ALASKA LEGISLATURE COMMITTEE FILES 1987-1988 8672

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Railroads

Railroads play a significant role in the economic development of the Washington port system. The statewide rail network, covering approximately 4,000 miles is a key component of a state freight transportation system which contains a combination of heavily used mainlines and moderate to low use branch lines.

Two rail carriers, Burlington Northern (BN) and Union Pacific (UP), own and operate over 90 percent of the rail trackage within the state. The remainder is owned by a variety of shortline, terminal, and rail district operators.

Trends in Rail Freight Transportation

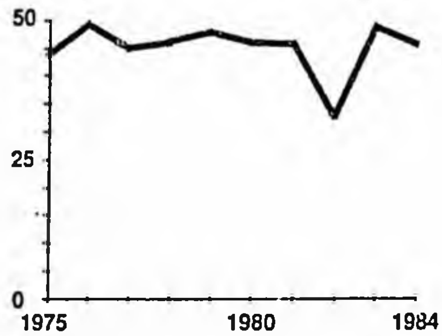
Since partial deregulation of the industry, the mainline rail system has become much more competitive with other inland transportation modes. At the same time, the increased level of competitiveness at all levels of world trade has imposed severe economic pressures on shipping companies and ports, resulting in an increasing emphasis on the efficiency of the inland transportation network.

The most notable changes in rail traffic patterns in the past decade include:

- A shift from boxcar to intermodal container (COFC) or trailer (TOFC) on flat car modes.
- A growth in intermodal traffic and a shift to rail from trucking for containerized cargoes.
- The introduction of twin stack rail cars.
- A decrease in forest products carried.
- An increase in grain traffic for export destinations.
- An increase in imported automobiles transported to final markets.

Agricultural and forest products dominate rail freight tonnage originating and terminating in the state. Contrary to popular opinion, the total tonnage handled by the rail companies has not increased significantly in the past ten years. During 1984 the total gross railroad tonnage, which includes the weight of rolling stock, locomotives etc, originating and terminating in Washington reached 45.7 million metric tons, compared with 43.5 million tons in 1975.

Figure 4: Total Cargoes; 1974-1984 (Millions of Metric Tons)



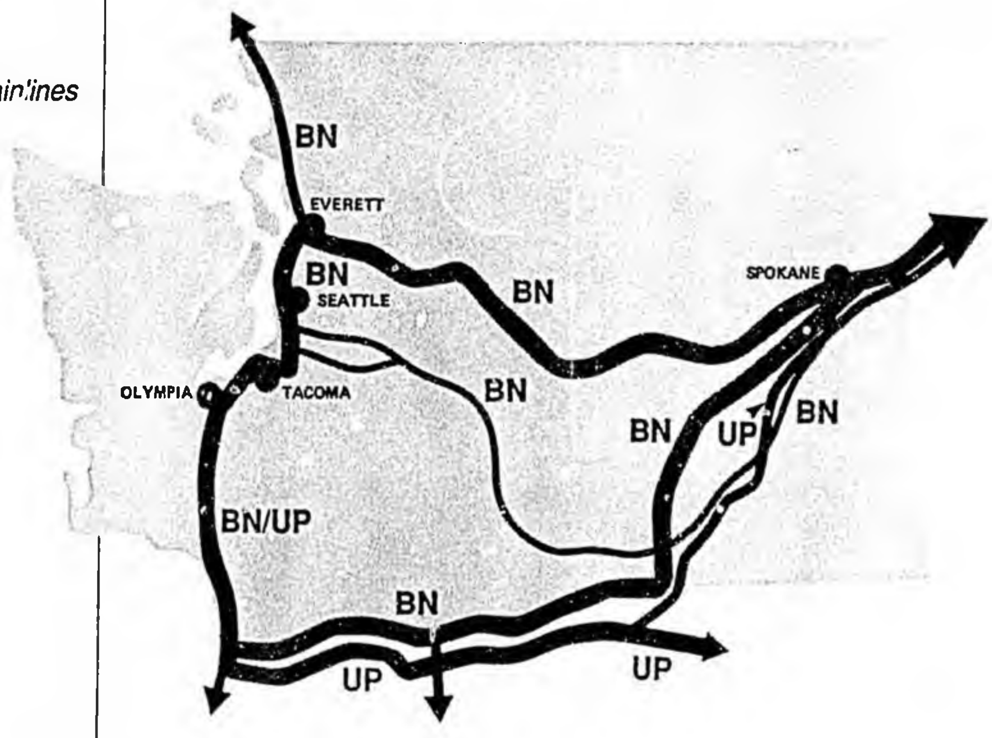
However, major changes have taken place in the distribution of traffic within this total. In particular, the volume of intermodal containerized general cargos originating in Washington has risen dramatically, increasing from 8 percent of all traffic in 1975 to 33 percent in 1984. During the same period, movements of farm products, principally grains and cereals, have also increased, although less spectacularly.

Rail Condition

Mainlines: The mainlines owned and operated by Burlington Northern and Union Pacific often exceed federal and state track and safety standards. As a consequence, the mainline system in the state is in excellent condition and is likely to remain so in the foreseeable future.

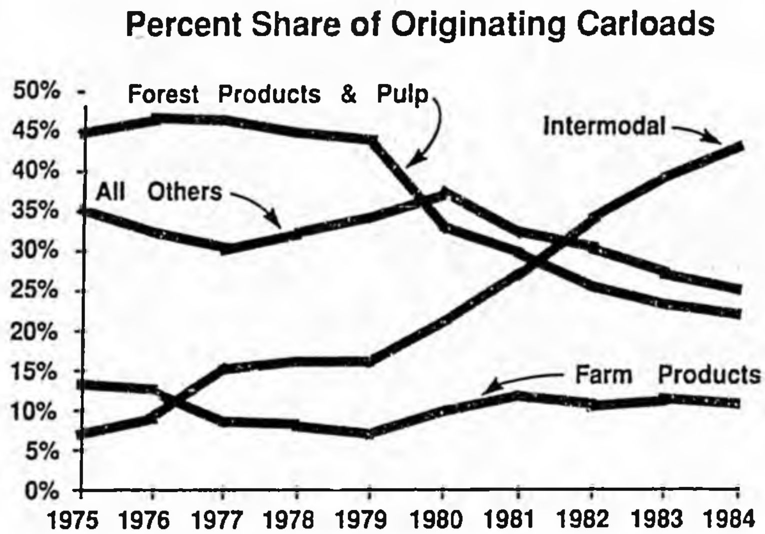
Currently, the main rail lines in Washington carry an average of 15 million gross tons per year over a particular section of rail. The theoretical potential capacity of a rail corridor is an imprecise number which includes many route and operational criteria. An order of magnitude estimate of 55 million gross tons per year for single track and 220 million gross tons for double track is often considered as an average. Centralized Traffic Control (CTC) raises the capacity of a single track to 99 million gross tons. This is well above the heaviest volume of 62 million gross tons recorded in Washington in 1984 over the single track, CTC, Burlington Northern Spokane to Sandpoint corridor.

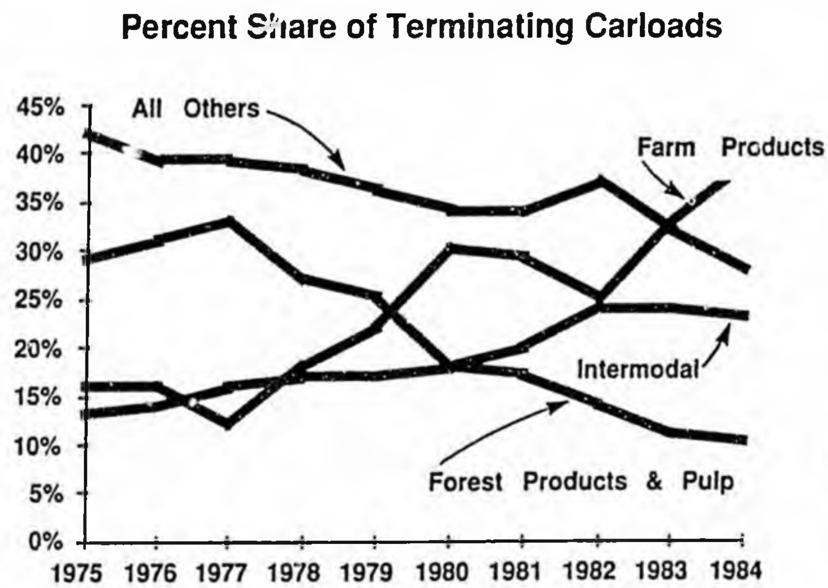
Figure 5: Railroad Mainlines



Low density lines are those rail lines that function as branches or feeders to the mainline system. Typically, a low density line will carry less than one million tons of freight per year. The low volume lines are susceptible to pressure for abandonment as revenues decline. This is particularly the case on those lines that carry single commodities which may undergo extreme fluctuations due to market or international economic conditions.

Figure 6: Percent Share of Originating and Terminating Cargos; 1974-1984

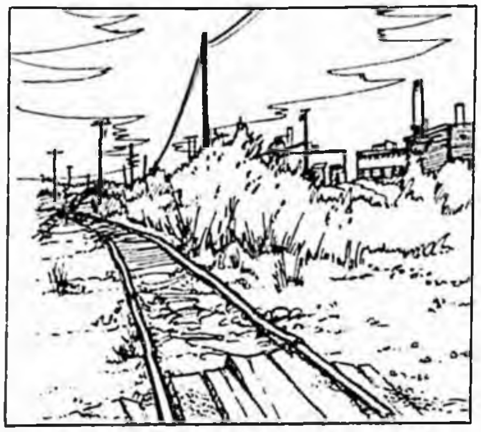




Rail Line Abandonment

Pressure to abandon low revenue branch lines is expected to continue as the major railroad companies concentrate on the economic performance and efficiency of the mainline system.

Since federal partial deregulation, the railroads have begun to increase service in high density traffic corridors at the expense of the low density lines. Increasingly, uneconomic lower density rail lines are either being abandoned, used sparsely, or provided lower quality



service. This normally results in a reduced level of service for the low density and feeder lines as the railroads change from a network system to a hub to hub configuration.

Consequently, a number of communities are expected to experience economic difficulties directly related to the loss or reduction of local rail service. This is particularly critical in many of the agricultural and timber production areas of the state.

Though outside port jurisdiction, ports should monitor the competitive aspect of vertical clearance limitations between competing west coast railroads. The BN and UP companies can currently accommodate one high cube container (9' 6") and one standard 8' 6" unit, while the Southern Pacific railroad can carry two high cube containers over certain corridors. If eastern railroads increase clearance height and BN and UP do not follow suit, Northwest ports could be competitively disadvantaged.

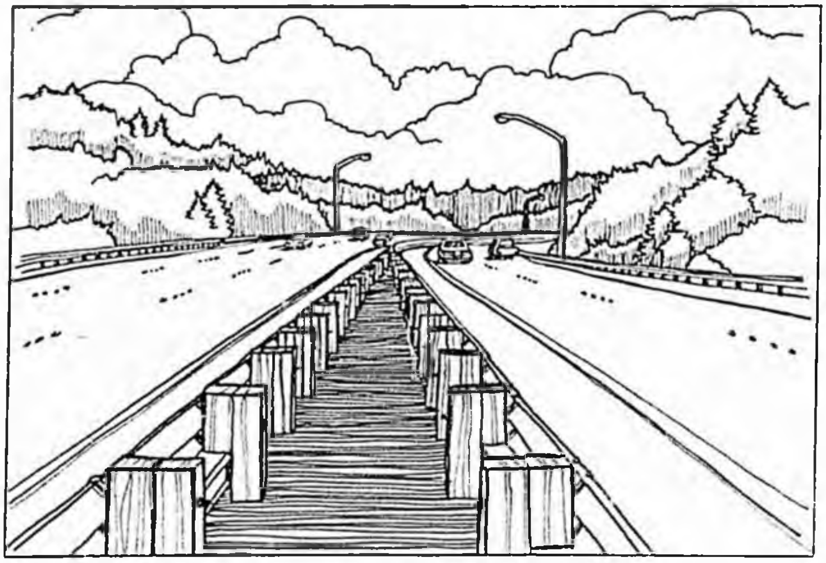
Although no projected capacity constraints are expected on Washington's major rail lines during the next two decades, local access to the mainline system may become more difficult in the future. This situation has come about as a result of the transformation of the mainline railroads into a freeway type of system where multiple car trains make fewer and fewer stops between the main loading and unloading points. This is a concern to a number of Washington ports since competitive status in current and future markets will be increasingly dependent upon the availability of an efficient rail system.

Recommendations

There is a need for a mechanism that will permit the evaluation of feeder service lines in order to determine the current and future viability of rail service to an area. In order to preserve low density lines threatened with deteriorating levels of service and possible abandonment, a coordinated effort will be required by port, city, county and state agencies and user groups.

Recommendations to intercept the low density rail abandonment cycle before it becomes too far advanced include:

- The creation of rail service areas in order to evaluate the viability and future of low density lines on an area basis. The boundaries of these service areas will be based upon the tributary of a particular rail line and cross established political, administrative and geographical boundaries. Shippers, carriers, users, and public agencies within the service areas would all participate jointly in decisions regarding the future of rail service in the relevant area.
- The organization of short line railroads.
- Increased support for additional federal program funding and a state loan program.



Roads and Highways

The identification and examination of Washington's major highway freight routes is a key component in analyzing the performance of the total transportation network in the state.

Although there are comprehensive records on vehicle volumes over the state and county highway systems, there is very little historical data on the origin, destination and routing of major commodities. The manifests and bills of lading used by the transportation companies are not circulated or collated by any public or private agency, primarily due to the proprietary nature of the material.

Shipper Interviews

Therefore, it was not possible to apply the same analytical techniques to the highway network as the other modal systems. In order to identify commodities and product volumes transported by truck over the identified corridors, the study team carried out an extensive program of interviews and discussions with over 800 representatives of companies engaged in the transportation of commodities originating or terminating in public ports. This direct approach was preferred since the more traditional mailing of questionnaire forms rarely produces a response from more than ten percent of the recipients.

During the interviews, data on commodity classifications, product volumes and origins and destinations was collected. Much of the information gathered was general in nature, and often confidential. Nevertheless, the interview process was extremely useful in creating a picture of the major movements of key commodities now being carried over the state roads and highway system. Almost all of the representatives and officials interviewed provided useful information and perceptions on the highway system. Respondents were also asked to identify any problem roads and highways that might impact the efficient performance of their business.

Key commodities trucked within and through the state include a variety of forest and agricultural products, neo-bulk commodities including logs, iron and steel, and autos, and bulk products including chemicals, fertilizers, and scrap metals.

The selection of an inland transportation mode is determined by cost, availability and timeliness of competing transport modes. The results of the interview process confirmed that trucking is generally preferred for haul distances of less than 500 miles, principally due to the more efficient and timely service and the competitiveness of the trucking industry over these shorter haul distances. The main exceptions to this general conclusion are the high density traffic areas, such as the Seattle-Tacoma-Portland corridor, where economic rail feeder service is being established over much shorter haul distances.

Highway System Performance

Basically, the highway system in Washington performs satisfactorily and presents few, if any major constraints to the efficient handling of cargoes through the public and private ports system.

With few exceptions, the route segments perceived by shippers to have condition or capacity limitations had already been identified and selected for improvement by the responsible county, state or appropriate agency.

Trucking companies hauling logs on the Olympic Peninsula and agricultural products in Eastern and Central Washington expressed concern over temporary weight restrictions imposed during winter and spring thaws. The imposition of these restrictions is considered to be a constraint to the efficient movement of export and domestic products. A number of bridges on Highway 101 were also identified as having height and weight restrictions.

The Major Corridors

The only areas of congestion on the interstate system are in the sections through the Seattle, Tacoma, and Olympia urban areas on I-5 and in Seattle and Spokane on I-90.

The congestion is caused by peak hour automobile commuter traffic. Traffic counts show no major variations in truck traffic volumes during these peak periods and to date the level of congestion does not appear to be a major constraint to the efficiency of freight movements.

The consistency of truck traffic volumes also indicates that the urban area congestion does not cause any significant diversions of truck traffic to alternative routes.

Congestion that is increasing on I-5, I-405, and I-90, in the Seattle metropolitan area is expected to be alleviated by 1993 when ongoing projects to increase the capacity of Interstate Routes 405 and 90 are complete. Congestion in Olympia and Tacoma will be alleviated with the completion of Interstate 705 and 5 in the early 1990's. Construction activities on I-90 in Spokane are anticipated to continue for the next several years, dependent upon the availability of federal construction funds, after which congestion should be moderate.

Port Access

In general, port officials are satisfied with the existing state, county, and local road network. Availability of access roads was the chief concern, followed by congestion and general roadway conditions in the urban and immediate port terminal areas.

Constraints to Future Freight Transportation

Although the existing highway system is considered to adequately support the efficient movement of freight by truck, there are a number of trends now developing that will require attention by the appropriate agencies in the future.

As unit container weights continue to increase, more trucks will carry loads that exceed current standard axle limits. Carriers are also expected to press for an extension of the maximum trailer combination length to 105 feet to align with current regulations in Oregon, Idaho, and other west coast states.

Increased truck traffic is expected on local freight routes in many areas. This increase is attributable to the change in transportation mode from rail to truck due to shipper choice, market conditions, poor rail service, or track deterioration. The eventual result is normally the abandonment of the rail line and all commodities are then shipped by truck, unless the industries previously served by the rail link cease to exist.

This will lead to increased road maintenance requirements, placing a greater financial burden on county and local authorities with jurisdiction over these freight corridors.

Recommendations

At a state level, there is real need to identify the major inland transportation routes, commodity mix and technological trends in cargo handling, since these may all impact future strategic planning and maintenance decisions.

With this in mind, it is recommended that the state of Washington, public ports, and local agencies undertake a joint project aimed at collecting information on directional commodity flows, types of products carried, weights, and timing of shipments on the highway system.

This might be achieved by a questionnaire supplemented by specific on-site survey information, and supported by commodity and multimodal data from port, state and other agency files.

Long term impacts and associated costs of commodity movements shifting from rail to truck due to marketing decisions and low density rail line abandonment should be monitored by affected agencies and shippers. Results should be shared in order to coordinate a collective stance on rail line abandonment that best serves the interests of state, county and local communities and the port and maritime industries.

