



THE MOORAGE INDUSTRY IN WASHINGTON'S COASTAL ZONE

Robert F. Goodwin and Robert Stokes

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About the Authors Mr. Robert F. Goodwin is the Coastal Management Specialist in the Washington Sea Grant Marine Advisory Program, assigned to the University of Washington Institute for Marine Studies' Coastal Resources Program.

Dr. Robert L. Stokes is an Assistant Professor of Marine Studies in the Institute for Marine Studies specializing in marine resource economics.

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Acknowledgments

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Foreword

The Pacific Northwest is blessed with coastal resources second to none in the nation. We have deep water for shipping, abundant fish and wildlife, and outstanding scenery. But the supply of these resources is scarce because the pressure to use them is so great. A great challenge for the future is to build a coastal zone management system that can keep these resources serving us for years to come. One issue such a system must address is the demand for new and expanded marinas to serve the growing population of boaters.

Debates over marina development usually lack reliable information. No one knows just how high the demand for moorage is, how much the economy gains or loses from the project, where in western Washington marinas serve the market best, and which sites have the least adverse environmental and community impacts. It is impossible to generate this information when the review process focuses on one project at a time. Also, analysis of one project without comparison with other projects serving the same or overlapping markets cannot lead to a rational decision.

A better approach would be to analyze boat moorage at the state level so that individual projects can be evaluated in a broader framework of economic, recreational, and environmental needs. The first step in preparing for a state-level analysis of moorage is to gather information about the industry. A 2-year project now being completed at the Coastal Resources Program contributes substantially to this first step. Studies have been done of the supply of moorage, the structure of the recreational boating industry, and the role of public ports in marina development.

This report is the first of two technical publications summarizing the results of the research. It describes the moorage industry in western Washington in terms of facilities, economic impacts, rental rates, trends, and constraints to growth. Important recommendations are presented to policy makers and industry leaders. This report is presented with the hope that the information will be useful to private and public planners. I also hope that the report will begin to add a state-wide perspective to our thinking about marina development, and how it fits into our goals for the state's coastal zone.

Marc J. Hershman
Program Manager
Coastal Resources Program
Institute for Marine Studies
University of Washington

Summary

The State of the Moorage Industry

The moorage industry in Washington's coastal zone provides boat moorage and storage facilities for recreational smallcraft, commercial and charter fishing boats, and miscellaneous craft. In 1978, the region's moorage facilities accounted for over \$23 million of sales, which, when indirect effects on related industries are added, rose to over \$30 million of state-wide sales. In addition, each new moorage slip occupied resulted in over \$4,000 of expenditures by the tenant in the first year of occupancy.

While some softening of demand for moorage is evident in Pacific coastal and northshore Columbia River harbors, the market is firm in Puget Sound.¹ Prices for moorage in Puget Sound facilities are rising and additions to the 1978 stock of moorage reported in this publication do not appear to have reduced occupancy rates at either public or private facilities. On the outer Strait of Juan de Fuca, demand is highly seasonal, presenting difficult choices for investments in the western part of Clallam County.

Moorage Supply

The supply of moorage in Puget Sound and adjacent waters has grown over three times faster than the number of households in the coastal zone counties, but its geographical distribution is inconsistent with the distribution of population. Furthermore, the trend over the 12-year period from 1966 to 1978 has been to increase this disparity: peripheral, rural Puget Sound counties have experienced strong growth in their already generous share of the region's moorage facilities, while the central, urbanized counties have slipped further behind.

Moorage Demand

Preliminary analysis of recreational boating in the study area suggests that Puget Sound boaters primarily seek permanent moorage close to home, although some want to moor at "gateway harbors" near their destination areas. Skagit county marinas are clearly favored for their gateway location to cruising waters in the San Juan archipelago. A preliminary estimate is that a minimum of 9,000 new wet moorage slips and an equal number of dry storage spaces would be required to satisfy latent demand for permanent moorage and storage in 1978. Approximately 85 percent of this demand lies in Pierce, King, and Snohomish counties. Construction of these slips would tend to equalize the opportunity for residents of Puget Sound counties to participate in recreational boating.

The fishing industry, as this report demonstrates,

is unlikely to expand significantly in the short run (5-8 years) to produce impacts on smallcraft harbors. However, the fleet of larger crabbers, draggers, and multigear vessels already constructed and using moorage in the region's ports may require retrofitting of piers and floats to withstand increased loads.

