOWER COLUMBIA RIVER

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL ECONOMY	
1981	$1.3 Billion Sales Transactions
1982	$1.4 Billion Sales Transactions
1983	$1.6 Billion Sales Transactions

In addition, port user industries had sales of at least $1.5 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL EMPLOYMENT		
	Jobs	Earnings
1981	21,000	$475 Million
1982	22,000	$520 Million
1983	22,500	$570 Million

Port user industries contributed an additional 15,000 jobs in 1980.

MARITIME TRADE THROUGH LOWER COLUMBIA RIVER PORTS	
1981	32 Million Revenue Tons
1982	33 Million Revenue Tons
1983	34 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of the Portland-Lower Columbia River area, with all its related and supporting activities, represents a vital part of the regional economy. It provides 21,000 jobs, contributes $1.3 billion to regional gross sales, and pays $70 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the region's industries, enabling expansion and contributing to the economic health of the Portland-Lower Columbia River area.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

PMSA

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MARITIME INDUSTRY

AN $800 MILLION BENEFIT TO THE

ALASKA ECONOMY

ALASKA

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

Alaska's ports are vital to its development and economic well-being. From its earliest days, Alaska has relied on the maritime industry for obtaining essential raw materials and provisions. Today, the industry is essential for bringing Alaska's vast natural resources to U.S. and foreign markets. Four shipping lines, all U.S. flag operators, provide regularly scheduled liner service to Alaska's major ports.

THE CARGO

Alaska's waterborne trade has grown by 1,800 percent since 1971.

ALASKA'S WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Liquid Bulk	Other	Total
1971	0.3	2.1	2.8	5.2
1981	2.2	93.8	3.0	99.0

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, Alaska ports handled foreign trade valued at $1.3 billion. The great majority of Alaska's trade is with other U.S. ports. Shipments include fish products and lumber as well as bulk petroleum; receipts include construction materials and modules, other inputs to Alaskan industry, and consumer goods.

U.S. flag vessels carried 56 percent of Alaska's commercial liner trade exports in 1981. Domestic trade is carried solely by U.S. flag vessels.

THE MARITIME INDUSTRY AND ALASKA

Maritime trade handled by Alaska means jobs and income for the state. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in Alaska generates 1 in every 20 jobs.

THE BENEFITS TO ALASKA IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	4,660	4,160	8,820
Earnings ($M)	120	115	235
Sales ($M)	450	350	800
Taxes Paid ($M)	10	10	20

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	4,660	450
Cargo Handling & Services	3,450	380
Shipbuilding & Repair	200	10
Port Development	100	20
U.S. Flag Shipping Company Headquarters	250	10
Government Maritime Services	660	30

About 13,620 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$15 Million
Transportation	$15 Million
Housing	$27 Million
Medical	$ 4 Million
Clothing	$ 4 Million
Education, Recreation etc.	$19 Million

The remaining $36 million goes to taxes, insurance, and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Alaska economy. Every dollar received by the maritime industry is worth $1.78 to the State.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many Alaska industries benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Million)	Jobs	% of the Industry
Petroleum	5,700	5,700	98%
Fish & Shellfish	650	3,650	60%
Forest Products	290	2,350	69%

Alaska relies on maritime transportation for much of its trade inside and outside the State. Even non-manufacturing industry, such as mining and contract construction, employing 15,000 people, depends on maritime transportation for its essential materials.

Together, port user industries in Alaska can attribute at least 11,700 jobs and $6.6 billion of their sales to maritime trade. This represents one in every 15 jobs in the State.

INDUSTRY IMPACT AT A GLANCE

ALASKA

MARITIME INDUSTRY CONTRIBUTION TO STATE ECONOMY	
1981	$800 Million Sales Transactions
1982	$845 Million Sales Transactions
1983	$900 Million Sales Transactions

In addition, port user industries had sales of at least $6.6 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO STATE EMPLOYMENT		
	Jobs	Earnings
1981	9,000	$234 Million
1982	9,000	$249 Million
1983	9,000	$268 Million

Port user industries contributed an additional 11,700 jobs in 1980.

MARITIME TRADE THROUGH ALASKA PORTS	
1981	99 Million Revenue Tons
1982	100 Million Revenue Tons
1983	100 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of Alaska with all its related and supporting activities, represents a vital part of Alaska's economy. It provides 9,000 jobs, contributes $800 million to state gross sales, and pays $20 million in state and local taxes. Maritime trade enables the development of the State's resources, provides its population with essential commodities, and contributes to the economic health of Alaska.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

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MARITIME INDUSTRY

A $15.7 BILLION BENEFIT TO THE

PACIFIC STATES ECONOMY

PACIFIC REGION

PACIFIC MERCHANT SHIPPING ASSOCIATION

THE PORTS

The ports of the five Pacific States are among the largest and busiest in the world. Commercial and manufacturing centers have grown up around the ports, which provide access to the nation's major trading partners. Some 63 shipping lines, including nine U.S. flag operators, provide regularly scheduled liner service to the region's ports.

THE CARGO

The Pacific States' waterborne trade has grown by 132 percent since 1971. Containerized trade grew by 256 percent reflecting major changes in cargo handling technology.

THE PACIFIC STATES' WATERBORNE TRADE
(Millions of Revenue Tons)

	Container	Dry Bulk	Other	Total
1971	11.8	22.5	106.3	140.6
1981	42.2	55.7	227.8	325.7

Note: Revenue tons, used in ocean tariff schedules, generally are equal to the greater of weight or measurement tons.