Pipelines

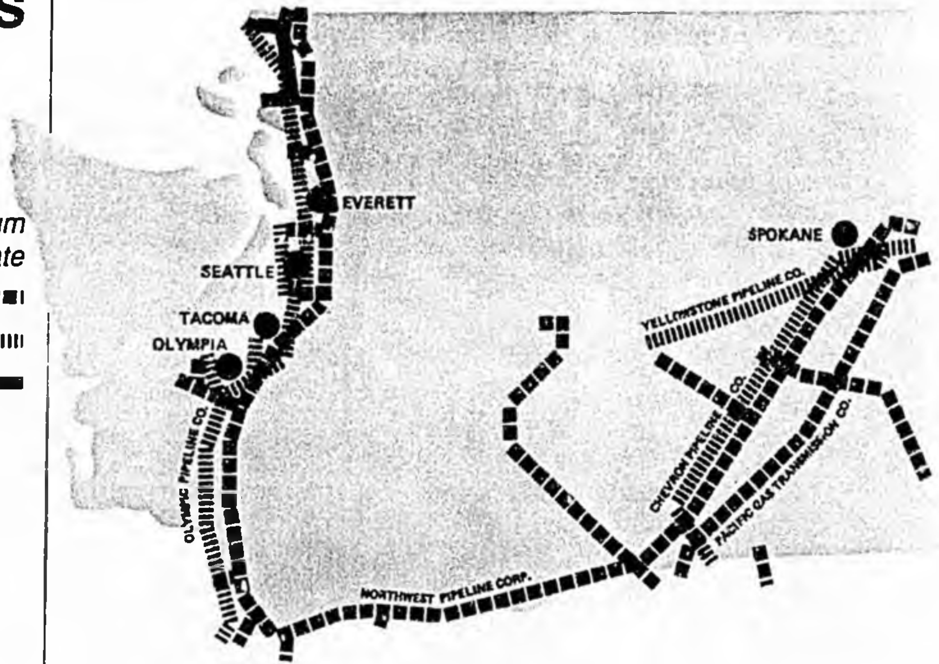


Figure 7: Major Gas and Petroleum Pipelines of Washington State

Gas ■■■
Petroleum Products ||||||||
Crude Oil ▬▬

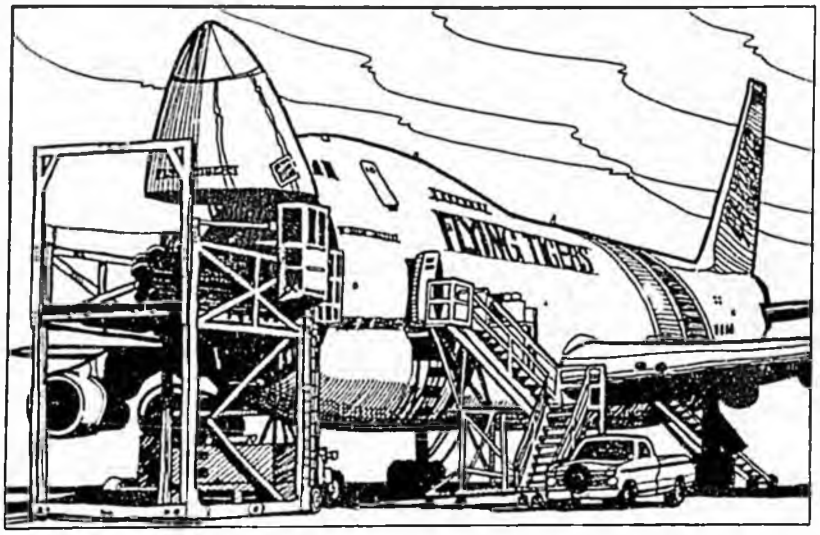
There are two natural gas, one crude oil, and three refined petroleum products pipelines in Washington. The gas lines transfer natural gas from Canada to serve Washington, Oregon, and California. The Trans Mountain crude oil pipeline is now used when a US/Canadian exchange agreement requires that Canada is given access to US reserves or vice versa. Petroleum products are moved through a variety of pipeline systems operated by the Olympic Pipeline Company, Chevron, the Yellowstone Pipeline Co. and the Buckeye Pipeline Co.

All Washington pipeline companies were contacted by the study team and none of the company officials interviewed expressed concerns over capacity limitations or policy considerations.

Recommendations

With no apparent capacity problems, the statewide pipeline system offers no major constraints to existing or projected future levels of trade. Although no changes in the present system are recommended, the collection of basic data on flows and volumes, trends and origin and destination of products enables any future trends to be identified at an early stage.

Air Cargo



There are six major air cargo airports in Washington.

- Sea-Tac International
- Spokane International
- King County International - Boeing Field
- Tri-Cities Airport at Pasco
- Bellingham International
- Yakima Air Terminal

The volume of cargo handled through airports in the state has increased from 135,000 metric tons in 1974 to 178,000 metric tons in 1984. Shipments through Sea-Tac International airport dominate all air cargo movements in Washington, accounting for 90 percent of the total air cargo tonnage. Almost 85 percent of Washington's total air freight is transported to domestic markets. The remaining 15 percent is destined for international markets, primarily in Canada, the Far East and Europe.

Table 1: Major Air Cargo Airports in Washington State; Tonnage in 1984 (Metric Tons)

Sea-Tac International Airport	167,704
Spokane International Airport	4,567
King County/Boeing Field	4,236
Tri-Cities Airport	504
Bellingham International	453
Yakima International	150
Total	**177,614**

Fifty carriers serve the six Washington airports. The largest air cargo carrier in the state is Northwest Orient Airlines which flies intoSea-Tac and Spokane airports. Other major carriers servicing state airports include Alaska Airlines, Flying Tigers, United Airlines, PSA, Federal Express, and Western Airlines.

Air transported products are typically time and market sensitive goods such as perishable foods, fashion apparel and high value products. Primary products transported by Washington air carriers are fresh fish and flowers, high value consumer products such as computers and medical equipment, sports apparel, replacement parts, equipment, machinery and agricultural products that include mushrooms, berries, and asparagus. The overnight package industry has also expanded rapidly over the last 5 years.

Airport Future Expansion

In anticipation of growth in air cargo volumes, several airports are considering facility expansion.

The most recent Master Plan produced for Sea-Tac International Airport calls for an additional 50 to 105 acres of air cargo space. The Port of Bellingham is planning an additional facility for air cargo and has applied for foreign trade zone status to attract foreign investment in high technology manufacturing. The ports of Bremerton, Olympia and Pasco are also giving high priority to the acquisition of additional air freight business.

Further information on small airports and air cargo trends is expected to be forthcoming from the Washington State Airport Systems Plan. The three-year study is now in its first year of preparation.

Recommendations

As a rapid growth sector of the Washington state port industry, the provision of air cargo service is an increasingly attractive element in the development of new industrial and marine related business in port districts.

With the exception of Sea-Tac Airport, the existing facilities in Washington are adequate to meet current and future demand for the efficient transportation of air cargo. In a highly competitive marketplace, efforts to enhance the attraction of the statewide air cargo system are expected to provide economic benefits to private industry and the public sector and should therefore be supported by local, county and state governments in addition to the local port district or sponsoring agency.

Ports and Waterways

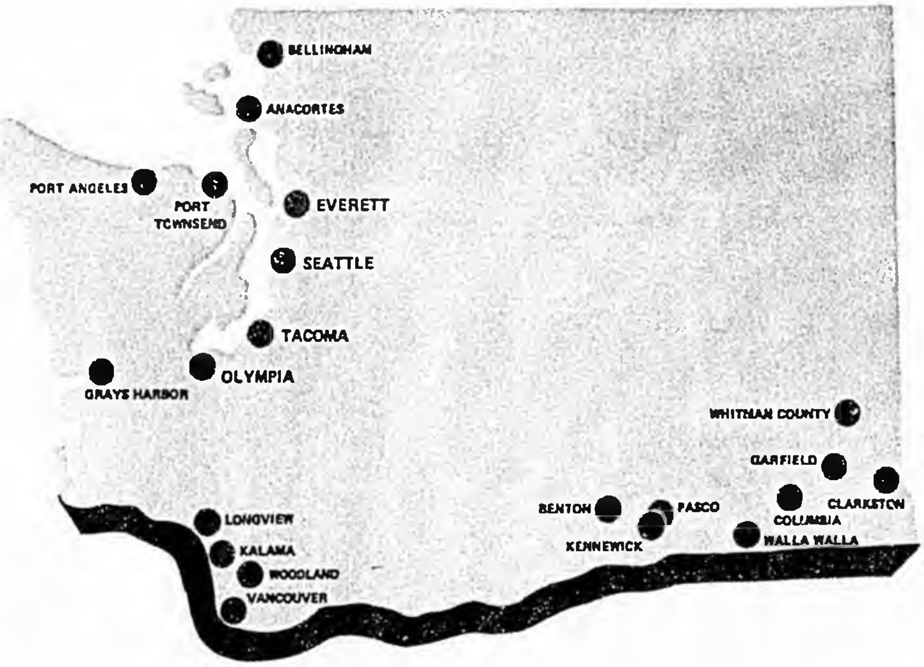


Figure 8: Public ports in Washington with Marine Terminals

Waterborne Commodity Forecasts

The need for additional port facilities to handle future waterborne commerce is dependent upon future international and domestic waterborne trade and trends in cargo handling. Eighteen WPPA member ports have public facilities for handling waterborne commerce. Trade projections prepared for the study cover both these public ports and the many private or leased single user facilities in the following regions:

- Puget Sound
- Lower Columbia
- Washington Coast
- Mid-Columbia/Snake River

Projections of waterborne commerce were prepared for each major trade component, including imports, exports, and domestic movements. They were also aggregated by cargo handling mode to include containers, breakbulks, drybulks, liquid bulks, neobulks and grain.

The waterborne commerce projections represent what is best described as a baseline forecast. Although they include a number of the more probable future cargo trends, other less quantifiable possibilities are not included. Specifically, the forecasts exclude factors such as major changes in market shares between west coast ports, potential long-term market opportunities, and the impacts of intense marketing campaigns by one or more ports in the statewide system.

Any long term projections must therefore be viewed with some caution since the impacts of regional competition and a multiplicity of operational, economic and technological factors will all affect the actual volumes of cargoes handled by Washington ports in the future.

The forecasts indicate that by the year 2005, total trade through Washington ports will reach 82.4 million metric tons, representing a 50 percent increase over the tonnage handled in 1984.

Table 2: Washington State - Projected Waterborne Commerce to 2005 (Metric Tons)

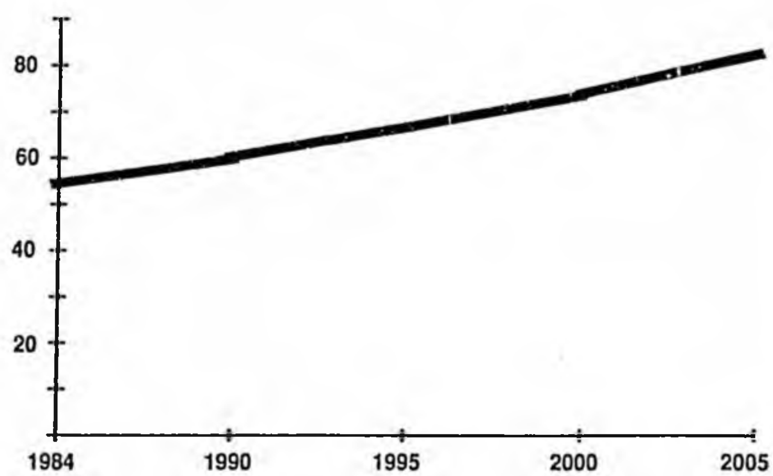
	1984[2]	1990	1995	2000	2005
Imports[1]	12,506,930	15,170,771	16,921,340	19,687,830	23,210,840
Exports	31,735,880	32,721,899	35,465,102	38,480,897	41,965,520
Shipments	4,283,300	4,738,100	5,512,600	6,181,300	[illegible]940,500
Receipts	5,621,768	7,080,660	8,323,790	9,211,200	10,249,410
All Modes	54,147,878	59,711,430	66,222,832	73,561,227	82,366,270

1) Imports and Exports are international trade. Shipments and Receipts are domestic movements.
2) Domestic movements based on 1983 data, international movements based on 1984 information.

Table 3: Washington State - Projected Waterborne Commerce to 2005 by Cargo Handling Mode (Metric Tons)

	1984	1990	1995	2000	2005
Containers	7,510,114	9,823,690	12,274,295	15,395,700	19,444,105
Dry Bulks	10,104,150	11,375,701	11,371,784	12,102,080	12,914,196
Grain	13,215,910	11,118,200	12,806,700	14,783,800	17,078,900
Liq.Bulks	10,077,480	11,547,480	13,426,180	14,763,830	16,265,610
Neobulks	10,951,700	12,877,700	13,096,400	13,047,600	13,029,700
Breakbulks	2,286,540	2,966,669	3,245,478	3,466,217	3,631,754
All Modes	54,147,878	59,711,430	66,222,832	73,561,227	82,366,270

Figure 9: Washington Total Trade, 1984-2005, Millions of Metric Tons



The Puget Sound Port Region

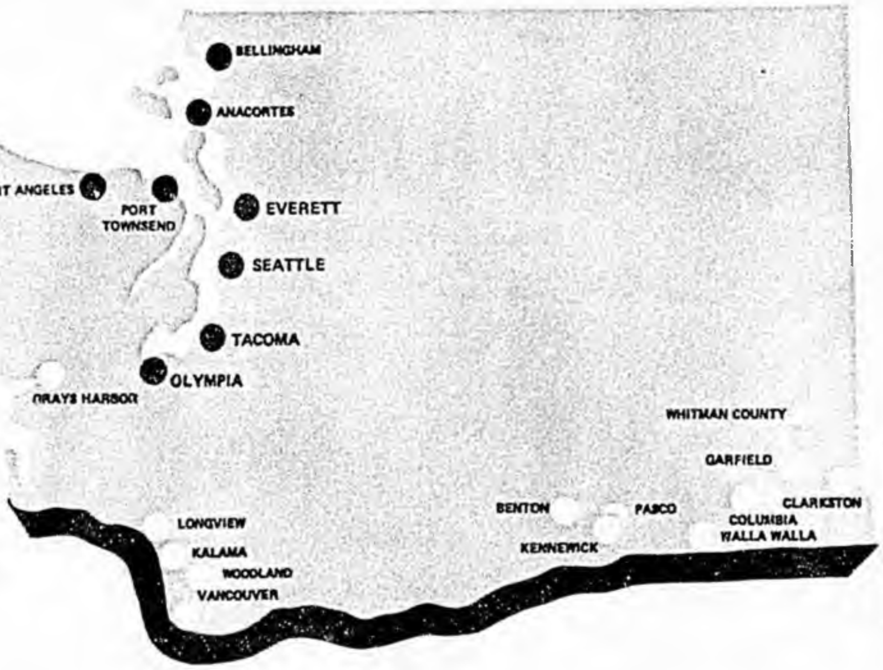


Figure 10: Ports of Puget Sound

The Puget Sound port region will continue to be the most active center for waterborne commerce in Washington, handling 73 percent of all statewide waterborne commerce. Containerized general cargoes are projected to reach 19 million metric tons by 2005. Liquid bulk commodities, mostly crude oil receipts from Alaska, are projected to reach 15 million metric tons, and will be the second largest contributor to total Puget Sound trade.

Table 4: Puget Sound Ports - Projected Total Trade to 2005 (Metric Tons)

	1984	1990	1995	2000	2005
Containers	7,240,000	9,527,000	11,946,800	15,034,300	19,044,700
Drybulks	7,829,700	8,798,881	8,597,350	9,148,740	9,778,000
Liquid Bulks	9,343,200	10,662,800	12,413,100	13,645,200	15,034,600
Breakbulks	1,437,100	1,963,580	2,137,550	2,308,820	2,510,250
Neobulks	5,999,100	7,048,700	7,244,900	7,274,300	7,326,100
Grain	5,746,500	3,974,700	4,590,800	5,325,200	6,208,900
All Modes	37,595,600	41,974,781	46,930,500	52,736,560	59,902,550

The distribution of tonnage by trade designation is not expected to alter significantly. Total waterborne trade will continue to be dominated by international movements, but the relative share of imports to exports will increase slightly. The percentage of domestic movements as compared to total trade, will remain virtually unchanged.

Significant changes within cargo handling modes for all waterborne commodities are anticipated during the next 20 years. The percentage share of cargoes handled in containerized form is expected to represent 32 percent of all tonnage handled through the region by 2005. Total tonnage for all commodities is expected to increase from 37.9 million tons in 1984 to 59.9 million tons by the end of the study period.

Table 5: Puget Sound Ports - Distribution of Trade - 1984 and 2005 (Metric Tons)

	1984		2005	
Foreign Imports	10,540,600	28%	19,781,500	33%
Exports	17,507,100	46%	23,381,250	39%
Shipments	4,060,900	11%	6,687,200	11%
Coastwise Receipts	5,847,000	15%	10,052,600	17%
Total	37,955,600	100%	59,902,550	100%

The Lower Columbia Port Region

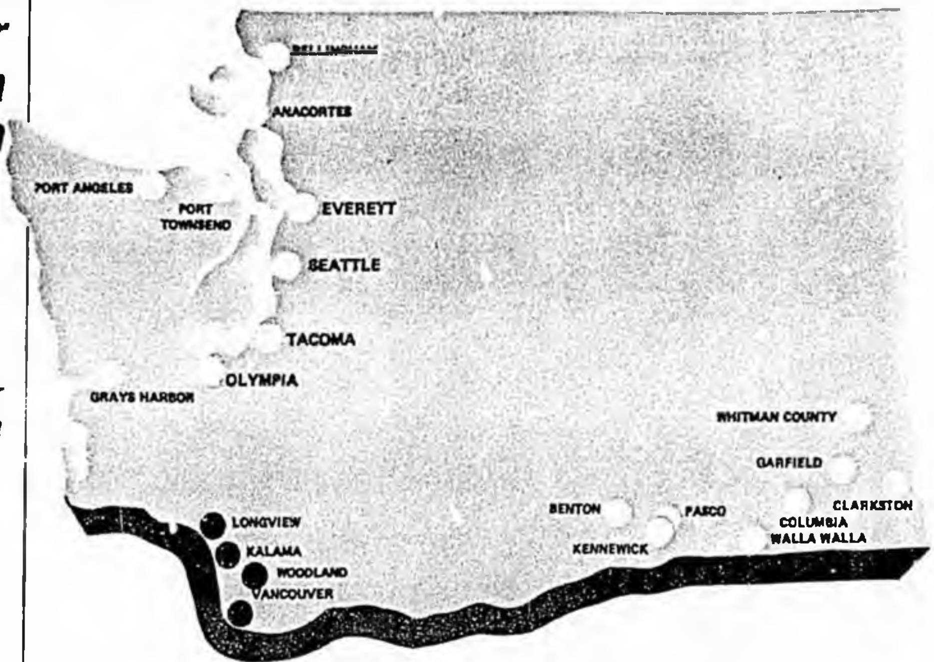


Figure 11: Ports of the Lower Columbia

Waterborne commerce movements through Lower Columbia River ports in Washington State are anticipated to increase by over 35 percent by the year 2005. As a result, total trade will reach approximately 15.6 million metric tons. Tonnages handled through Lower Columbia ports will continue to be dominated by exports, which presently constitute 85 percent of total trade. In spite of considerable uncertainty over the long term future of world markets, grain exports are expected to represent 56 percent of all trade through Lower Columbia ports by 2005.