Regional population growth will induce increasing numbers of households to participate in recreational boating. Decreasing availability and higher prices of marine fuel, the reduced pulling power of family automobiles, and difficulties in storing boats at home will exacerbate the demand for moorage and storage of the recreational boating fleet at the water's edge. Many boats in the 16-26 foot length class (almost 50 percent of the fleet in Puget Sound) will no longer be trailered. Dry open or dry stacked storage facilities will be required to absorb these displaced craft.

Assessing the future demand for moorage in quantitative terms will prove difficult. Waiting lists, as shown in this report, are unreliable measures of unmet demand. Accurate county-level estimates of the size of the recreational boating fleet are unavailable and, even if they were available, would be difficult to match against the known supply of moorage. The ultimate capacity of a moorage facility depends upon the size of boats being moored, the amount of moorage preserved for temporary and transient use, and the policy of marina managers toward renting seasonally vacated slips. "Capacity" is an elastic term. In extreme cases, rafting vessels can dramatically increase a marina's capacity, a strategy frequently used to absorb peak demand for moorage by commercial fishing vessels.

The disparity in pricing between public and private moorage further compounds the problem of assessing demand by creating excessive waiting lists at public facilities where prices are lower. Because it is unlikely that the gap between public and private moorage rates will be closed by raising public moorage rates to equal prevailing private rates, means other than counting names on waiting lists for assessing moorage demand must be used.

Expansion of the Moorage Industry

This study shows that expansion of the stock of moorage to satisfy existing latent demand and future demand is being deterred by piecemeal public policies toward marinas at local, state, and especially federal government agency levels; by high commercial interest rates and shortage of capital for private moorage facilities; and by the scarcity and high price of waterfront land. Several governmental planning activities currently underway, particularly a boating facilities study by the U.S. Army Corps of Engineers, Seattle District, hold promise for reducing some of the uncertainty confronting proposed moorage development. However, siting, sizing, and design of new moorage and

storage facilities to satisfy existing (1978) latent demand and new demand will have to be accomplished with minimal disruption of the physical, biological, and visual integrity of the state shorelines if projects are to pass increasingly rigorous agency reviews. Innovative alternatives to wet moorage for both trailerable and smaller nontrailerable vessels and more efficient storage of boat trailers can help reduce the impact of new recreational facilities on the shoreline environment and free up wet moorage for vessels that require it.

The disadvantageous position of private marinas in securing investment capital for new facilities construction can be ameliorated by four kinds of strategies: first, legislative provisions for low-cost loan programs, comparable to California's Assembly Bill 1284; second, better understanding and treatment of the industry by commercial banking institutions (one Seattle bank is developing a technical assistance program to help the moorage industry secure better banking services); third, expanded use of condominium financing arrangements; and finally, joint public/private smallcraft harbor ventures. Such joint ventures, successfully accomplished at Marina del Rey in Los Angeles County and being emulated at the proposed Seacrest Marina in West Seattle, provide opportunities to combine federal funding for wave protection structures with the economic efficiency of the private market.

Recommendations

Several recommendations derived from the study are discussed at the end of this report. Briefly, these include:

- o Maintaining accurate, current records of the stock of moorage in Washington's coastal counties.
- o Refining the Final Guidelines to the Shoreline Management Act for marinas.
- o Developing marina planning policies that encourage dry storage facilities for trailerable boats.
- o Expanding the role of the Washington Public Ports Association's Marina and Cooperative Development Committees in marina planning.
- o Charging rates at public facilities to cover, at least, a fair return on locally managed capital investment in their facilities.
- o Phasing construction and occupation of new public moorage facilities to reduce impacts on private marinas.
- o Improving bank financing arrangements for private marinas.