In 1981, Pacific States ports handled foreign trade valued at $78.4 billion, representing 25 percent of U.S. foreign trade. Exports include lumber and forest products, agricultural products, raw materials, and manufactured goods; imports include petroleum, iron ore, alumina oxide, other inputs to U.S. industries, and consumer goods such as automobiles.

U.S. flag vessels carried approximately 33 percent of Pacific State's commercial overseas liner trade in 1981.

PACIFIC STATES' OVERSEAS LINER TRADE IN 1981

	U.S. Flag	Total
Exports	25%	$15.8 Billion
Imports	38%	$28.7 Billion

Note: Non-liner overseas trade generally is carried by foreign flag vessels; domestic trade generally is carried by U.S. flag vessels.

THE MARITIME INDUSTRY AND THE PACIFIC STATES

Not all the cargo handled by the Pacific States ports originates or remains in the region. Increasing container traffic, improved linkages with overland transportation and growing trade with Pacific Rim nations encourage other states to use the region's services. A significant portion of the foreign trade handled by the Pacific States is "passing through".

Whatever its origin and destination, maritime trade handled by the Pacific States means jobs and income for the region. As the volume of cargo grows, so do the benefits.

The Economic Benefits

Through its multifaceted activities, and through industry and household purchases, the maritime industry in the Pacific States generates 1 in every 59 jobs.

THE BENEFITS TO THE PACIFIC STATES IN 1981

	Direct Maritime Industry	Induced Economic Impact	Total
Jobs	104,780	135,310	240,090
Earnings ($M)	2,610	2,940	5,550
Sales ($M)	7,230	8,470	15,700
Taxes Paid ($M)	240	340	580

The maritime industry itself contributes a substantial part of this total.

MARITIME INDUSTRY JOBS AND REVENUES IN 1981		
	Jobs	Gross Sales ($ Million)
TOTAL	104,780	7,230
Cargo Handling & Services	55,360	4,490
Shipbuilding & Repair	31,580	1,880
Port Development	2,130	170
U.S. Flag Shipping Company Headquarters	5,550	320
Government Maritime Services	10,160	370

280,810 people in maritime worker households are supported either wholly or in part by the industry payroll. Spending by maritime industry employees and their families benefits many local businesses:

1981 EXPENDITURES

Food	$310 Million
Transportation	$365 Million
Housing	$680 Million
Medical	$100 Million
Clothing	$ 80 Million
Education, Recreation etc.	$470 Million

The remaining $605 million goes to taxes, insurance and savings.

Purchases made by maritime industry firms and their employees stimulate other sectors of the Pacific States economy. Every dollar received by the maritime industry is worth $2.17 to the region.

Integral Part of the Economy

In addition to the maritime industry and its suppliers, many industries in the five Pacific States benefit from maritime trade. Access to larger markets and to supplies of materials enable increased production and employment. Some examples:

BENEFITS ATTRIBUTABLE TO MARITIME TRADE IN 1980

Selected Industries	Sales ($ Billion)	Jobs
Agriculture & Food Products	7.5	125,400
High Technology	4.1	66,900
Forest Products	3.3	29,200
Metals	4.4	46,500
Petroleum	17.3	19,900
Textiles & Apparel	0.6	13,500
Chemicals	1.4	10,000
Transportation Equipment	0.5	5,700

Together, port user industries in the Pacific States can attribute at least 320,000 jobs, $5.5 billion in payroll, and $40 billion in industry gross sales to maritime trade. This represents one in every 43 jobs in the Pacific States and about one in every 10 manufacturing jobs.

INDUSTRY IMPACT AT A GLANCE

THE PACIFIC STATES
CALIFORNIA, WASHINGTON, OREGON, HAWAII, ALASKA

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL ECONOMY	
1981	$15.7 Billion Sales Transactions
1982	$17.0 Billion Sales Transactions
1983	$19.2 Billion Sales Transactions

In addition, port user industries had sales of at least $40 billion in 1980.

MARITIME INDUSTRY CONTRIBUTION TO REGIONAL EMPLOYMENT		
	Jobs	Earnings
1981	240,000	$5.5 Billion
1982	248,000	$6.0 Billion
1983	262,000	$6.8 Billion

Port user industries contributed an additional 320,000 jobs in 1980.

MARITIME TRADE THROUGH PACIFIC STATES PORTS	
1981	326 Million Revenue Tons
1982	330 Million Revenue Tons
1983	340 Million Revenue Tons

Note: 1981 actual figures; 1982, 1983 forecast figures as of June 1982.

The maritime industry of the Pacific States, with all its related and supporting activities, represents a vital part of the region's economy. It provides 240,000 jobs, contributes $15.7 billion to regional gross sales, and pays $580 million in state and local taxes. Maritime trade opens larger markets and supplies of materials to the region's industries, enabling expansion and contributing to the economic health of the Pacific States.

The Pacific Merchant Shipping Association (PMSA) is the only regional maritime association based on the West Coast. Its primary function is to monitor the local, state and federal issues which impact the maritime industry on the West Coast. Its members include operators and owners of U.S. and foreign flag vessels which trade in the Pacific Basin.

PMSA has been representing a major segment of the West Coast maritime industry since it was founded as the Pacific American Steamship Association in 1919. It was chartered as PMSA in 1974 to "initiate, sponsor, promote, and carry out plans, policies, and activities which will tend to further the prosperity and development of owners and operators of vessels engaged in the transportation by water of cargo or passengers from and/or to the Pacific area of the United States and to engage in all lawful activities and operations usually and normally engaged in by a business league."

PMSA

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