The forecasts also indicate a potential increase in the tonnages of miscellaneous dry bulk commodities handled through the River ports.

Table 6: Lower Columbia River Ports Changes in Commerce by Cargo Handling Mode - 1984 to 2005

	Percent of Total Trade 1983/1984	2005
Containers	1	1
Dry bulk	19	15
Grain	53	56
Liquid bulk	1	2
Neobulk	19	20
Breakbulk	7	6
Total	100	100

Although grain exports at a statewide level are only expected to experience modest increases over the next twenty years, the tonnages handled through elevators on the Lower Columbia River are projected to increase from 6.1 million to 8.7 million metric tons by the end of the study period. Much of this increase is expected to come from a continuing trend for rail shipments of grain to move along the Columbia River corridor, shifting exports away from Puget Sound ports.

Table 7: Lower Columbia River Ports - Projected Total Trade to 2005 (Metric Tons)

	1984	1990	1995	2000	2005
Containers	90,130	94,700	104,500	115,400	127,400
Drybulks	2,200,400	2,086,732	2,216,588	2,327,353	2,429,968
Grain	6,089,000	5,655,500	6,531,900	7,552,600	8,714,000
Liquid Bulks	175,300	197,200	216,100	238,700	259,500
Neobulks	2,180,500	3,058,300	3,094,600	3,084,700	3,081,500
Breakbulks	797,820	872,740	974,820	1,025,350	990,500
All Modes	11,533,150	11,965,172	13,138,508	14,344,103	15,602,868

The Washington Coast Port Region

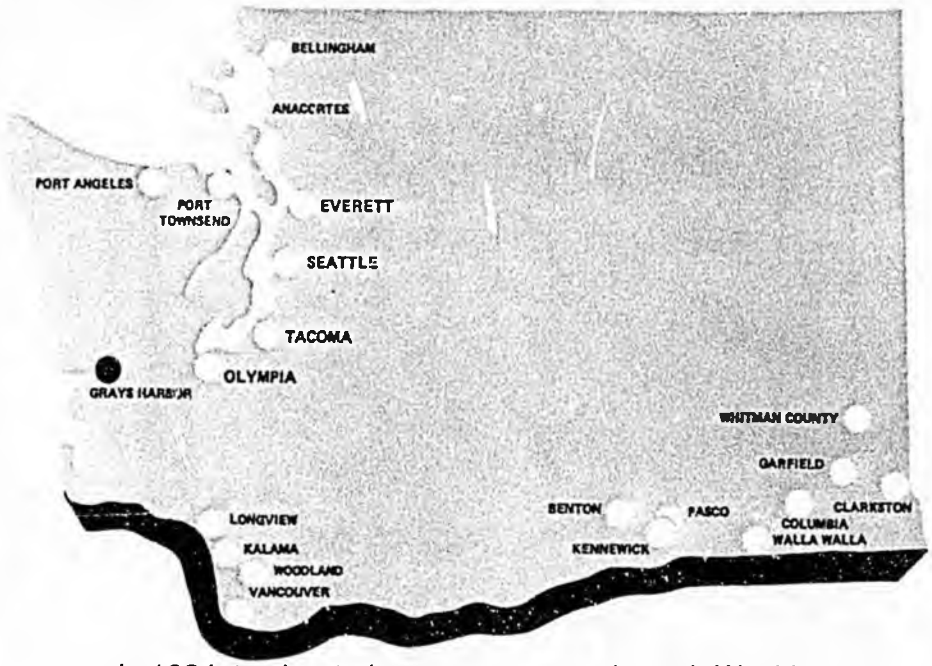


Figure 12: Ports of the Washington Coast

In 1984, total waterborne commerce through Washington Coast ports was 2.85 million metric tons. In 1984, 98 percent of the total trade was export business, with logs representing the bulk of the tonnage.

The projections of trade for the port region indicate that total trade is expected to decrease slightly to 2.82 million metric tons by the year 2005. The primary source for the predicted decline in cargo volumes is an overall 1.5 percent annual decrease in log exports partially offset by a two percent annual increase in woodchip exports after 1995.

Table 8: Washington Coast - Projected Total Trade to 2005 (Metric Tons)

	1984	1990	1995	2000	2005
Drybulks	29,650	83,288	86,246	79,387	72,428
Breakbulks	51,620	130,349	133,108	132,047	131,004
Neobulks	2,772,100	2,770,700	2,756,900	2,688,600	2,622,100
All Modes	2,853,370	2,984,337	2,976,254	2,900,034	2,825,532

Mid Columbia/ Snake River Region

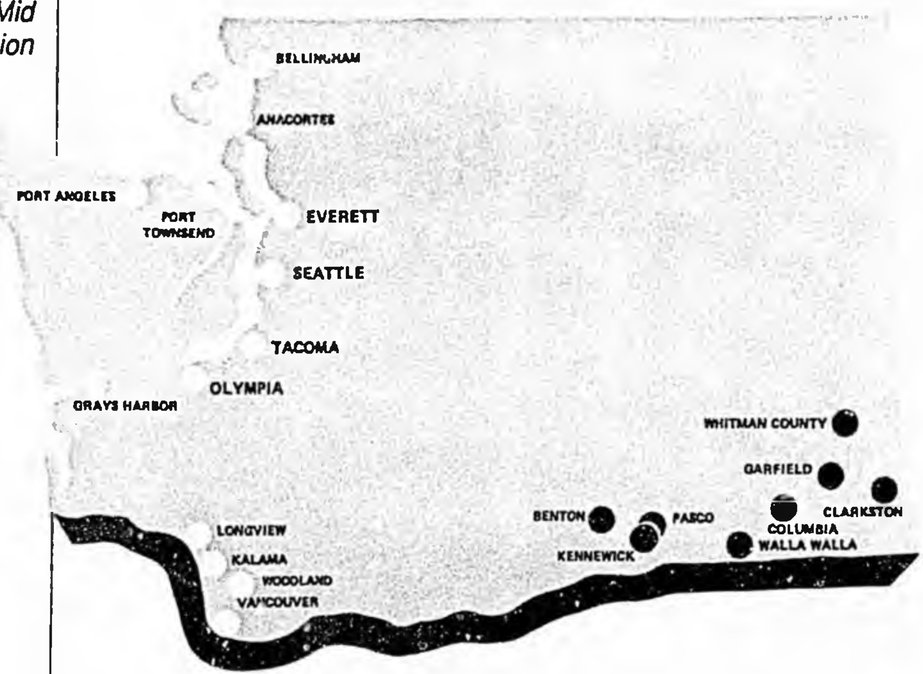
In 1984, total waterborne commerce volume through Mid-Columbia River ports reached 2.2 million metric tons. Outbound grain shipments represented 64 percent of the total tonnage. Other significant outbound cargoes included containerized agricultural and forest products. Major inbound commodities were petroleum products, chemicals, and fertilizers.

Waterborne commerce volumes are projected to reach approximately four million metric tons by 2005. Moderate growth, between two and three percent per year, is anticipated for the major inbound and outbound commodities.

Table 9: Mid Columbia/Snake River Region - Projected Cargo Movements to 2005 (Metric Tons)

	1983	1990	1995	2000	2005
Inbound	563,280	1,045,680	1,212,280	1,361,330	1,529,610
Outbound	1,598,510	1,736,600	1,961,300	2,215,300	2,501,700
Total	2,161,790	2,782,280	3,173,580	3,576,630	4,031,310

Figure 13: The Ports of the Mid Columbia/Snake River Region



Port Facilities Inventory

The port and waterway system inventory was derived from information presented in the WPPA system study of 1980, the US Army Corps of Engineers facility handbook and discussions and visits to each of the ports.

Table 10: Public and Private Cargo Handling Berths in Washington State (1985)

Description	Puget Sound	Lower Columbia River	Mid Columbia River	Wash. Coast	Total All Regions
General Cargo					
-Containerized	24	2	5	0	31
-Break Bulk	54	5	6	[illegible]	66
-RO/RO	1	1	0	0	2
-Railroad/Barge	3	0	0	0	3
Neobulks					
-Automobiles	6	1	0	0	7
-Logs	15	2	0	6	23
-Steel	2	1	0	2	5
-Forest Products	20	10	0	2	32
Bulk Terminals					
-Dry Bulks	33	9	1	1	44
-Grain	2	4	15	0	21
-Liquid Bulks	12	3	4	0	19
-Wood Chips	2	0	0	1	3
Totals	174	38	31	13	256

Note: List includes barge and ship berths, public and private terminals.

New Facilities and Terminal Upgrades

Since the 1980 WPPA Port System Study, there have been several facility changes in each port region.

Puget Sound: Changes in the Puget Sound Region include the completion of Terminal 30 in Seattle and the Tacoma and Alaska terminals in the Port of Tacoma. Since 1980, Terminal 46 in Seattle has also become fully operational. The Port of Anacortes has expanded berthing space and storage for bulk exports at Pier 2. In addition, a dry bulk unloader was also installed. The Port of Port Angeles completed the reconstruction and expansion of a log loading and general cargo pier at Terminal 3 in 1985. Finally, the Port of Everett purchased two docks from Weyerhaeuser which are awaiting marine terminal improvements.

Lower Columbia River: The Ports of Vancouver, Kalama and Longview in the Lower Columbia port region have all upgraded facilities in the past five years. At Vancouver, the dry bulk facility at Berth 7 was completed, and extension of Berth 8/9 is underway. Grain elevator storage was also upgraded from 3.1 to 5 million bushels.

The Peavey Grain Facility, constructed in 1983 at the Port of Kalama, has 2.0 million bushels of storage and is able to service two unit trains. The Port of Woodland has purchased waterfront land for a deepwater terminal site.

Berths 1, 2, and 5, at Port Longview, were all reconfigured and upgraded to handle new and additional cargoes. Berth 1 will handle exports of beet and alfalfa pellets and animal feeds, bulk chemical exports will be shipped from Berth 2, and the Arco calcined coke facility was upgraded at Berth 5.

Washington Coast: At the Port of Grays Harbor in the Washington Coast port region, the pier at Terminal 1 has now been removed and the outer end rebuilt as a bunker barge facility.

Mid Columbia/Snake River: Improvements in the Mid-Columbia River port region include new container terminals in Clarkston and Walla Walla, and expanded grain storage at the Ports of Columbia, Garfield, and Walla Walla with a combined storage increase of 3.3 million bushels.

Facility Requirements

Existing throughput capacity of the statewide port system was compared to projected waterborne commerce volumes in order to identify any large scale facility limitations that may constrain future freight movements and inhibit the economic development of the various port regions.

Facility analysis was based upon berth and apron transfer capacity, storage capacity, and hinterland transfer capacity. This means that the overall capacity of each facility is controlled by the component having the lowest capacity. As an example, containerized general cargo terminals are land intensive and are often limited by storage area rather than by berth or hinterland transfer capacities.

Where the projected level of waterborne commerce exceeded the system capacity for a particular cargo mode, the equivalent capacity of a typical facility is divided into the forecast shortfall to obtain the number of additional typical facilities required. The comparison of existing cargo terminal capacity with the baseline waterborne commerce forecasts shows no major existing constraints to commodity movements. Between 1990 and 1995, a shortage of containerized general cargo terminals is expected as volumes of imports continue to increase, and more export cargoes are containerized to fill vessels on backhaul routes to Pacific Rim nations. A shortage of capacity to handle imported automobiles is also expected by 1995.

Container Terminals

At the present time there is an excess of containerized general cargo handling capacity in the state, primarily as a result of the recent construction of terminals in Tacoma. However, the study indicates that demand should be greater than existing system capacity sometime between 1990 and 1995. By the year 2005, demand is expected to exceed 1985 capacity by 9.25 million tons per year.

Table 11: Container Terminals: Comparison of Forecasted Demand with System Capacity

Region	No. of Berths	Existing Capacity (1000MT)	Actual Tonnage 1985	Projected Cargo Vol. (1,000 MT) 1990	1995	2000	2005
Puget Sound	24	9,514	8,775[1]	9,527	11,947	15,030	19,045
Lower Columbia River	2	400	n/a	95	104	115	127
Mid Columbia Ports	5	277	n/a	200	221	224	270
All facilities	31	10,191		9,822	12,272	15,369	19,442

Note: Puget Sound tonnage for 1985 estimated from Port of Seattle and Port of Tacoma records, supplemented by unaudited data on private terminals.

Based upon current typical levels of throughput for multi-user terminals, this translates to a need for up to 11 new container terminals in the region by the end of the study period.

Table 12: Containerized Cargo Handling Requirements - 1985 to 2005

Year	Berths	Storage Area (Acres)	Equivalent Modular Terminals
1985	0	0	0
1990	0	0	0
1995	6	150	3
2000	8	200	4
2005	8	200	4
Total	22	550	11

Note 1: A modular terminal is considered to require 2,000 ft of berth space, with 45 ft depth of water and up to 75 acres of back up storage and marshalling area. An intermodal yard and mainline rail access are also considered essential to the efficient operation of a modern terminal.

Grain Terminals

The outlook for grain terminals is unclear and exports during 1985 declined drastically. They are expected to recover somewhat but are unlikely to regain former growth trends as long-time importing nations begin to grow more domestic grains. Although not shown in Table 13 below, there has recently been an increasing trend towards consolidation of grain exports on Lower Columbia river ports. This is likely to result in a surplus of capacity at Puget Sound facilities and in turn may lead to long term need for additional capacity on the Columbia River. It is anticipated that this shortfall, if it occurs, will be met by increasing the capacity of existing terminals and is unlikely to result in the construction of a new grain terminal.

Table 13: Grain Terminal: Comparison of Existing Capacity to Forecasted Demand 1985-2005

Region	No. of Terminals	Exist Capacity (1000MT)	1984[1]	1990	1995	2000	2005
Puget Sound	2	11,000	5,746	3,975	4,591	5,325	6,208
Wash. Coast	0	0	0	0	0	0	0
Lower Columbia	4	10,400	6,089	5,655	6,532	7,553	8,714
Mid Col/Snake[2]	15	4,160	1,380	1,488	1,684	1,906	2,156
	21	25,560	13,215	11,118	12,807	14,784	17,078

Note 1: Actual Tonnage; Note 2: Mid Columbia/Snake River terminals are shallow draft barge facilities.

Dry Bulk Facilities

Miscellaneous dry bulk cargo opportunities are increasing and a modest increase in facility needs is anticipated. Since most dry bulk terminals are specialized facilities with greatly varying capacity, it is difficult to predict berth, storage and infrastructure needs on a regional basis.

Automobile Terminals

Increasing volumes of automobile imports to the Puget Sound and Lower Columbia port regions will require additional terminals in these areas. The ports of Tacoma and Seattle have a combined capacity of approximately 450,000 metric tons per year, and the Port of Vancouver has an estimated 50,000 metric tons. The current level of automobile imports is expected to almost double to 825,000 metric tons in the next two decades. Additional capacity for approx-imately 325,000 metric tons per year will be needed. Although most of the existing terminals are located in Puget Sound, other port regions have the necessary attributes to offer a competitive service to handle the future new business.

Table 13: Additional Automobile Import Terminal Requirements to 2005

Region	1990	1995	2000	2005
Puget Sound	0	1	1	1
Wash. Coast	0	0	0	0
Lower Columbia	0	0	0	0
Total	0	1	1	1

Note: Requirements are based on a modular terminal having one berth and 20 acres of storage to give a capacity of 120,000 metric tons/year (110,000 vehicles). Additional uplands area is required for vehicle processing and distribution.

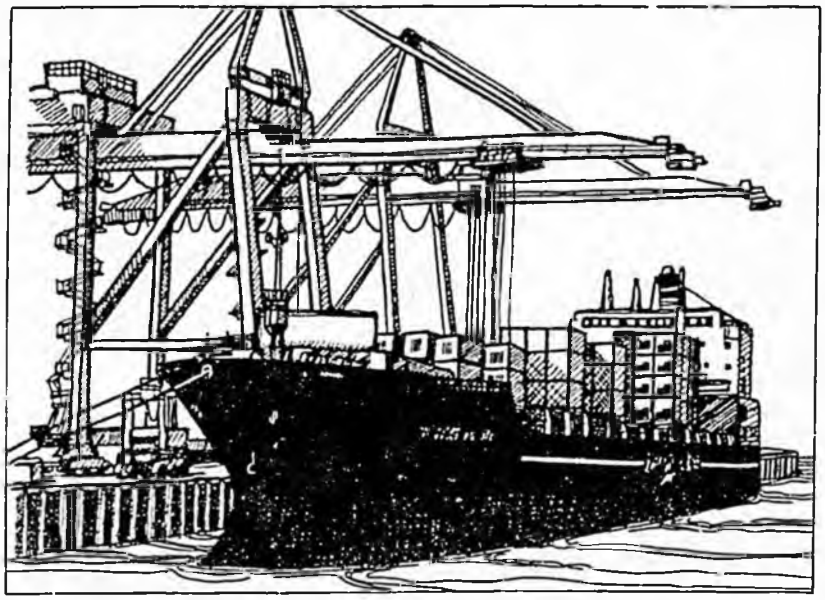
Other Commodities

The study group identified no additional major capacity constraints that might impact the efficient movement of the remainder of the commodities historically handled through the statewide port system. These commodities include logs, woodchips and other forest products, breakbulk and liquid bulk cargoes.

During the next twenty years, increasing excess capacity for breakbulk cargoes will become available as more goods are shipped in containers. This will especially impact a number of the smaller ports in Washington as more of their traditional cargoes are diverted to the larger container load centers of Seattle, Tacoma, and the Port of Portland.

In many instances, these breakbulk terminals will be converted to miscellaneous or special purpose bulk terminals to offer maximum flexibility to capture new business or cargoes displaced from the larger container load centers.

Future Transportation Patterns and Technology Trends



Cargo handling, distribution and operational techniques are undergoing a second level of development in the 1980's. The move to containerization of general cargo is well established although the trend to increasingly large vessels has slowed, perhaps temporarily, in response to a surplus of capacity in the shipping industry and diminished profit margins. This second level of technology developments includes service and cargo handling efficiency improvements such as twin stacked rail cars for container cargoes, intermodal rail yards, through service from origin to destination by multiple transportation modes, and computerized systems.

Vessel Size and Terminal Requirements

General Cargo Vessels: Container ships continue to increase in capacity but the dimensional limits still remain within the size of the Panama Canal Locks. Although there has been considerable discussion and speculation that a new breed of containerships, too large to transit the Canal, will shortly be built, no major steamship line has yet placed an order for construction.