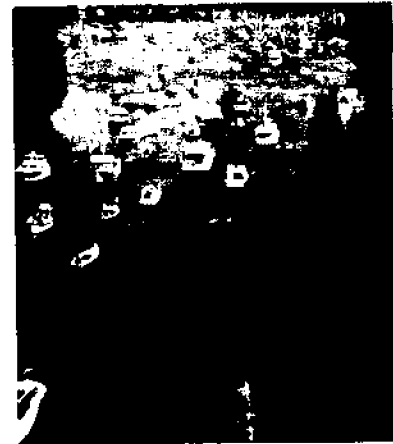
Introduction

Public and private marina operators in Washington's coastal counties contend that there is an acute shortage of moorage slips available to the recreational boater and the commercial fisherman. Occupancy rates approach 100 percent at most Puget Sound marinas, and waiting lists, some for more than the total number of slips in the marina, are the rule. Boat manufacturers argue that this shortage of moorage retards new boat sales. Not only is access to recreational boating being restrained by the moorage shortage, but state and local income from boat manufacturing, trade, and services is being held back. If demand for wet moorage is as strong elsewhere in western Washington as it appears to be in Puget Sound, why has the moorage industry failed to expand to meet it?

This report first examines characteristics of the moorage industry in Washington's coastal counties and how it has grown since 1966. The economic magnitude and impacts of the industry are documented at both the state level and the individual coastal county level. Regional disparities in both the stock and growth of moorage are examined, particularly as they relate to the distribution of households in the study area. Second, the principal factors constraining marina development are identified and discussed. These include: public/private price disparities, high costs of waterfront land, difficulty in financing, and uncertainty and delays caused by environmental regulations and piecemeal public policies on marina siting and design. Third, changes in the commercial fishing fleet which affect smallcraft harbors are discussed.

Finally, the report identifies remedies and potential remedies to ameliorate some of the constraints on industry expansion and discusses constraints which are likely to remain. This report, prepared by the Coastal Resources Program of the University of Washington's Institute for Marine Studies, is directed to the moorage industry, consulting firms, government planning and regulatory agencies at federal, state, and local levels of government, recreational and commercial smallcraft users, and legislative bodies in order that they may understand problems confronting the industry and assess possible remedies for their resolution.

A forthcoming report will provide information on the present and projected utilization of smallcraft moorage, storage, and launching facilities, based on a 1979 boating household survey. Some of the preliminary data analyses are also used in this moorage industry report. This report addresses the supply of moorage and storage facilities; the companion report will address demand for these facilities.



Characterization of the Industry

Overview

The provision of moorage for recreational and commercial smallcraft in Washington's coastal counties is shared between public port authorities and private marina establishments. There are approximately 290 moorage establishments, providing 30,000 permanent rental wet moorage slips and dry storage spaces in this region.³ Sixteen percent of the establishments are operated by public ports and 84 percent by private marina operators and yacht clubs. Public port marinas are over five times larger (average number of slips: 270) than private facilities (average number of slips: 50) and provide 43 percent of the region's moorage and storage spaces. Usually protected by breakwaters, public smallcraft harbors are required, in some cases, to provide a harbor-of-refuge function to smallcraft, regardless of type, seeking protection from weather or making other emergency landfalls. Public smallcraft harbors provided moorage for almost five times as many commercial vessels (1765 per month) as did private marinas (371 per month) in 1978.

Up to 50 percent of the costs of developing breakwaters, jetties, bulkheads, access channels, and turning basins at public marinas catering to recreational craft may be funded by the federal government through the U.S. Army Corps of Engineers' public works congressional authorizations. This federal share of costs may be increased to 100 percent where the harbor caters exclusively to commercial fishing vessels. The share of costs borne by "local sponsors" for construction of these wave protection structures, together with docks, finger piers, shoreside buildings, utilities, parking, etc., is usually financed by revenue bonds, though public port authorities may issue general obligation bonds or special tax levies for this purpose. Occasionally, grants from the Economic Development Administration (EDA) may be available for public smallcraft harbor development projects.

Private marinas, on the other hand, are financed entirely by private capital. Hence, it is unusual to find private marinas located where extensive breakwater or jetty construction is required. Usually, private marina developers seek enclosed or protected sites where wave protection is unnecessary.

The trend toward public/private joint ventures, evidenced in California, may emerge in Washington State. A public port authority acts as the "local sponsor" for the nonfederal share of wave protection structures, while construction of the moorage facilities is contracted to a private-sector concessionaire.

Marina del Rey in Los Angeles County, the largest marina on the West Coast, is organized in this fashion.

Private yacht clubs' moorage facilities, while restricted to members, provide a significant quantity of slips which would otherwise have to be provided by the private marina operator or the public port authority.

To represent their interests before legislative bodies, to promote their services, and to perform state-wide studies, public port authorities formed the Washington Public Ports Association (WPPA). The WPPA's Cooperative Development Committee (CDC) issues "Certificates of Need"⁴ for proposed smallcraft harbor developments. The association's Marina Committee provides a forum for issues concerning public smallcraft harbors. Private marina operators have two organizations representing their interests: the Northwest Marine Trade Association (NMTA) and the Association of Independent Moorages (AIM). Yacht clubs are represented through the Inter Club Boating Association (ICBA).

Economic Magnitude of the Industry

Respondents to Washington Sea Grant's 1979 Boating Household survey spent, on the average, \$145.60 for moorage services in 1978. Extrapolation of this figure yields a statewide 1978 moorage industry sales estimate of \$23.4 million, a figure corroborated by other estimates. For example, estimates of 1978 revenue from wet moorage slips in coastal and lower Columbia River counties in Washington totalled \$16.5 million (See Table 1). This figure must be

Puget Sound and Adjacent Waters

County	Est. Rev.
Thurston	442,584
Pierce	1,195,332
Kitsap	667,040
Snohomish	691,608
Mason	72,204
King	8,452,272
Jefferson	311,016
Island	193,620
Skagit	567,324
San Juan	425,976
Whatcom	1,354,836
Clallam	<u>1,166,568</u>

Totals \$15,540,380

Western Washington Total

Coastal and Columbia River

County	Est. Rev.
Grays Harbor	373,764
Pacific	349,260
Wahkiakum	14,056
Cowlitz	168,708
Clark	76,140

\$982,428

\$16,522,808

Table 1. Estimated Annual Revenues¹ for Moorage, by County, 1978.

¹ Again, these estimates are conservative, since revenues from only wet, open moorage are included; transient moorage receipts, lockers, and revenue from lockers, groceries, and other services are not reported.

increased by 20 percent to account for temporary and transient moorage receipts as reported by Boating Household Survey respondents. The resulting \$20 million estimate does not include dry storage charges, or revenues from marinas in Eastern Washington's lakes and rivers. These additional revenues would easily account for the \$3.4 million difference from the estimate of \$23.4 million based on boaters' expenditures.

Another estimate reported in a recently completed Coastal Resources Program study⁵ accounts for 1977 moorage industry sales of \$14.1 million. This estimate is conservative because of the manner in which industry data are classified at the state level. Washington State Departments of Employment Security and Revenue report data for marinas only if 50 percent or more of their business income is from moorage rental; many smaller marinas' sales of gas and groceries exceed revenue from slip rental, and these facilities are therefore classified as retail establishments. There are probably a large number of private marinas which are so classified and therefore excluded in the calculation of the \$14.1 million 1977 sales estimate. Further, industry growth and price changes in 1977 to '78 would inflate this figure.

While the Ellis report underestimates the magnitude of the moorage industry, it does provide a sound, quantitative description of the industry's economic structure, permitting reliable estimates of the industry's impact on local county and statewide economies to be made.

Economic Impact of the Industry

State Multipliers and Impacts

In order to produce \$23.4 million in sales of moorage services in 1978, the moorage industry purchased goods, services, and labor from a large number of other firms, public services, and households. These direct purchases fall into two categories: *interindustry purchases* and *value-added*. Interindustry purchases are from other firms for goods and services necessary to maintain, and operate a marina. Value-added consists of the sum of payments made to marina employees (wages and salaries), to government in the form of taxes, to creditors for interest, and to landowners for rent.

In turn, these other industries, households, and government agencies must purchase inputs to produce goods, services, and labor for the moorage industry. This process creates a "ripple" effect of *indirect* purchases and sales in the state's economy, which diminishes with each round of expenditures: certain goods and services must be imported (from elsewhere in the U.S. and from foreign producers); workers do not spend all their wages, but save some part; federal income and excise taxes siphon income out of the state; and profits are distributed to stockholders or owners

who are not Washington residents. As a result of these "leaks" in the economy, the magnitude of each successive round of purchases diminishes, and the "ripple" effect is extinguished. In addition to the *direct* sales of \$23.4 million, the subsequent *indirect* sales, described above, create an additional impact of \$6.8 million, for total (*direct + indirect*) sales of \$30.2 million in the state of Washington; or, for every \$1 of sales of moorage services to boaters, \$1.29 of new statewide industrial output is created.