As vessel size increases, carriers will make fewer calls en route. Increasingly sophisticated marine terminals will be required in the future in order to persuade shipping lines to include a port as a regular, scheduled port of call.

A typical 1990's container ship calling at a major load center will require a 1,000 foot long marginal wharf with up to 4 cranes capable of lifting up to 50 tons. With a 25 to 35 acre storage area required to support each berth, a modular terminal of the future will be a two berth facility, with 50 to 75 acres of open storage and an adjacent intermodal rail yard or piggyback service. A completely automated, computer controlled container storage and distribution yard is technically possible at this time and could well represent the state of the art within the next ten years. Given the extremely high investment needed to provide a modern and efficient facility, the trend in general cargo handling continues to move toward the load center concept.

At the present time the economic success of a major load center is increasingly dependent upon the quality and efficiency of intermodal rail service. With increasing competition between Puget Sound and California ports, it is not clear whether the final outcome will be a number of smaller but important west coast load centers, or just one or two major cargo corridors to and from the Pacific Rim.

Bulk Carriers: With the worldwide reduction in bulk cargo commodity movements in the past five years, there is a considerable surplus of vessels with intense competition for cargoes. Few new vessels have been commissioned and the Panamax size limits envisioned in the 1975 and 1980 WPPA studies still hold good for most bulk carrier vessels.

Grain Ships: Grain carriers calling at Columbia River and Puget Sound ports are typically sized at or near Panamax limits, although few actually traverse the Canal. No major increases in vessel size are anticipated in the next 20 years.

Log ships: A typical log carrier is a special purpose 20,000 to 30,000 dwt ship, 500 to 600 feet long, drawing 35 to 40 feet fully laden with four 25-ton capacity on board cranes, requiring four gangs to load. Newer vessels expected to call at Pacific Northwest ports are in the 600 to 650 foot range and many are now being designed as combination log/bulk carriers. Shipboard cranes are still standard equipment but a number are being upgraded to 35 ton capacity.

Cargo Handling Technology

Intermodal Traffic: The most significant recent developments are the introduction of intermodal service for general cargo, something that was little known ten years ago. The advent of the intermodal yard adjacent to a container terminal has become a necessity if a port is to compete successfully.

Intermodal traffic originating in Washington State in 1984 was 2.33 million tons compared with 487,000 tons in 1975, almost a fivefold increase. Following partial deregulation of the rail industry, intermodal, piggyback and container traffic on the Burlington Northern and Union Pacific railroads within the state increased from less than 10 percent of all rail traffic in 1975 to over 42 percent in 1984.

The introduction of twin stack rail cars capable of carrying two stacked 40 foot units is reducing shipping costs. With the exception of the high density traffic I-5 corridors, rail is now the favored form of transportation for containers destined for inland locations more than 500 miles distance from the port of entry.

New developments in the future may include the use of combination rail/road trailers. The concept, which is at an advanced experimental stage involves the use of a trailer with two sets of axles and equipped with rubber tired and steel wheels for use on rail or highways.

If successful, the concept could have far reaching effects in the way general cargo containers and trailers are handled.

Containers: The height of containers is unlikely to increase substantially as it is limited by the 13.5 feet maximum height regulations on the highway system, and existing vertical bridge clearances. However the length of container boxes has increased from 40 feet to 42.5 feet and more recently, 45 feet and 48 feet units are being seen.

"Domestic" containers, are being developed to fill multiple car trains on the east west backhaul routes In order to compete with highway transportation these new units are being designed to maximum truck dimensions of 48 feet in length. Few, if any, will actually be carried on vessels, but most will be transferred through intermodal facilities at container terminals, and distributed within the region of influence of the port.

At the same time, the unit weight of cargo carried in each container is steadily increasing and loads of 10 tons per twenty foot equivalent unit (TEU) are not uncommon for export containers. This is resulting in increased truck axle loads, which in turn, increases the rate of deterioration of pavements and requires truckers to obtain "over legal" permits.

Backhaul Cargoes

As economic and competitive pressures continue to increase on maritime carriers, more and more ports and shipping lines are developing market strategies based on backhaul opportunities. One result is the containerization of cargoes such as scrap metal, lumber and even bulk cargoes all of which were not previously considered suitable for containers. As the containers are being moved through the large load centers such as Seattle and Tacoma, the result is a diversion of certain cargoes from a number of ports in the Pacific Northwest.

In order to offer the maximum flexibility to replace lost break bulk or neobulk cargoes, these ports must now offer multipurpose facilities capable of handling bulks, breakbulk or neobulk commodities as the market dictates.

Computers and Computerized Cargo Tracking

Major ports in the nation are investing in computerized systems designed to track, invoice and monitor cargo from point of entry to final destination and to enhance customs and manifest documentation. Operational systems such as berth allocation, equipment distribution, survey, maintenance, safety and support services are also being linked to central computerized control systems.

A new development in computer use is in the construction of sophisticated port modeling and simulation systems, particularly for operational and facility planning purposes.

Vessel Traffic Control

In an effort to monitor increasing levels of vessel traffic in Puget Sound the U.S. Coastguard recently instituted a state of the art monitoring system that tracks all vessels larger than fishing boats or pleasure craft. Vessel operators must first contact the Coast Guard and report their proposed destination, current location, and indicate an estimated time of arrival. The vessel is then tracked through Puget Sound to its final destination. With the overall objective of an increase in vessel safety, the system also permits a larger volume of traffic to operate in the area than would be possible under previous systems.

Labor

Ports and carriers are constantly seeking to reduce costs in order to remain competitive and differences in work rules and labor rates have the potential to shift business from one area or state to another. Although union leadership has generally responded favorably to this need for greater economic efficiency, an increasing number of non union terminals are being introduced in eastern and Gulf Coast ports.

In the event that a non union terminal is established in the Pacific Northwest, the competitive status of a number of the major terminals could undergo significant change.

Modal Choice

The selection of a preferred mode of transportation requires consideration of a number of factors. With the exception of air cargo, which was not included in this analysis, the most important parameter is usually bottom line cost. This in turn is affected by many criteria, including return on investment, basic operational costs, system availability, legal and administrative issues, system efficiency and technology.

Although economic comparisons of transport mode choice based on cost are valid, they do not take into account special factors that may induce a shipper to select a particular mode over another. These include convenience and speed of delivery against product value and carrier rates that may be below actual long term costs due to market considerations. In particular, some haulers may be prepared to cut rates below actual costs in order to survive or generate new business, while others may arbitrarily set high rates where competition does not exist.

An analysis was made of the major cost components between truck, barge and rail modes of transportation including piggyback, multiple car grain shipments, and container cargoes. The results indicated that in general, the break even point on total cost per mile traveled for rail and highway modes will vary from 75 to 500 miles depending on commodity and local factors. An equivalent barge - highway haul break point of 100 miles is accepted as reasonable by many shippers, dependent upon the commodity handled.

Barge haul for all commodities is generally the least costly transportation alternative on the mile by mile basis. However, this advantage is often eliminated by the cost of drayage from the point of origin of a commodity to the barge terminal.

Rail (carload) transportation costs tend to be next lowest except at very short lengths of haul. Freight transport by piggyback rail mode tends to be more expensive than for transport by carload, by a relatively small amount on a ramp-to-ramp basis, and by a substantial amount when local pickup and delivery costs are included. Highway transportation costs tend to exceed all other mode costs except for short lengths of haul.

As the length of haul increases, costs of highway transportation currently exceed those of rail at distances varying from 100 to over 500 miles, depending on particular commodities and circumstances. Nonetheless, significant volumes of freight move by highway transportation in preference to rail, even where the underlying carrier cost does not appear to favor trucking. This is probably due to some operators being willing to move limited amounts of freight at rates to cover only short term costs, which may be much less than long term costs. Highway carriers may also haul freight at relatively low rates in order to fill available back haul capacity.

Convenience is a major modal choice factor which favors trucking, and shippers are often prepared to pay some premium to take advantage of this improved service, particularly when the cost differential is low compared to the value of the commodity being transported.

Sensitivity Analysis

The cost analysis between transport modes was tested for sensitivity by varying fuel prices 50 percent above and below the current price levels.

It was found that rail costs per mile are less sensitive than truck and barge costs but large variations are apparent between commodities. This reflects the varying energy consumption associated with alternative types of rail equipment used for different products. As an example, the use of a double stack intermodal train is considered to increase fuel consumption by 25 percent over that of a similar length conventional container on flat car (COFC) train, while the capacity of the train has almost doubled.

The analysis also showed that costs incurred at origins and destinations are mainly dependent upon labor rates and are not particularly sensitive to variations in fuel costs. Since the proportion of these labor costs, as a percentage of total costs, decreases with increasing haul distance, it follows that the relative sensitivity of total costs to fuel prices will increase as haul distance increases.

Political and Other Issues Impacting Port Development

Environmental Issues

The uncertainties, delays and costs associated with the acquisition of environmental permits is probably the largest single issue confronting ports desiring or determined to follow a structured plan of facility expansion and development of new business opportunities. Indeed, the federal, state, and local resource agency approach to projects in shoreline areas is becoming increasingly cautious, and developers face a formidable array of regulations, agencies and interest groups.

Specific areas of greatest concern in the permitting process currently include:

- Dredging and treatment of contaminated sediments in Puget Sound
- Corps of Engineers Areas of Jurisdiction
- Mitigation for habitat loss
- Agreement on the criteria needed to establish "Need for Project"

Currently, a large number of government agencies including local government, the Corps of Engineers, Ports, and the Puget Sound Estuarine Program share responsibility for managing the quality of Washington State waters. They often have overlapping roles and jurisdictions.

It is difficult to predict when and if the current caution of the resource and permitting agencies will ease. At the present time, concerns over contaminated sediments, water quality requirements, local shorelines factors and natural habitat losses are causing significant delays to the development of waterfront properties for commercial or other use. Agencies such as the U.S. Army Corps of Engineers are developing programs that establish unified evaluation criteria for items such as contaminant testing, turbidity monitoring and other dredge and fill related issues. However, there seems to be no mechanism in place to systematically compare the economic benefits of a project in terms of employment or revenues with the environmental impacts.

The ability to develop port facility projects by public ports prior to the acquisition of a tenant or user is being constrained by regulatory and permitting agencies.

The preparation of Port Comprehensive Plans and Regional Master Plans goes part way toward this goal. However, the nature of port development does not generally allow the proof of need or demand sufficiently ahead of development to serve as an absolute guarantee that a proposal will be used specifically as expected at the planning stage. In a competitive environment where the carrier or shipper has a wide range of options, environmental restrictions have the potential to shift development to other regions or states. It also has far reaching consequences as competition between west coast ports intensifies.

Recommendations

There is an overwhelming need for improvement in the coordination between local, federal and state agency requirements during the permitting process. Measures that are urgently required include a methodology to assess mitigation needs and a better distribution of responsibilities for the various aspects of habitat replacement.

The timing of the federal (NEPA) and state (SEPA) environmental processes also requires further coordination. Although the federal government has agreed to accept SEPA Environmental Impact Statements as part of the NEPA process, the reverse has not been accepted and the timing of the two processes does not match.

Foresight and cooperative planning efforts are required where fast tracking of projects is desired. A clear definition of mitigation will go a long way towards achieving this goal.

Navigation Issues

Currently there are several major navigational projects planned for implementation within the study period. The construction of any or all of these major projects will bring about significant changes in waterborne commerce patterns within and through the state. It will also enhance the surrounding regional economies.

Bonneville Lock Expansion. The project of greatest interest to Columbia River ports and the shipping industry is the plan to construct a new lock at Bonneville Dam at Mile 146. This lock is smaller than the other locks on the river and is a serious constraint to efficient barge operations.

With the federal appropriation of $10 million for rail relocation and excavation work, and the receipt of bids on the first two major construction contracts, the Lock Expansion project is now moving into the construction phase.

Upper Columbia/Snake River Navigation. In the 1960's The Corps of Engineers determined that the extension of navigation on the Columbia River to Wenatchee was feasible. In 1982 the Corps' Columbia Snake River System Study proposed several alternatives to extend navigation. More recently, a number of studies have been undertaken to reduce the total cost of the project. Proposals to utilize shiplift devices in place of locks appear to offer substantial potential savings and are being investigated for specific cost and feasibility.

Grays Harbor Deep Draft Navigation Project. In 1982 the Corps of Engineers completed an Interim Feasibility Report on navigation improvements to Grays Harbor. The study determined that the present 30-foot channel is too shallow for ocean going vessels and severely constrains the maritime and economic development potential of the region. The Corps recommended that a 38 foot deep navigational channel should be dredged, with deeper sections of 40 and 42 feet at the entrance to the harbor.

Final environmental studies are now approaching completion and a Design Memorandum will be prepared in July 1986 as a preparatory step before final designs and contract documents are assembled.

User Fees

Authorization of most of the navigation projects is tied to resolution of the User Fee issue at federal level. In order to meet the Administration's criteria, legislation to resolve the issue must contain the concept of local cost sharing of projects, combined with a general port user fee based on cargo value and an inland navigation fuel tax. At a local level the implications of cost sharing also require resolution, as many of the schemes will benefit large areas not within any convenient political boundary.

Separate bills containing similar language were recently app ·ıd by the House and Senate and at this writing, are in tl ˏnference stage. Since both bills generally meet the Administration guidelines for establishment of a User Fee and Local Cost sharing requirements, it is anticipated that most, if not all of the projects will soon be authorized.

The successful completion of any of the projects listed above is considered by many experts to be vital to the future economic health of key areas of the state.

Bridges

Most of the bridges in Washington State do not represent a significant constraint to the efficient movements of cargoes. Port officials identified only four bridges which present safety problems or limit the efficient transit of vessels. At the present time, attempts are being made to obtain funding to improve navigation through the Blair and Hylebos Bridges in Tacoma, the BN and Spokane Street bridges over the Duwamish Waterway in Seattle and the UP bridge over the Chehalis River in Grays Harbor.

The 1984 Shipping Act

The extensive efforts of the federal government to deregulate the transportation industry have had a direct impact on international trade. The 1984 Shipping Act, which allowed significant changes in the control of international freight and redefined the power of the federal government, has generally been well received by the majority of shippers and to date, has not had a significant impact on ports.

Most experts consider that it is too early to decide on the long term implications of the legislation and continued analysis of potential impacts on Washington State trade is recommended.

Port Financial Performance

A simplified decision making tool to determine port financial performance has been developed as part of the Washington Sea Grant Program at the University of Washington. The system uses a combination of financial indicators to assess the performance of a particular port. The approach was applied to fifteen ports in the state that had comparable facilities and financial situations.

Table 14: Washington State Port and Airport Financial Performance - 1980 to 1984 ($ x 1000)

Item	1980	1981	1982	1983	1984
Operating Rev.	153,400	153,172	155,313	159,034	168,786
Operating Exp.	100,488	103,364	99,691	99,175	108,811
Net Operating Income	52,912	49,808	55,622	59,859	59,977
Non-Operating Revenues	19,803	29,618	26,559	27,187	34,860
Non-Operating Expenses	24,247	22,093	26,717	30,494	34,663
Net Income	48,468	57,333	55,464	56,552	60,174
Depreciation	22,182	25,324	29,399	30,216	31,245
Tax Revenues	16,973	23,225	24,844	27,767	29,193
Net Income After Depreciation and Including Tax Revenues	43,259	55,234	50,909	54,103	58,122

Source: Annual reports as compiled by TAMS.
Note: Financial indicators not shown.

Operating Revenues

These revenues from port operations are generated from tariff charges and miscellaneous real estate and other contracts. Airport revenues are generated by landing fees, parking fees, and industrial leases. Washington State operating revenues for major port and airport facilities remained stable from 1980 through 1982, then increased by 2.5 percent in 1983 and by 5.7 percent in 1984. The relatively poor performance from 1980 through 1982 resulted mainly from the international recession. Future near term increases are unlikely due to vessel and carrier over-capacity in both the Alaskan and Transpacific trades which is severely constraining profit margins.

Non-operating Revenues

Non-operating revenues consisting of interest income have provided a major source of revenues representing more than 15 percent of total income in 1984. Under the terms of the Tax Reform Bill of 1986, interest income from future tax exempt bond issues will be eliminated. The Bill also requires that all bond proceeds be spent within three years. If passed in its proposed form, the Act will have a negative impact on port financing costs and sources of non operating revenues.

Property Taxes

Property taxes for operations may be levied by ports on the basis of not more than $0.45 per $1,000 of assessed valuation within the port district. This source of revenue, which is also constrained by the 106 percent state levy lid, increased at an average rate of 14.5 percent between 1980 and 1984. It now represents 12 percent of total income.

Ports also have a unique industrial development capability which includes a tax of $0.45 per $1,000 of assessed valuation. The levy is for a six year period but may be extended for a future six years in certain circumstances.

Expenses

Expenses for operations, maintenance, administration and general costs increased at a rate of two percent annually from 1980 to 1984. Ports responded to the constraints on operating revenues by controlling costs in almost every category.

Maintenance management and other means of cost reductions will continue to be important keys to financial performance in the near future.

Non-operating expenses consisting mainly of interest income rose at an average annual rate of 9.3 percent from 1980 to 1984.

Net Operating Income

Net operating income, defined as operating revenues less operating expenses rose at an average annual rate of 3.2 percent, due to the slightly faster rate at which revenues grew. This increase is not adjusted for inflation.

Future Finance Requirements

Several financing mechanisms are used to fund port industrial development and port improvements including:

- Net operating revenues
- Revenue bonds
- General obligation bonds
- Industrial revenue bonds.

Financing for future improvements will come primarily from revenue bond and general obligation bond issues. While there is an expected shortfall of bonding capacity, the provisions of the Tax Reform Act of 1986 may also increase the costs associated with financing, thus compounding the financial difficulties of ports in the near term future.

Port Facility Construction

The Tax Reform Bill will limit all peripheral, projects considered to be nonessential from tax exempt status. As an example, dock and wharf facilities will no longer be tax exempt if 10 percent of the proposed debt is used to finance a private facility. Tax exempt status will also be withdrawn for those facilities which are not considered to be directly related and essential to the transport of passengers and cargo by water. Typical facilities that will be affected include:

- Structures alongside a dock.
- Marine equipment.
- Parking areas for passengers and employees.
- Road and rail interchanges.
- Ship repair and maintenance facilities.

The Future

Ports are once again entering a period of substantial change. Increasing competition at all levels of the maritime industry has fostered technological, operational and economic innovations that in turn will cause a redistribution of cargoes among many ports.

The waterborne commerce forecasts indicate that import volumes, principally high value consumer goods, will increase from 12.5 million metric tons in 1984 to 23.2 million metric tons by the year 2005. Exports of lower value raw products such as farm and forest products and chemicals are expected to increase from 31.7 to 41.9 million metric tons in the same period. Total international and domestic trade will increase from 54.1 million metric tons to 82.4 million metric tons by 2005, representing an overall growth rate of 52 percent.