The *value-added* purchases create income to the state through payment of wages, salaries, taxes, interest, and rent. For each \$1 of sales, 77¢ of direct income is generated. When indirect sales are added, income increases to 96¢ per \$1 of sales, or from \$18.0 million direct total income to \$22.5 million direct plus indirect total income in the state. Further, 714 employees supported by sales in the moorage industry increase to a total of 1,328 employees in the state, supported by direct and indirect industry sales. The relationships between *direct* and *direct + indirect* sales, income, and employment are known as *Output, Income, and Employment Multipliers*. These are summarized in Table 2.

	Direct Impact	Direct and Indirect Impact	Multipliers
Sales (\$ X million)	\$23.4	\$50.2	1.29
Income (\$ X million)	\$18.0	\$22.5	.96
Employment	714	1328	57.7 jobs/ \$1 million final demand

Table 2. Moorage Industry Impacts on Washington State's Economy, 1978.

Source: Calculations on page 3 supra, and Ellis et al., 1979.

For every \$1 of direct purchases made by the moorage industry, 23¢ was for interindustry purchases and 77¢ was for value-added purchases (wages, salaries, taxes, interest, rent). The moorage industry can therefore be characterized as labor-intensive.

The industries most impacted by moorage industry purchases⁶ are listed in order of magnitude below. Expenditures are per \$1 of total direct purchases:

Retail services	6.7
Finance insurance & real estate	3.8
Construction	3.4
Electric utilities	3.2
Other utilities	1.8
Other marine mfg.	1.1

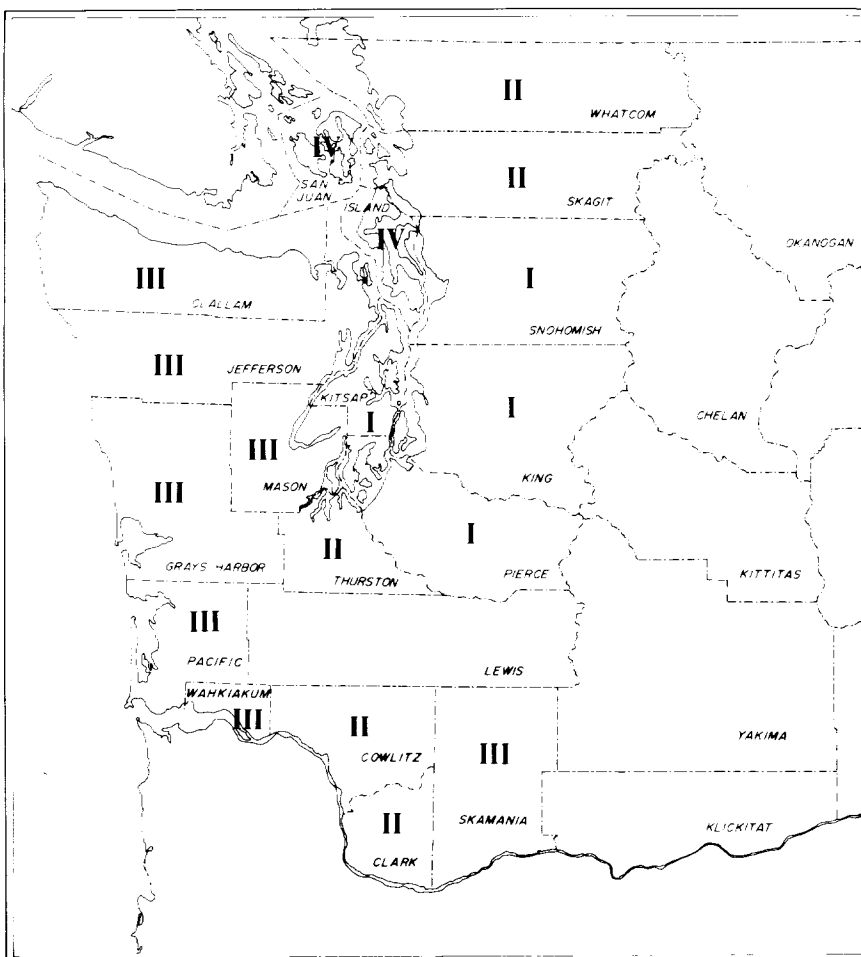
Purchases of less than 1¢ per dollar are made from marine services, marine trade, communications, wholesale trade, other manufacturing, sawmills, printing, and motor vehicles.