With the cost and functional requirements of container terminals steadily increasing, the load center concept is expected to further concentrate all general cargo movements in the Puget Sound area. At the same time, the need for backhaul cargoes on the Transpacific shipping routes is leading to the containerization of commodities that were traditionally shipped in break bulk mode. This trend is emphasized by moves to obtain more domestic freight to fill empty rail cars on the east-west corridors.

The result appears to be a trend towards a redistribution of cargoes among ports in this state. The commerce projections and capacity analyses in this study indicate a need for up to eleven new container terminals by the year 2005. Given the limited waterfront land with deepwater access presently available, it appears that many of the commodities currently handled through Puget Sound ports may be displaced to other port regions within the state to make way for the increased containerized cargo requirements.

It is not unreasonable to expect that these displaced break bulk, dry and liquid bulk and neo bulk commodities represent opportunities for the Lower Columbia, Washington [illegible] non container Puget Sound ports to incr[illegible] shares of statewide commerce.

The study also shows the strength of Washington public ports at a national and international level. In many instances, ports in this state lead the world in technological innovation and at the same time are continuing to negotiate more efficient operating agreements with organized labor. This represents an opportunity to improve the competitive status of the major load centers against other west coast ports.

The study indicates that the movement of waterborne commodities through and within the state is supported by an efficient inland transportation system. It is estimated that the main line railroads have adequate capacity to handle up to twice the expected traffic volumes and very few concerns were expressed over the efficiency and performance of the statewide highway system.

As the number of access points to the main rail lines decreases, the traditional feeder rail lines are becoming increasingly isolated. With more and more short-haul freight moving by truck, the added pressure is most severe on the county road system. A number of these rural roads have been upgraded through the Rural Arterial Program but others are in poor condition.

Continued attention will be required to this important link between the consumer or producer and the state, interstate highway and mainline rail systems in order to maintain the efficiency of the entire statewide freight transportation system.

Although capacity and condition are not current problems for the highway system, there is no convenient database available to identify commodity types, characteristics and routings. While high quality commodity specific origin and destination data is on file for the port and rail systems, information on highway movements is generally limited to axle counts, vehicle distributions and sample survey or census data.

Recommendations

In order to coordinate the future development of the public port system with strategic highway maintenance and planning decisions, it is recommended that a program be instituted to obtain an integrated multi modal database.

Finally, with environmental and permitting procedures continuing to tighten, the acquisition of the necessary federal, state and local permits for waterfront projects is becoming increasingly time consuming. The extended lead time required to resolve resource agency concerns on items such as dredge disposal in Puget Sound, need for project, mitigation for habitat displacement and uplands fill has the potential to divert new economic and business opportunities to other regions or states.

Policy, legislative and local jurisdiction changes are required urgently in order that the permitting process may be streamlined. Approval and permitting procedures should be better coordinated in order to maintain a consistency of approach which gives sufficient lead time to both the resource agencies and the applicant.

The unique entrepreneurial nature of public port development needs to be better recognized by the permitting agencies. If ports are unable to attract new maritime business, the economic benefits of new opportunities available to the Pacific Northwest may be lost to other regions.

Glossary

Apron -- The space on a pier or wharf measured between the outer edge of berth and storage area or shed.

Backup Area -- The area of a marine terminal consisting of paved open storage at the inshore or upland side of a pier or wharf.

Beam -- The extreme width or breadth of a ship

Berth -- The water area at the face of a wharf or at the head and/or sides of a pier where vessels moor or dock for the transfer of cargo.

Breakbulk Cargo -- Heterogeneous items of general cargo that are packaged and moved as single parcels or assembled together on pallet boards.

Bulk Terminal -- A marine terminal which handles loose, grained, free-flowing, solid or liquid cargoes by specialized mechanical handling equipment.

Container -- A standard sized box into which cargo may be packed for shipment aboard oceangoing containerships and designed to be easily interchangeable between ship, truck, and rail.

Containerizable Cargo -- Cargo that will physically fit into a container and result in an economical shipment consistent with delivery requirements.

Deadweight Ton (dwt) -- The cargo carrying capacity of a vessel, including the weight in long tons of cargo, fuel, water, stores, crew and their effects that can be safely carried by the ship.

Double-Stack or TwinStack Railcar - the trademark name for the first rail flatcar capable of stacking two containers on top of each other.

Draft -- The depth of a vessel between the waterline and the vessel's keel.

Drayage -- Charge for the movement of freight between terminals or terminals and warehouse by trucks or other motor vehicles.

Dry-Bulk Cargo -- Cargo which may be either loose, grained, free-flowing or solid, but is not shipped in packaged form, and is usually handled at specially designed dry-bulk terminals.

Feeder Line - Interchangeable with the term Branchline, is a low density line that collects and/or distributes rail traffic between railcar loading/unloading terminals and a rail mainline.

General Cargo -- Miscellaneous goods and commodities shipped in various types of packaging of irregular size and weight or uniform size and weight. The shipping and handling techniques will vary depending on whether the cargo is breakbulk, containerized, or neobulk general cargo.

General Obligation Bond -- A type of bond issue that a public port authority may seek as a means of raising capital financing for port improvements. The issuer of the bond, is required to back the bond by pledging its full faith and credit.

Gross Ton -- When used in the context of a railroad, signifies the total tonnage carried including the weight of the rail car.

Hinterland -- The geographical area served by or tributary to a port, and where a port's exports are produced and its imports are marketed.

Intermodal -- Used to describe the capability of marine containers to be moved, transported, or interchanged between rail and truck and ship in any order.

Landbridge -- A joint water, rail or truck container movement from one foreign port to another foreign port through the United States.

Liquid-Bulk Cargo -- Liquid cargo shipped in large enough quantities to make it practical to employ tankers or tank barges rather than handling in barrels, casks, or drums as breakbulk general cargo.

Load Center -- A concept applied to the establishment of a few large intermodal ports on each coast of the United States which are served by the newer and larger ships, leaving the remaining ports to be served by smaller feeder ships from the load centers.

Low Density Line - generic term for any rail line that collects and/ or distributes rail traffic between rail terminals and a rail mainline.

Mainline -- A major rail line that provides a connecting link between significant transportation centers and capable of carrying a high volume of traffic.

Marine Terminal -- Consists of pier or wharf structure located in a harbor used for transferring cargo between ship and shore, and includes one or more ship berths together with cargo handling equipment, railroad and truck accommodations, covered and open storage space, and other facilities.

Marshalling Yard -- Open space adjacent to containership berthing facilities at marine container handling terminals designed for parking and stacking inbound and outbound containers moving between ship and terminal storage and between the hinterland and terminal storage.

Metric Ton -- A weight measure. One metric ton (or tonne) weighs 1,000 kilograms (kg)

Mitigation -- A form of action taken to reduce harmful environmental effects. Mitigation is usually achieved by the provision, at a new location, of natural habitat lost by a project.

Multiple Car Rates - pricing mechanism to allow a railroad to pass on cost savings incurred from large units of traffic being assembled by the shipper.

Neobulk Cargo -- Used to describe general cargo of a single type handled in uniform size units and shipped in very large quantities, frequently as an entire shipload. Automobiles, steel, logs, lumber, scrap, and other cargoes are some typical examples of neobulk cargo.

Pacific Rim -- A loosely defined group of nations located in a circle around the Pacific Ocean. Japan, China, Taiwan, Singapore, Korea, Hong Kong, Alaska and the West Coast of the United States are traditionally considered Pacific Rim nations. Australia and New Zealand are newer members.

Panamax -- Ships designed within the dimensional limitations of the locks of the Panama Canal are often called Panamax vessels. The locks are 1000 ft long, 109 ft wide and generally operate with 39 ft of water over the sills.

Piggyback -- A term describing a "Trailer on Flatcar" (TOFC) operation where a container attached to a removable chassis is loaded on a railcar for transport.

Port Capacity -- In terms of tons per year, the total capability of a port to move cargoes through terminal facilities located within the port precincts.

Receipts -- Commodities received by a port from another domestic port outside the region.

Ro/Ro -- Abbreviation for "Roll-on/Roll-off", and identifies a cargo vessel designed to allow containerized or unitized cargo loading without ship's gear or wharf cranes, but by wheeled trailers driven on and off the vessel by tractor power via ship's ramps at the cargo terminal Ro/Ro berth.

Shipments -- Commodities shipped by a port to another domestic port outside the region.

Short Ton -- A standard measure of weight used in the United States. A short ton has 2,000 lbs. A long ton has 2,240 lbs.

Stevedore -- A firm or individual who contracts to load or discharge a vessel's cargo. In order to perform his responsibilities, the stevedore employs "longshoremen," who perform the physical work of loading and unloading ships.

TEU -- Abbreviation for "Twenty-foot Equivalent Unit," and is used as a standard measure of a vessel's container carrying capacity in terms of an 8x8x20-ft. size container.

Throughput Capacity -- The estimated total tons of cargo that can be processed and handled through a port terminal or berthing facility in the course of one year.

Unit Train -- Loosely defined as a dedicated set of multiple car rail equipment to a particular operation on a fixed schedule that bypasses classification yards for a designated point-to-point service. Usually one bill of lading will be issued for the entire train.

Wharf -- A general term for any structure at which vessels berth or dock. The term is also used specifically for berthing structure of open piling construction, aligned parallel with the shoreline, and referred to as a marginal wharf.

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Acknowledgments: To list the names of everyone who provided assistance, advice, information and support for this study would require a separate document. However, TAMS is particularly grateful to Lew Holcomb, Don White, and Don Moos of the Washington Public Ports Association, to all the members of the Cooperative Development Committee for guiding the direction of the study for the past 18 months, to the Port of Seattle for extracting waterborne commerce data from Department of Commerce tapes and to the many executive directors, port staff and representatives of the business community who provided information to the study team.

WASHINGTON PUBLIC PORTS ECONOMIC STUDY

Prepared For

The Washington Public Ports Association

DECEMBER, 1978

SUMMARY REPORT

Prepared By

WILLIAMS-KUEBELBECK AND ASSOCIATES, INC.

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Post Office Box 1518
Olympia, Wa. 98507
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Lewis R. Holcomb Executive Director

December 7, 1978

TO: Members of the Washington Public Ports Association

SUBJECT: Ports Economic Study

We are pleased to send to you this report on the Ports Economic Study. The study was the culmination of an idea which began in the fall of 1977 and was approved by the Board of Trustees, at the 1977 Annual Meeting, held in Olympia on December 2, 1977.

During the early months of 1978 the Association membership actively assisted in establishing the parameters for the study through meetings in both Western Washington and Eastern Washington. Also, a Technical Committee and a Policy Committee developed the specific statement of work, selected the consulting firm and served as study supervisors.

We are grateful for the time and effort our port officials spent in providing information used in making this comprehensive study. We are particularly thankful for the involvement of the four members of the Washington State Legislature who gave freely of the time to monitor the progress and thus help assure a creditable product. We trust this study report will be meaningful and helpful to our port members and to the people of the State of Washington.

Dean S. Hagerty

DEAN S. HAGERTY
WPPA President

Lewis R. Holcomb

LEWIS R. HOLCOMB
Executive Director

DSH:LRH:ps

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December 15, 1978

Mr. Lewis R. Holcomb
Executive Director
Washington Public Ports Association
1501 Capital Way
Olympia, Washington 98507

Dear Mr. Holcomb:

In accordance with our contract dated May 12, 1978, we are pleased to submit this summary of our technical report for the Washington Public Ports Economic Study. The study presented a challenging assignment for our firm but one which has given us a great deal of satisfaction in preparing. The assistance of you and your staff, particularly Mr. Donald R. White - Assistant Director and Project Coordinator, and the Policy and Technical Committees has been greatly appreciated. This cooperation and help in obtaining the enormous amount of information we needed for the study and facilitating our dealings with the participating member port districts contributed significantly to the study.

This report includes a statement of the study's purpose and scope, highlights of information presented in the economic profile of the Washington public port districts, a summary of the economic and fiscal impacts generated by port-related private industrial activities and answers to the five primary study questions posed by the Policy and Technical Committees. The reader of this report should, of course, be advised that detailed research and analysis is provided in the technical report.

We appreciated the opportunity to serve WPPA and the Washington public port districts on this assignment and look forward to being of further service in the future.

Very truly yours,

WILLIAMS-KUEBELBECK AND ASSOCIATES, INC.

Lawrence E. Williams

Lawrence E. Williams
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CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

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ACKNOWLEDGEMENTS

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PURPOSE AND SCOPE OF THE STUDY

In 1977, the Washington Public Ports Association (WPPA) determined that a private consulting organization should be retained to conduct a Public Ports Economic Study. After making this decision, WPPA organized both a Policy and a Technical Committee to select the consultant and to assist with and monitor the conduct of the study. The Committees established criteria for the consultant selection and prepared a statement of work. The statement of work required the consultant to provide necessary research and analysis to answer five questions which were developed by the Committees:

1. *What are the socio-economic effects accruing from the public ports to Washington State? Can they be documented in tangible form?*

2. *What are the financial means which enable the public ports to operate? What portion stems from tax sources?*

3. *What is the net balance between port tax levies and the overall amount of state and local taxes the public port district activities generate?*

4. *What are the alternatives to the current taxing authority of the public port districts?*

5. *Could all public port districts fulfill their present roles if the tax levy were eliminated? Under what circumstances could a public port district become self-sufficient? Could ports meet future needs without a levy?*

In April 1978, Williams-Kuebelbeck and Associates, Inc. (WK&A) was selected to prepare the study. A contract was then negotiated and signed on May 12, 1978 with the work to be completed by December 15, 1978.

This presentation summarizes the 135-page Technical Report which resulted from WK&A's six-month research and analysis program. The Technical Report was presented in four chapters. Chapter I summarized the findings of the report.

Chapter II summarized the powers of public port districts in Washington and compared them with similar entities on the West Coast.

Chapter III presented a profile of the Washington public port districts. This chapter dealt with Question 3: *What are the financial means which enable the public ports to operate? What portion stems from tax sources?* In addition to addressing this question, the chapter presented basic organizational, financial and functional information which served as foundation material for use in the remainder of the study.

Chapter IV presented an assessment of the economic impact of Washington's public port districts on the state and their service areas. This chapter dealt with Question 1: *What are the socio-economic effects accruing from the public ports to Washington State? Can they be documented in tangible form?* The chapter included an explanation of the economic impact assessment method used in the study and why it was selected and a presentation of results of the assessment including the state and local taxes generated due to port district activities.

Chapter V presented a discussion of taxation and the Washington public port districts. The chapter dealt with Questions 3: *What is the net balance between port tax levies and the overall amount of state and local taxes the public port district activities generate?* 4. *What are the alternatives to the current taxing authority of the public port districts?* and 5: *Could all the public port districts fulfill their present roles if the tax levy were eliminated? Under what circumstances could a public port district become self-sufficient? Could ports meet future needs without a levy?* In addition to these tax dependency questions, the chapter also presented information on the issue of how well the public port districts have been fulfilling the roles prescribed to them under state law.

WASHINGTON PUBLIC PORT DISTRICT POWERS, ACTIVITIES, CHARACTERISTICS AND FINANCING

Districts in the Study

Currently there are 73 public port districts in the State of Washington. These districts exist in 32 of the state's 39 counties. Fourteen of these districts were not covered in the study since they are not members of the Washington Public Ports Association. Pend Oreille port district, which was formed in September 1978, was not included since it has no record of activities. Therefore, the study includes 58 of the state's 73 public port districts which are now in existence.

For the purposes of this study, the 58 public port districts were classified into five geographic regions in the state. These include:

- *The Puget Sound Region* - including 12 counties bordering the Puget Sound with 25 districts. The largest districts in this region include the Ports of Seattle, Tacoma, Olympia, Bellingham, Everett and Port Angeles.

- *The Pacific Region* - including two Pacific Coast counties with five public port districts. The largest district in the region is the Port of Grays Harbor.

- *The Lower Columbia Region* - including five counties with nine public port districts. The largest districts in this region are Vancouver and Longview.

- *The Mid-Columbia and Snake Region* - including eight counties with nine public port districts. The largest districts in the region are Pasco and Benton.

- *The Upper Columbia Region* - including four counties with ten public port districts. The largest district in this region is the Port of Moses Lake.

Public port districts in Washington generally fall into three district organizational categories. These include countywide districts, districts in multiple-district counties where the districts collectively occupy all of the area within the county and districts in multiple-district counties where the districts' collective area does not cover the entire area within the county.

The names, counties of location and area locations for all the 72 public port districts which existed in Washington on June 1, 1978 are shown for each of the regions on the exhibit maps in the back of this report.

Obtaining Information for the Study

Initial research for the study included the collection and analysis of all available information regarding the history, characteristics and recent activities of the public port districts. This research was conducted by interviews with the Washington Public Ports Association staff, public port district commissioners and staff, state and local government agencies, university and college personnel and private groups, including public port district lessees. It was soon concluded that much of the information required to properly address the key questions in the study had to be obtained directly from the public port districts, both individually and collectively. In order to obtain such information reported in a uniform manner, WK&A developed a Public Port District Questionnaire. The questionnaire, which was 35 pages in length, contained two parts: Part I - General Information; and Part II - Port and Port-Related Activities. The first part of the questionnaire included 15 questions that were to be answered by all public port districts. These 15 questions included requests for information on the following topics:

- the estimated value of all property held by the public port district;
- the number of employees and their payroll expenses;
- all revenues of the public port district by their source from 1968 through 1978;

- amounts and types of funds flowing to the public port districts from sources other than gross operating revenues for the period 1968 through 1978;

- amounts and types of public port district expenditures for the period 1968 through 1978;

- population, year of formation, and other baseline data.

The second part of the questionnaire dealt more specifically with the four major functions of the public port districts: marine terminals, industrial development, marinas and airports. The questions posed in this part of the questionnaire were designed to provide a current inventory of land and facilities owned by the public port districts and how these were acquired, developed and are managed for each of the public port district major functions. The answers to these more detailed questions allowed WK&A to obtain a more precise breakdown of the general information provided in the first part of the questionnaire. In addition to detailing the information provided in the first part of the questionnaire, this part obtained information on port-related businesses and their employment. The reason for obtaining this information was to provide input for the economic impact assessment.

It was understood by WK&A that broad judgment would be exercised in answering some questions; so thoughtful estimates were encouraged. Nevertheless, the questionnaire was determined to be the most realistic and economical approach to obtaining such information.

After the questionnaire was drafted by WK&A, it was pre-tested by the Technical Committee of the Washington Public Ports Association. The Technical Committee determined whether or not the questions presented by WK&A could be reasonably answered by all of the public port districts. The Technical Committee also suggested a number of additions, deletions and modifications to the questionnaire directed at both enhancing its comprehensiveness and increasing the probability of gaining meaningful and complete response from all of the 58 public port districts.

The questionnaires were mailed on July 5, 1978 and the final response date was established as September 15, 1978. During this period, each of the 11 larger cargo handling ports, as well as seven other selected public port districts were visited by the WK&A team. The primary purpose of the visits was to conduct field inspections, interview appropriate district officials and to collect data which would supplement the questionnaire itself. The public port districts visited were:

- Anacortes
- Bellingham
- Benton
- Camas-Washougal
- Chelan
- Everett
- Grays Harbor
- Kalama
- Kennewick
- Longview
- Moses Lake
- Olympia
- Pasco
- Port Angeles
- Seattle
- Tacoma
- Vancouver
- Walla Walla

As a result of the questionnaire and supplemental interviews, detailed information was obtained from 55 of the 58 public port districts currently active in the state. The information obtained from the questionnaires served as the primary data used in preparing an economic profile of the Washington public port districts.

District Powers

The functions performed by the public port districts flow from a variety of powers available to them under state law and in response to the needs of the communities they serve. A generalized chronology of state laws, legislative actions and judicial decisions relating to Washington's public port districts is presented in Table 1.

The public port districts' powers are essentially to plan, acquire, develop, operate and maintain facilities for all forms of transfer -- air, land and marine. Under this primary power the districts may:

Table 1

<u>CHRONOLOGY OF LAWS RELATING TO PUBLIC PORT DISTRICTS</u>

Washington Public Ports Economic Study

I. GENERAL PUBLIC PORT DISTRICT ACTIVITIES:

1911 - Legislature authorized establishment of public port districts.

1951 - Legislature authorized City of Seattle, King County, and the Port of Seattle to develop an industrial development district jointly.

1955 - Legislature authorized public port districts to establish industrial development districts.

1957 - Legislature authorized public port districts to levy for industrial development districts, outside statutory millage limit, limited to a six year period and one time only.

1959 - Legislature authorized public port districts to be established in areas lacking appropriate bodies of water.

1961 - Legislature authorized the establishment of the Washington Public Ports Association.

1966 - Constitutional Amendment 45 reaffirmed industrial development role of public port districts.

1971 - Washington Shorelines Management Act passed.

1972 - State Environmental policy Act went into effect.

II. SOURCES OF REVENUE

1911 - Legislature authorized public port districts to levy property tax.

1937 - Entire proceeds of tidelands leases earmarked for local public port districts.

1967 - Tidelands leases changed to 20 percent for local public port districts and 80 percent going to the state general fund with certain exceptions.

1970 - Washington Supreme Court expanded application of leasehold tax.

1971 - 106 percent property tax levy limitation passed by Legislature.

1974 - Tax levies subjected to 106 percent lid.

1976 - Public port districts collect leasehold tax from tenants and give over 90 percent to the state.

III. SPECIAL CAPABILITIES AND CONSTRAINTS

1959 - State Supreme Court decision in <u>Hoque vs. Port of Seattle</u> clarifies public port districts' industrial development role.

1965 - Amendatory Act passed providing for consolidation of one or more public port districts.

1966 - Constitutional Amendment passed reaffirming industrial development role of public port districts, also allowing promotional hosting by public port districts to attract trade.

1970 - Foreign Trade Zone capabilities of public port districts expanded by Legislature.

1971 - Legislation passed requiring that subsequently formed public port districts have boundaries coextensive with the limits of a county.

1971 - Legislation passed providing for dissolution of inactive public port districts.

1972 - Legislature authorized public port districts to issue revenue bonds for pollution abatement facilities.

1974 - Revenue bonds issued for pollution abatement facilities declared unconstitutional by Washington Supreme Court. <u>Port of Longview</u> case.

- provide terminal facilities, airports, multi-use buildings, warehouses, elevators, canals, locks, tidal basins, rail and motor vehicle freight and passenger handling facilities, and improvements needed for industrial and manufacturing activities;

- Construct, purchase or maintain facilities and equipment needed for the freezing or processing of goods and agricultural products;

- improve land by dredging, filling, bulkheading, providing waterways, or developing such land for sale or lease for industrial and commercial purposes;

- install waste disposal, sewer, water, and other utilities when not adequately provided by other governmental entities;

- improve any waterway, create new waterways, widen, deepen, or otherwise improve water courses, bays, lakes or streams;

- install pollution abatement facilities for new or existing business firms and industries under certain conditions;

- develop and maintain public parks and recreational facilities in order to more fully utilize boat landings, harbors, wharves and other facilities of the districts; and

- establish, operate and maintain foreign trade zones, with permission of the federal government, and construct and maintain warehouses and other facilities within such zones.

In order to exercise these powers, the public port districts may receive funds from a number of sources, the primary of which are: user charges; lease rental payments; interest income and payments from government; capital grant proceeds; bond proceeds; and property tax levies. State law authorizes the public port districts to use four separate property tax levies which are determined based upon tax rates applied against the assessed valuation of all taxable property located within the boundaries of each district. These levies and their limitations are as follows:

- Regular property tax levy - for general district purposes up to a maximum of 45¢ per $1,000 assessed valuation annually;

- General obligation bond debt service levy - for the payment of the principal and interest on bonded indebtedness for general obligation bonds annually subject to maximum indebtedness restrictions;

- Industrial development district levy - for creating and funding improvements within industrial development districts. This levy power can be used only once for six consecutive years and is allowable up to a maximum of 45¢ per $1,000 assessed valuation annually; and

- Harbor improvement levy - for dredging, canal construction or land leveling or filling purposes. This levy must be authorized by a majority of district voters and when enacted may be up to a maximum 45¢ per $1,000 assessed valuation annually. This levy power has never been used.

Prior to 1971, property taxing powers of the public port districts were limited through maximum tax rates per assessed valuation and general obligation bond limitations. In 1971 the Legislature passed the 106 percent levy limitation which applies to all district tax levies. This tax lid has imposed limits which are significantly more restrictive on the districts than any of the prior limitations.

History of District Formation

The Legislature authorized the formation of public port districts in 1911. The Port of Seattle was formed that year as the first district in the state. By 1925 most of the Puget Sound districts had been formed. Vancouver was the first Lower Columbia district to form in 1912. There was little impetus to form districts during the depression and the war years, however, the 1950's and 60's saw a resurgence of district formations, especially along the Upper Columbia and the inland areas. Two actions of the Legislature triggered this resurgence in district formation -- the 1955 authorization for districts to establish industrial development districts and the 1959 authorization to establish inland districts. The most recent district to be formed was Pend Oreille in September, 1978. A chronology of public port district formation is presented on Table 2.

District Characteristics

In 1977 public port district constituents included 76 percent or 2,781,200 of the state's total 3,662,000 residents. The two largest districts in the state were the Ports of Seattle and Tacoma with populations of 1,164,400 and 422,400 persons, respectively. These two large districts include 43 percent of the state's entire population as constituents. Only seven more districts had a population of 50,000 or more. These included: Vancouver, Olympia, Bellingham, Bremerton, Everett, Longview and Grays Harbor. All of the remaining 49 districts included in the study had populations under 50,000.

The property tax base of the state's public port districts in 1978 is $45.5 billion, 77 percent of the state's total tax base in terms of taxable property assessed valuation. Seattle and Tacoma currently have the largest tax bases of $20.3 and $5.4 billion, respectively, the total of which amounts to 43 percent of the total state property tax base.

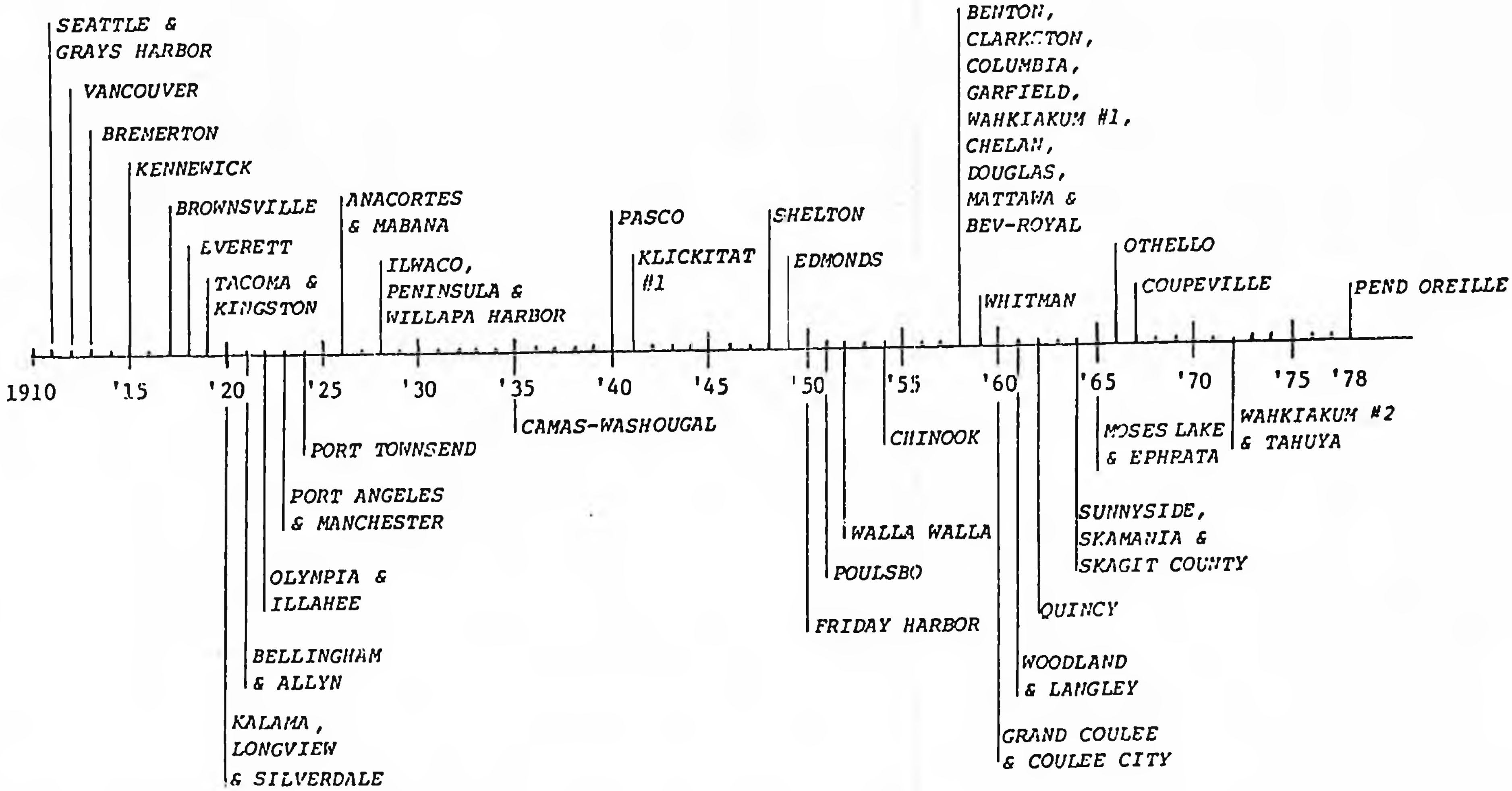
The public port districts own or manage about 2 percent of all the 3,600 miles of shoreline on Washington's coastlines, bays and rivers. The districts own 38,500 acres, approximately one-tenth of one percent of the total area in the state.

The estimated 1978 value of all land, buildings, and equipment owned by Washington's public port districts is about $1,454.6 million.

Table 2

CHRONOLOGY OF PUBLIC PORT DISTRICT FORMATION: 1911 TO 1978

Washington Public Ports Economic Study



Source: Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

District Financial Activities

Table 3 presents a financial history of the 58 public port districts for selected years during the last ten-year period, 1968-1977. The presentation shows the major income and expenditure categories for both operations and capital improvements. Several important statewide trends related to the financial activities of the public port districts are shown in Table 3. One of the first items illustrated is that operating income has increased significantly. Operating income in 1977 was 234 percent higher than in 1968. This was caused by increases in all three major operating income categories; charges, leases and interest income and payments from government. The largest aggregate and percentage increases occurred in the charges category. This was largely due to the results of aggressive capital improvement programs conducted by the districts.

Operating expenses also increased significantly over the last ten years but at a rate somewhat less than the increase in operating income. This has resulted in the growth of operating surpluses (net operating income) to the districts. This operating surplus is normally used for capital improvement programs or to provide the necessary reserve requirements for the districts to maintain viable revenue bond programs. The primary components of the districts' capital improvement programs are: operating surpluses, property tax levies, proceeds from general obligation and revenue bonds and proceeds from capital grants. Table 4 presents the bonded debt of the public port districts in 1977. It may be noted that 85 percent of this debt, which created the capital improvements that generated increases in operating income, was for revenue bonds. The primary security for repaying revenue bonds is from operating surpluses generated by individual district projects or operating surpluses of the entire district operation. The operating surplus must not only cover the payment of principal and interest on the revenue bonds but must also maintain a 35 percent cushion above that amount (debt coverage ratio of 1.35 times).

Table 3 also illustrates the declining reliance of the public port districts on property tax levies. It may be noted that in 1968 the districts collected

Table 3

FINANCIAL HISTORY OF THE PUBLIC PORT DISTRICTS: 1968-1977

Washington Public Ports Economic Study

(All Figures in Millions)

	Years					
	1968	1973	1974	1975	1976	1977
OPERATING INCOME	$36.7	$ 81.8	$ 91.3	$101.0	$113.7	$122.6
Charges	23.6	58.2	64.5	70.4	80.9	86.2
Leases	10.1	17.9	20.8	24.4	27.2	29.5
Other 1/	3.0	5.7	6.0	6.2	5.6	6.9
Minus: OPERATING EXPENSES	27.3	52.1	63.3	68.2	73.1	78.8
Maintenance and Operations	23.7	49.6	59.3	65.2	71.1	76.2
Other 2/	3.6	2.5	4.0	3.0	2.0	2.6
Equals: OPERATING SURPLUSES	$ 9.4	$ 29.7	$ 28.0	$ 32.8	$ 40.6	$ 43.8
Plus: TAXES COLLECTED	17.3	17.8	18.7	18.4	19.6	19.6
Plus: PROCEEDS FROM BONDS & GRANTS	21.3	22.3	27.4	39.0	33.4	35.5
Revenue Bonds	16.6	17.3	8.5	31.0	15.9	19.1
General Obligation Bonds	1.8	.1	8.8	1.3	13.9	7.2
Grants	2.9	4.9	10.1	6.7	3.6	9.2
Equals: FUNDS FOR CAPITAL IMPROVEMENTS	$48.0	$ 69.8	$ 74.1	$ 90.2	$ 93.6	$ 98.9
Minus: CAPITAL IMPROVEMENTS	40.5	84.0	82.0	75.0	75.9	69.2
Capital Improvement Projects	31.3	57.6	56.4	45.7	48.9	42.4
Bond Repayment	9.2	26.4	25.6	29.3	27.0	26.8
Equals: INCREASES OR (DECREASES) IN RESERVE FUNDS	$ 7.5	($ 14.2)	($ 7.9)	$ 15.2	$ 17.7	$ 29.7

1/ Includes interest income and payments from government.

2/ Includes payments to government other than sales and leasehold taxes.

Sources: Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

Table 4

PUBLIC PORT DISTRICT BONDED DEBT IN 1977

(All Figures in Millions Except Percentages)

Washington Public Ports Economic Study

State Regions/Districts	Revenue Bonds	General Obligation Bonds Voted	General Obligation Bonds Non-Voted	General Obligation Bonds Total	Total	Percent of Total	Annual Bond Repayment Requirement
Puget Sound	$302.1	$2.4	$44.8	$47.2	$349.3	93%	$24.7
Seattle	215.1	-	30.5	30.5	245.6	65	17.9
Tacoma	58.5	-	11.0	11.0	69.5	19	4.3
Others	28.5	2.4	3.3	5.7	34.2	9	2.5
Pacific	7.3	.4	1.0	1.4	8.7	2	.6
Lower Columbia	6.3	3.0	3.4	6.4	12.7	4	.9
Mid-Columbia and Snake	4.2	.5	.5	1.0	5.2	1	.5
Upper Columbia	.7	.2	-	.2	.9	-	.1
Totals	$320.6	$6.5	$49.7	$56.2	$376.8	100%	$26.8
Percentage of Totals	85%	2%	13%	15%	100%		

Source: Washington State Auditor; Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

$17.3 million in property taxes while in 1977 this figure amounted to $19.6 million. If the two figures were adjusted to 1977 constant dollars, it is shown that property tax take by the districts has actually decreased since 1968 at an annual rate of minus 4.5 percent. Another way of looking at the property tax dependency of the public port districts is to assess the relative proportion taxes constitute of district funds available for capital improvements. The 1968 and 1977 comparisons are shown following:

Categories of Funds for Capital Improvements	Funds Available in Millions 1968	1977	Percentages of Total Funds Available 1968	1977
. Operating Surpluses	$ 9.4	$43.8	20%	44%
. Taxes Collected	17.3	19.6	36	20
. Proceeds from Bonds and Grants	21.3	35.5	44	36
Revenue Bonds	16.6	19.1		
General Obligation Bonds	1.8	7.2		
Grants	2.9	9.2		
. Total Funds for Capital Improvements	$48.0	$98.9	100%	100%

It may be noted that property taxes constituted 36 percent of funds available for capital improvements in 1968, while in 1977 this component represented only 20 percent.

The statewide public port district financial history allows a reviewer to observe general relationships and trends. The Technical Report also presented financial characteristics for the five regions and the Ports of Seattle and Tacoma separately. Although detailed analysis is not the intent of this Summary Report, several observations on a region-by-region basis seemed appropriate. The Puget Sound Region, due to its dominance among the five regions, fairly well mirrors statewide financial relationships and trends discussed above.

The Pacific Region's financial history has been dictated largely by the Port of Grays Harbor. Contrary to statewide trends, the region's operating expenses have increased faster than operating income. This region has not been dependent on tax levies and its capital improvement programs have been funded equally from operating surpluses and bond proceeds.

Districts in the Lower Columbia Region have relied more heavily than districts statewide on taxes to finance both operations and capital improvements. In fact, the region is the only one in the state where operating expenses have been subsidized by the tax levies.

Operating expenses for the districts in the Mid-Columbia and Snake Region have increased at a rate about 2.5 times the increase in operating income over the last ten years. About two-thirds of the operating income of districts in this region comes from leases. This differs significantly from all other regions where user charges constitute the largest income component. The region relies heavily on taxes to fund their capital improvement programs.

Operating income and expenses for districts in the Upper Columbia Region have been quite stable over the last few years. Like the Mid-Columbia and Snake Region, this region's districts rely more heavily on lease income than districts statewide. The region's districts are distinguished by the fact that they have the smallest proportionate reliance on bonds and grants for funding their capital improvement programs than any other region. Capital improvements are funded by operating surpluses and tax income on a two to one ratio.

In 1977, the state's public port districts spent $148 million on operations and capital improvements. Since 1972, all the districts' average expenditures for their primary functions have been: 84 percent for marine terminals and industrial development, 13 percent for airports, and 3 percent for marinas.

Maritime commerce is the traditional and primary activity of the state's large public port districts. Deep water districts include the ports of:

- Seattle
- Tacoma
- Anacortes
- Bellingham
- Everett
- Olympia
- Port Angeles
- Grays Harbor
- Longview
- Vancouver
- Kalama

In addition to these 11 deep water ports, there are seven slack water ports which accommodate barge traffic. These are the ports of:

- Pasco
- Benton
- Clarkston
- Columbia
- Walla Walla
- Whitman
- Willapa Harbor

The districts rely primarily on their operating income, 63 percent of the total, to finance their maritime operations and capital improvements. Secondary sources of funding include revenue bonds and taxes which constitute 17 and 15 percent of total expenditures, respectively.

The majority of the public port districts, 38 of the 58 districts, engage in industrial development. This activity is both in direct connection with their marine terminal and airport operations and separate from them. Eleven of the districts have created industrial development districts under the 1955 law. All but two of these have used up their six years' taxing capability under this authority. Industrial development activities have been financed largely through revenue and general obligation bonds, 37 percent of total expenditures, and taxes, 21 percent of the total. Tax income is therefore very important to the districts in this regard.

As in the case of industrial development, the majority of public port districts, 33 of 58 districts, engage in marina development and operations. Such facilities are provided for both recreational and commercial fishing boat owners. It is notable that many of the districts' sole function is the operation of a marina. This is particularly true for many of those districts in the Puget Sound Region. The Puget Sound and Pacific Regions provide about 90 percent of all moorages offered by the districts statewide. Revenue bonds are an important source of funding for marina development and marinas rely on tax income to a lesser extent than all other district functions except airports.

Airport development and operations are performed by 23 of the 58 public port districts. Seattle, Moses Lake and Pasco are the largest operations. Revenue bonds and operating income pay the largest share of airport expenditures, 77 percent. Grants are a very important source for capital funding for airports in the state, constituting 22 percent of total expenditures. Only 1 percent of the total expenditures on airports is from tax income.

Washington's public port districts generate both economic and fiscal impacts statewide and to the local areas they serve. These impacts, as estimated in the study, are from expenditures by private businesses whose activities are totally or partially related to the public port districts' functions and from expenditures induced by these private businesses.

The economic impacts estimated in this study for 1976 include employment; payrolls; final demand, which is gross state product plus imports; and gross output, or total sales. A summary of these estimated economic impacts, both statewide and by region, is shown in Table 5.

Table 5

SUMMARY OF ECONOMIC IMPACTS

GROSS OUTPUT, FINAL DEMAND, PAYROLLS, EMPLOYMENT

PORT DISTRICT RELATED PRIVATE INDUSTRIAL ACTIVITIES

Washington Public Ports Economic Study

Area	Gross Output ($000's)	Final Demand ($000's)	Employment	Payroll ($000's)
State	$4,465,852	$2,078,510	99,091	$1,391,297
Puget Sound	3,159,593	1,432,240	70,419	994,845
Pacific	655,238	246,330	10,954	160,607
Lower Columbia	163,448	86,940	4,209	55,729
Mid-Columbia and Snake	435,167	288,190	11,985	160,810
Upper Columbia	52,406	33,810	1,524	19,306

Source: 1972 Washington Input-Output Model; 1976 Update; Williams-Kuebelbeck and Associates, Inc.

The results of the study show that about 99,100 jobs in the state are related to the activities of the public port districts. Seventy-one percent of these jobs are in the Puget Sound Region providing employment for 70,400 Washingtonians. On a statewide basis, public port districts generate about 9 percent of total employment. These 99,100 jobs created payrolls of about $1.4 billion.

Public port district activities generated final demand of $2.08 billion and gross output, or total sales, of $4.5 billion in 1976. These estimates represent about 5 percent of the state total for both factors.

The fiscal impacts of the public port districts were estimated in terms of state and local tax revenue generated by public port district related activities. These total tax benefits in 1976 were estimated at $211.6 million -- $90.3 million in property taxes; $87.6 million in sales taxes; and $33.7 million in business and occupation (B&O) and public utility taxes.

ANSWERS TO THE QUESTIONS POSED BY THE WASHINGTON PUBLIC PORTS ASSOCIATION

The information presented to this point provides answers to two of the five questions posed by WPPA for research and analysis in the Public Ports Economic Study. The questions and our answers to them are presented below.

Question 1: *What are the socio-economic effects accruing from the public ports to Washington State? Can they be documented in tangible form?*

Answer: The socio-economic effects can be documented in tangible form and have been estimated for 1976 using the results of an updating of the 1972 Washington State input-output tables and information provided by the public port districts.

The economic and fiscal impacts generated by the public port districts were shown in the prior section.

Question 2: *What are the financial means which enable the public ports to operate? What portion stems from tax sources?*

Answer: The public port districts receive funds from: charges for the use of facilities and services provided by the districts; lease payments from private users of district owned land, improvements and equipment; interest from reserve funds being held for a future capital project use; payment of operating funds from other levels of government, particularly the federal and state governments; grant funds for capital improvements; proceeds of bonds; and taxes.

The proportion of funding support provided to the public port districts through taxes has been declining in recent years. The proportionate shares which each component of district funding made up in 1977 is shown below:

Funds From	Total in Millions	Percent of Total
Charges	$ 86.2	48%
Leases	29.5	17%
Interest Income and Payments from Government	6.9	4%
Capital Grant Proceeds	9.2	5%
Bond Proceeds	26.3	15%
Taxes	19.6	11%
Total	$177.7	100%

It may be noted that taxes constituted 11 percent of all funds available to the districts in 1977.

Question 5: *What is the net balance between port tax levies and the overall amount of state and local taxes the public port district activities generate?*

Answer: Tax impacts estimated in the study included property taxes, sales taxes, business and occupation taxes and public utility taxes. They amounted to $211.6 million statewide in 1976. A summary of gross state and local tax benefits, by type and region, is presented is Table 6.

Tax take has been defined to include the district levies, property tax exemptions and government payments of tax funds received by the districts minus payments they make to other levels of government. These tax take items will amount to $36 million statewide in 1978. A summary of tax take, by category and region, is presented in Table 7.

Therefore, the gross tax benefit to tax take ratio for Washington's public port districts is 5.9 to 1.0. In essence, for every dollar of tax levy or exemption realized by the public port districts, district activities generated a gross amount of $5.90 in state and local taxes. A summary of tax benefit-tax take ratios, by region, is presented in Table 8.

Table 6

PUBLIC PORT DISTRICT STATE AND LOCAL TAX BENEFITS IN 1976

(All Figures in Millions Except Percentages)

Washington Public Ports Economic Study

	Taxes By Type				
State Region	Property	Sales	Business & Occupation and Public Utility	Total Tax Benefits	Percent of Total
Puget Sound	$63.2	$62.7	$23.9	$149.8	71%
Pacific	9.7	10.1	4.9	24.7	12
Lower Columbia	4.7	3.5	1.2	9.4	4
Mid-Columbia and Snake	11.1	10.1	3.3	24.5	12
Upper Columbia	1.6	1.2	.4	3.2	1
Total	$90.3	$87.6	$33.7	$211.6	100%

Source: Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

Table 7

PUBLIC PORT DISTRICT TAX TAKE IN 1978

(All Figures in Millions Except Percentages)

Washington Public Ports Economic Study

		Public Port District Regions					
		Puget Sound Region	Pacific Region	Lower Columbia	Mid Columbia & Snake	Upper Columbia	State Totals
	Property Tax Levy	$17.7	$0.1	$2.1	$1.7	$0.5	$22.1
Plus:	Property Tax Exemption	19.2	0.8	1.5	0.8	0.2	22.5
Plus:	Payments From Government	1.3	0.1	0.5	0.0	0.0	1.9
Equals:	Gross Tax Take	$38.2	$1.0	$4.1	$2.5	$0.7	$46.5
Minus:	Payments to Government	8.9	0.3	0.8	0.3	0.2	10.5
	o Leasehold Tax	2.8	0.1	0.2	0.1	0.1	3.3
	o State Assessed Property Tax	1.5	0.0	0.0	0.1	0.0	1.6
	o Other Taxes 1/	4.6	0.2	0.6	0.1	0.1	5.6
Equals:	Total Net Tax Take	$29.3	$0.7	$3.3	$2.2	$0.5	$36.0
	Percentages of Total	82%	2%	9%	6%	1%	100%

1/ Sales and Business and Occupation taxes paid by the public port districts.

Source: Washington State Department of Revenue; Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

Table 8

PUBLIC PORT DISTRICT TAX BENEFIT TO TAX TAKE RATIOS
BY REGION AND STATEWIDE

Washington Public Ports Economic Study

State Region	State and Local Tax Benefits (Figures in Millions)	Tax Take (Figures in Millions)	Tax Benefit/ Tax Take Ratios
Puget Sound	$149.8	$29.3	5.1/1.0
Pacific	24.7	.7	35.3/1.0
Lower Columbia	9.4	3.3	2.8/1.0
Mid-Columbia and Snake	24.5	2.2	11.1/1.0
Upper Columbia	3.2	.5	6.4/1.0
Totals	$211.6	$36.0	5.9/1.0

Source: Public Port Districts of the State of Washington; Williams-Kuebelbeck and Associates, Inc.

Question 4: What are the alternatives to the current taxing authority of the public port districts?

Answer: The most logical alternative to the use of tax income by the public port districts is for them to increase operating surpluses (net operating incomes). The districts are limited in their ability to increase net operating incomes due to a number of factors. For example, charges which are the largest component of operating incomes, are set by agreements, competitive factors and by local conditions. Lease income is dictated by the terms of lease agreements, many of which call for flat rental payments which do not respond directly to inflation or to changes in business volume of the lessee. On the other hand, operating expenses of the districts will continue to increase.

Another alternative to the use of tax income for capital projects is grants and bond proceeds. Our analysis indicates that the districts are sensitive to the need to increase the flow of grant funds and have been endeavoring to do so. Additional bonds, the major portion of which must be revenue bonds, must be geared to the flow of net operating income.

At the present time, no realistic alternative to the maintenance of tax levy powers of the Washington public port districts has exhibited itself to WK&A.

Question 5: Could all public port districts fulfill their present roles if the tax levy were eliminated? Under what circumstances could a public port district become self-sufficient? Could public port districts meet future needs without a levy?

Answer: The dependency of the Washington public port districts on the tax levy varies between region and individual districts. The nature of this inquiry, which dealt with 58 separate districts throughout the state, dictated a degree of generalization on this important question.

Three of the public port district regions in the state have been experiencing an increase in net operating income over the last ten years -- Puget Sound, Pacific and Upper Columbia. This is not the conclusion, however, for the Mid-Columbia and Snake Region and the Lower Columbia Region. Therefore, on the basis of future trends, as we can best forecast them for these two latter regions, any reduction of tax levies would be extremely detrimental.

With reference to the remaining regions, if they are to continue a reasonable level of capital improvements, any reduction in tax levy power would be most damaging. Support for this conclusion is illustrated in Table 9 which presents an analysis of the tax dependency question for the Puget Sound Region districts. This analysis, although it does not specifically include the Pacific and Upper Columbia regions, applies to financial considerations within these regions. The analysis is for the Puget Sound Region since that region is so financially dominant in the state. The table presents a three step process to determine tax levy requirements. Step 1 assumes that the Puget Sound districts do not have their tax levy power for the sake of this illustration. Columns 1 through 3 on the table show the amount which would be required from bond proceeds under the following assumptions:

- The districts continue to fund a $50 million annual capital improvement program;

- Existing bonded debt outstanding is repaid with interest and a 1.35 times debt coverage ratio is maintained;

Note: These two assumptions are built into Column 1 in Table 9.

Table 9

PUGET SOUND REGION PUBLIC PORT DISTRICTS' TAX

DEPENDENCY ANALYSIS - TEN YEAR PROJECTION: 1979-1988

(All Figures in Millions - 1977 Price Levels)

Washington Public Ports Economic Study

	Funding Using Operating Surpluses			Need for Tax Levy			
Years	Capital Improvements Funding Requirements 1/ (1)	Minus: Operating Surpluses and Grant Funds 2/ (2)	Equals: Annual Bonding Requirements 3/ (3)	Cumulative Bonded Debt Required (4)	Bond Repayment Required For Taxes 4/ (5)	Minus: Estimated Tax Income Available 5/ (6)	Equals: Surplus After Using Tax Income (7)
1979	$83.3	$50.9	$32.4	$ 32.4	$ -	$18.8	$N.A.
1980	83.3	53.9	29.4	61.8	3.8	19.9	16.1
1981	83.3	56.8	26.5	88.3	7.3	21.1	13.8
1982	83.3	59.8	23.5	111.8	10.4	22.4	12.0
1983	83.3	62.8	20.5	132.3	13.1	23.7	10.6
1984	83.3	65.8	17.5	149.8	15.5	25.1	9.6
1985	83.3	68.8	14.5	164.3	17.7	26.6	8.9
1986	83.3	71.8	11.5	175.8	19.3	28.2	8.9
1987	83.3	74.8	8.5	184.3	20.7	29.9	9.2
1988	83.3	77.8	5.5	189.8	21.7	31.7	10.0

N.A. = not applicable.

1/ Capital improvement funding includes $50.0 million annually for capital projects, $24.7 million annually for bond repayment on bonds outstanding in 1978 and 8.6 annually as a debt coverage reserve based on 1.35 times the $24.7 million.

2/ Operating surpluses increasing based on historic trends and grants assumed at an annual level of $4 million.

3/ Amount of bond proceeds necessary to maintain a $50 million per year capital improvements program plus repayment of existing bonded debt after using operating surpluses and capital grant funds.

4/ Level payments of principal and interest on 20-year bonds at 6 percent per annum interest (factor = .087185) with a 1.35 times debt coverage reserve.

5/ Projection of 1978 tax levy at 6 percent per year compounded to reflect the effect of the tax lid.

Source: Williams-Kuebelbeck and Associates, Inc.

- Operating surpluses continue to increase based upon historic trends and grants available to the districts amount to $4 million per year;

Note: These assumptions are built into Column 2 in Table 9.

- Capital improvement funds not provided from operating surpluses and grants will be provided from revenue bond or voted general obligation bond proceeds which will be repaid over 20 years at 6 percent average annual interest; and

Note: These assumptions are built into Columns 4 and 5 in Table 9.

- All tax income to the districts will continue to be limited by the 106 percent lid.

Note: Shown in Column 6 of Table 9.

It should be noted that the projections in Table 9 are based upon the preceding assumptions and these assumptions may certainly change in the future. Nevertheless, the assumptions are considered realistic for making such a future projection.

The results of the tax dependency analysis is shown clearly in Columns 5 through 7 of Table 9. Column 5 shows the districts' bond repayment funding requirements prior to use of tax income assuming full use of increasing operating surpluses, a reasonable level of grants from other governmental agencies, sale of new bonds and the maintenance of a $50 million annual capital improvement program. The need for tax income shown in Column 5 increases consistently from $3.8 million to $21.7 million over the next ten year period. Therefore, flow of tax income for current and future use by the public port districts to maintain their current level of capital improvements is, as shown in Columns 6 and 7 of Table 9, unquestionable.

The circumstances which would allow certain public port districts in the state to become financiall. self-sufficient would be a major reduction in capital improvement programs. The capital improvement programs of the public port districts, supported by tax levies, has allowed the districts to successfully compete for business in the past. Any dimunition of this competitive ability would damage the districts competitive advantage in the short term and negatively impact the economic benefits generated by the districts and their fiscal health in the long term.

Therefore, our conclusion is that the public port districts in Washington are essentially doing quite well financially even with recent limitations placed upon their tax levy powers. However, any further dimunition of such powers would have damaging effects on the public port districts and the state's economy.

PUBLIC PORT DISTRICT REGION
MAP EXHIBITS

Washington Public Ports Economic Study

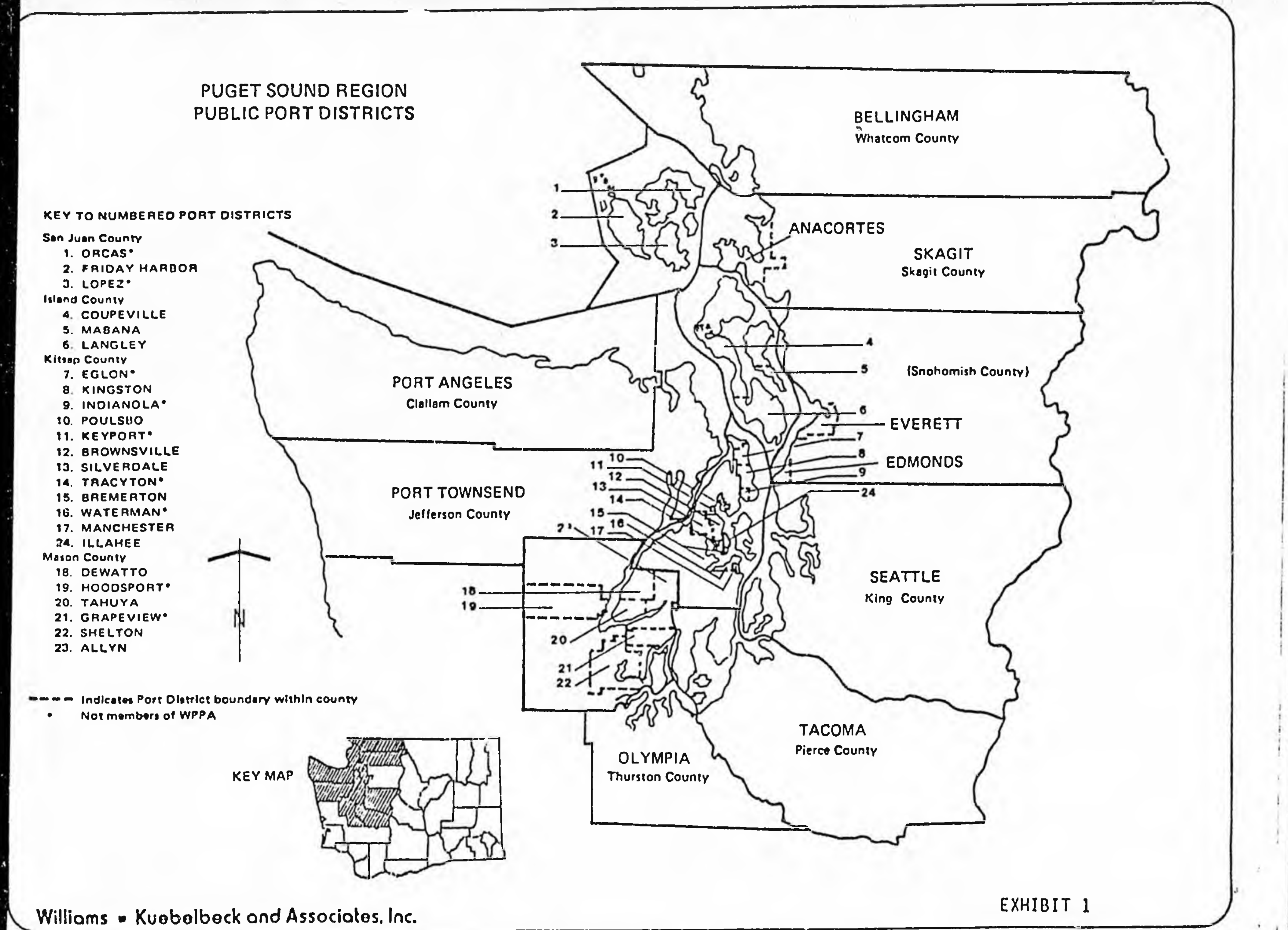
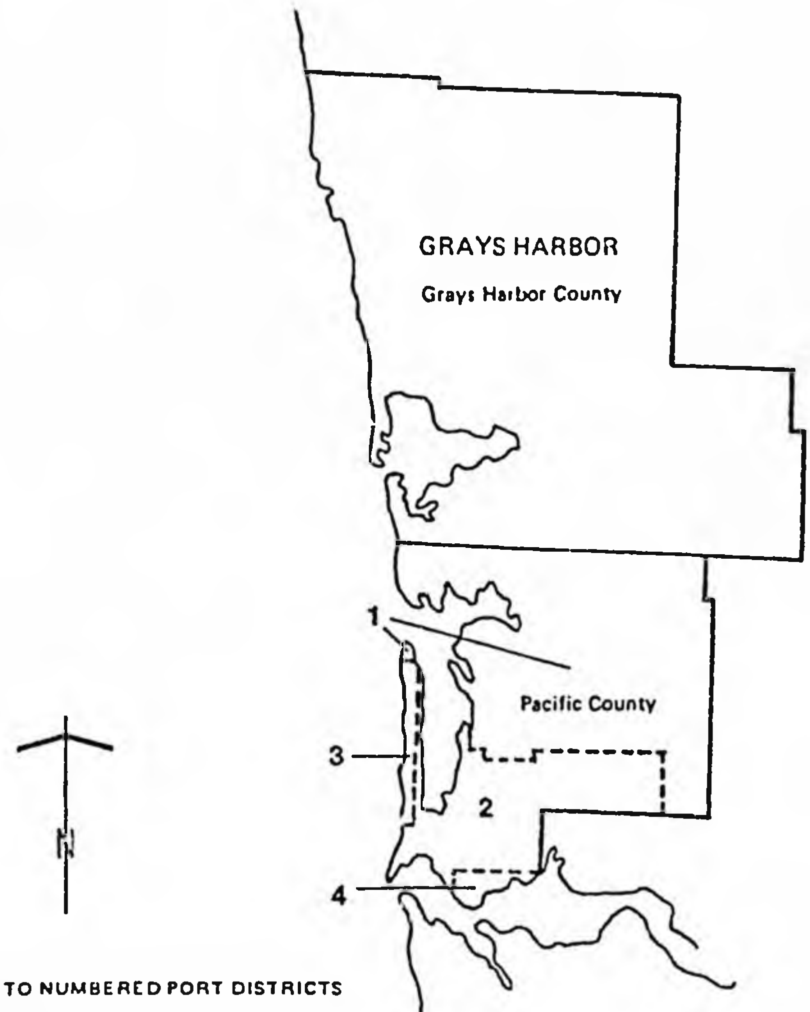

PUGET SOUND REGION
PUBLIC PORT DISTRICTS
KEY TO NUMBERED PORT DISTRICTS
San Juan County
1. ORCAS*
2. FRIDAY HARBOR
3. LOPEZ*
Island County
4. COUPEVILLE
5. MABANA
6. LANGLEY
Kitsap County
7. EGLON*
8. KINGSTON
9. INDIANOLA*
10. POULSBO
11. KEYPORT*
12. BROWNSVILLE
13. SILVERDALE
14. TRACYTON*
15. BREMERTON
16. WATERMAN*
17. MANCHESTER
24. ILLAHEE
Mason County
18. DEWATTO
19. HOODSPORT*
20. TAHUYA
21. GRAPEVIEW*
22. SHELTON
23. ALLYN
---- Indicates Port District boundary within county
* Not members of WPPA
KEY MAP
N
BELLINGHAM
Whatcom County
ANACORTES
SKAGIT
Skagit County
(Snohomish County)
EVERETT
EDMONDS
PORT ANGELES
Clallam County
PORT TOWNSEND
Jefferson County
SEATTLE
King County
TACOMA
Pierce County
OLYMPIA
Thurston County
Williams • Kuebelbeck and Associates, Inc.

EXHIBIT 1

PACIFIC REGION
PUBLIC PORT DISTRICTS

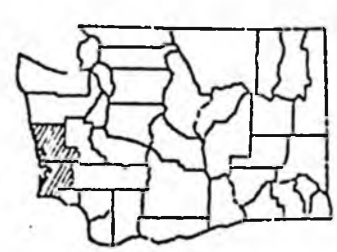


KEY TO NUMBERED PORT DISTRICTS

Pacific County
1. WILLAPA HARBOR
2. ILWACO
3. PENINSULA
4. CHINOOK

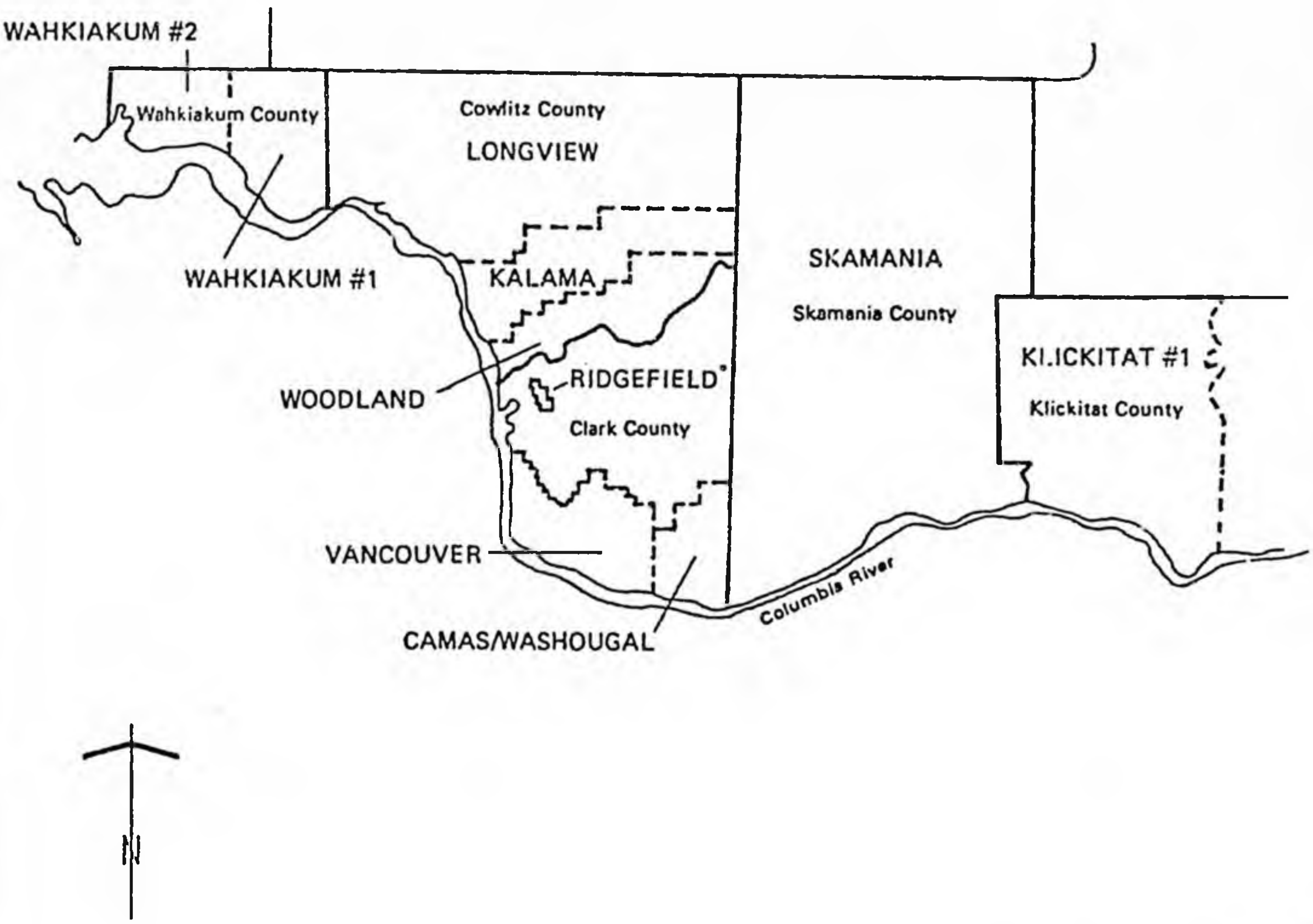
- - - - Indicates Port District boundary within county

KEY MAP



Williams • Kuebelbeck and Associates, Inc. EXHIBIT 2

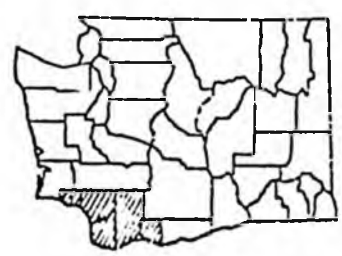
LOWER COLUMBIA REGION
PUBLIC PORT DISTRICTS



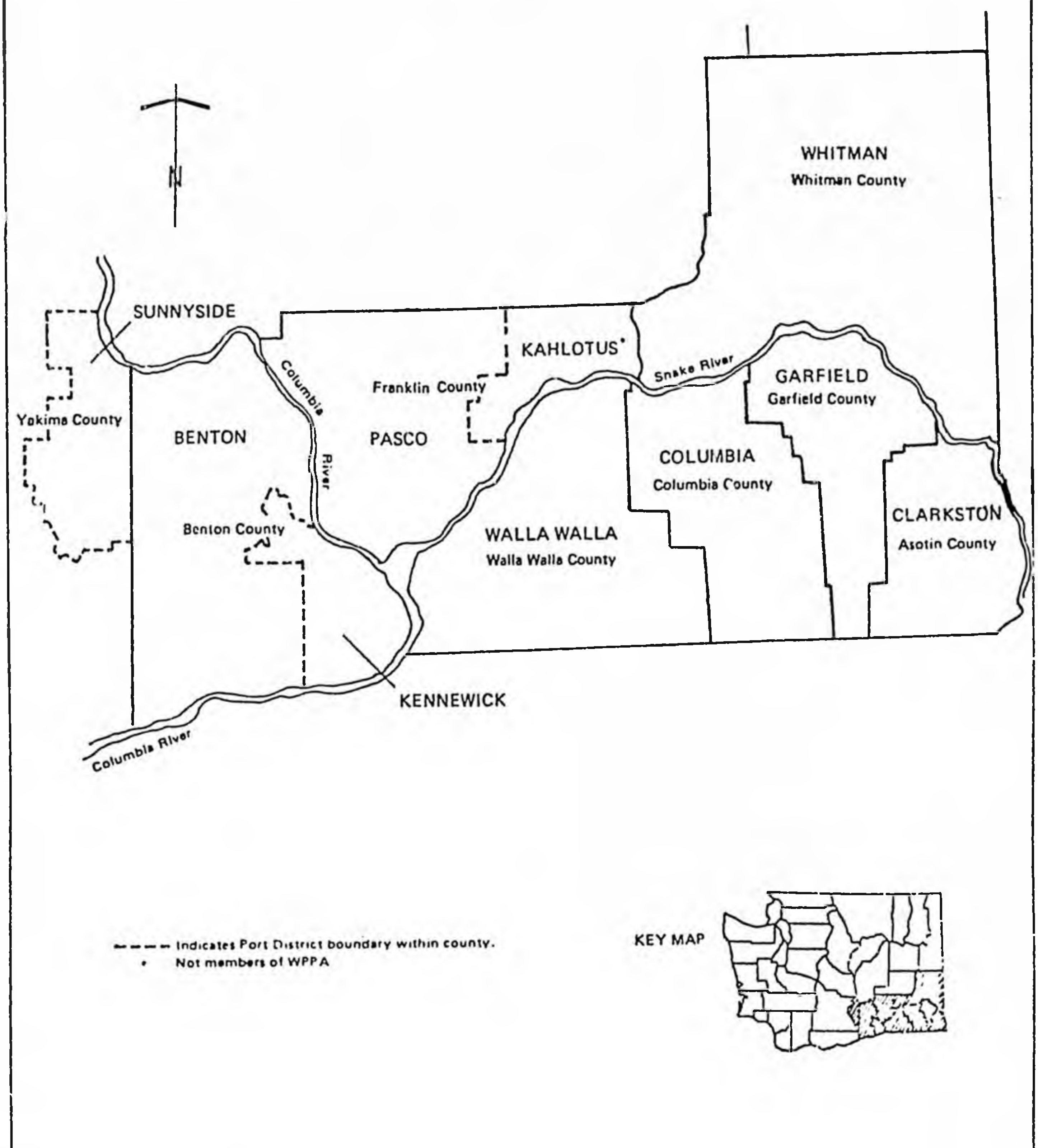
- - - - Indicates Port District boundary within county.

* Not members of WPPA

KEY MAP



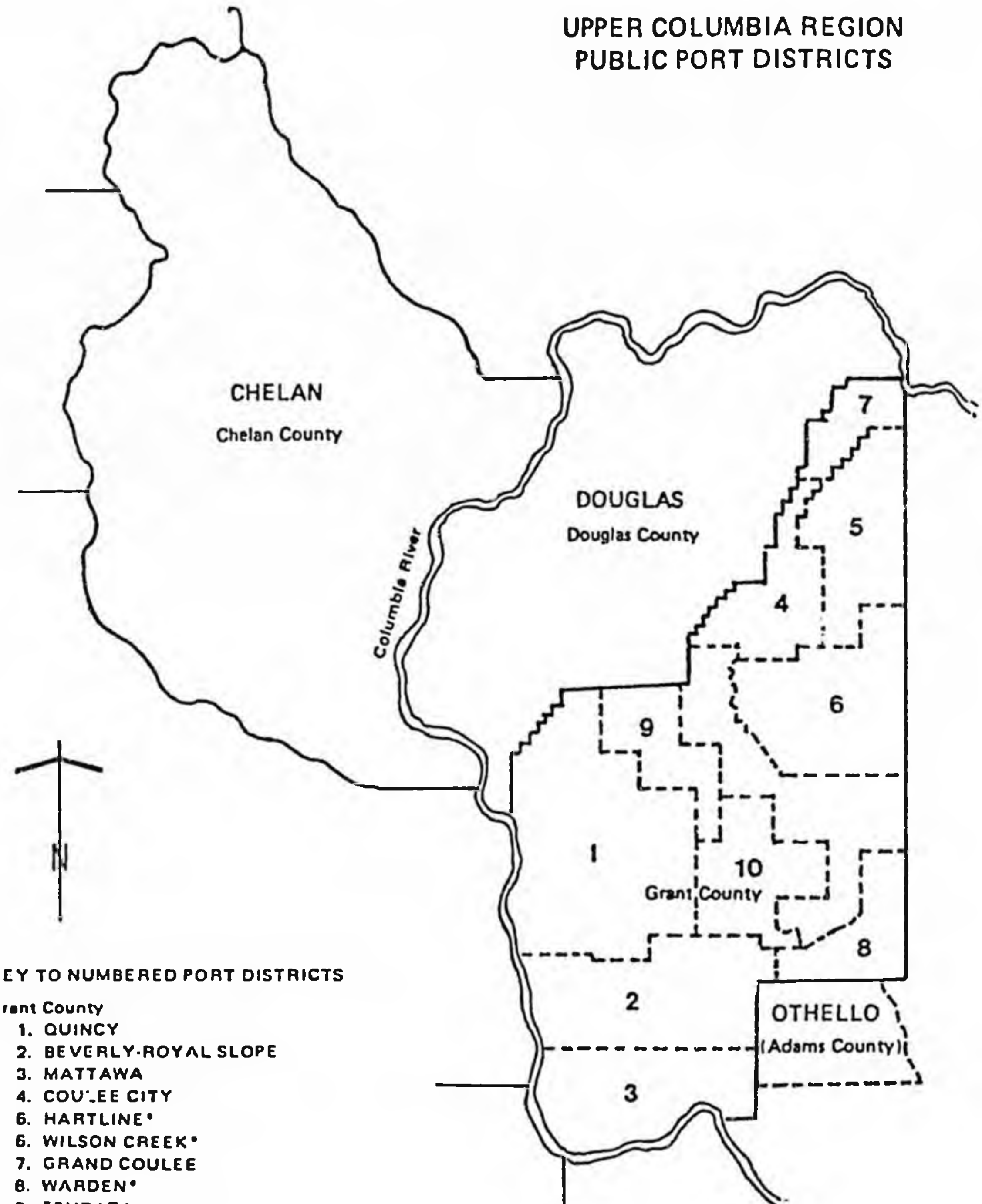
MID COLUMBIA AND SNAKE REGION
PUBLIC PORT DISTRICTS



Williams ▪ Kuebelbeck and Associates, Inc.

EXHIBIT 4

UPPER COLUMBIA REGION PUBLIC PORT DISTRICTS



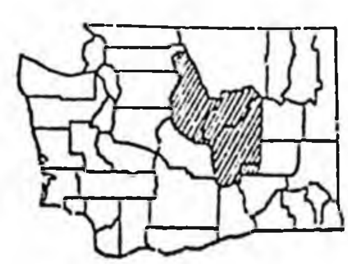
KEY TO NUMBERED PORT DISTRICTS

Grant County

1. QUINCY
2. BEVERLY-ROYAL SLOPE
3. MATTAWA
4. COULEE CITY
5. HARTLINE*
6. WILSON CREEK*
7. GRAND COULEE
8. WARDEN*
9. EPHRATA
10. MOSES LAKE

---- Indicates Port District boundary within county.
* Not members of WPPA

KEY MAP



SURVEY OF STATE FUNDING OF LANDSIDE PORT FACILITIES AND CARGO TERMINALS 1983

An Informational Report

by the

STANDING COMMITTEE ON WATER TRANSPORTATION

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

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