Out of every dollar of moorage industry sales, almost 99¢ is to Washington households, 1¢ is to out-of-state boaters and less than 1/2¢ to marine trade establishments in Washington. The industry therefore satisfies a local market and has a very small export role.

County Multipliers and Impacts

Because counties have smaller and less complex economic structures than the whole state, the impact on counties' economies of each dollar of sales made by the moorage industry is smaller than for the state as a whole. That is, a higher proportion of the goods, services, and labor necessary to construct and operate a marina must be imported into a county than into the whole state. Also, the more metropolitan the county, the more self-sufficient it is and the fewer goods, services, and labor need to be imported. Output, Income, and Employment Multipliers for the moorage industry, then, are smaller for individual counties than for the state, but vary according to the county's level of urbanization and kind of economy. However,

Figure 1: Washington's Coastal Counties: Types of Economies.
Source: Ellis et al., p. 40



while the impact of each dollar of sales is smaller, the importance of the industry for counties' economics can be proportionally greater than statewide.

Figure 1 maps all coastal Washington counties into four categories. According to Ellis et al. (1979):

"The highly urbanized central Puget Sound region is shown as Type I. Type II counties are urbanized, but their economies are more strongly oriented toward the processing of resources than is the case in the Type I counties. Type II counties include Whatcom, Skagit, Clark, and Cowlitz counties. Marinas are relatively more important in these counties compared to the state as a whole. The counties in Type III are dominated by forest products processing activities, but also have a significant maritime orientation in the moorage/marina trade sectors. Type III counties include Clallam, Jefferson, Mason, Grays Harbor, Pacific, Wahkiakum, and Skamania. Type IV counties, San Juan and Island, have significantly less dependence upon forest products and are more oriented toward leisure and recreation. In addition, their insular qualities make marine recreational activities relatively significant to their economies."⁷

The multipliers for each type of county are reported in Table 3. State multipliers are shown for comparison.

Multiplier Type	Type I county	Type II county	Type III county	Type IV county	State
Output (sales) multiplier	1.27	1.03	1.04	1.01	1.29
Income multiplier (payrolls, taxes, profits)	.95	.78	.80	.78	.96
Employment multiplier (jobs per \$M final demand)	53.8	42.2	43.0	41.7	57.7

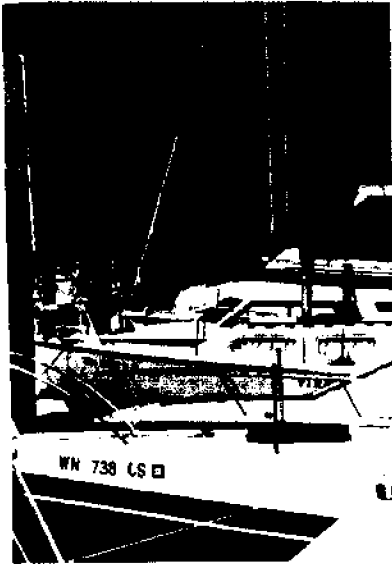
Table 3. Marinas/Moorage: County-Level Multipliers.

Source: Ellis, et al., 1979.

In order to estimate the post-construction impact of a new or expanded marina on the economies of the state and local counties, the only information needed is the anticipated new annual revenue from the facility. Then, using the multipliers in Table 3, the total new annual sales, income, and employment can be estimated. Appendix A works through such an example. The multipliers reported in Table 3 should be used cautiously; they are specific to the year data were gathered, 1977. Shifts in prices, wages, and productivity, as well as changes in the structure of the state and local economies will cause these multipliers to change through time.

Dependency of Marine Manufacturing, Trade, and Services on the Moorage Industry

In order to participate in recreational boating in nontrailerable boats, a boater requires moorage; without moorage such boat ownership is virtually impossible. For this reason, yacht brokers frequently lease blocks of wet moorage from private marinas in order to guarantee their customers slips for their newly purchased sailboats. For every potential boat owner requiring wet moorage but finding none available, a boat sale is "lost" and boat manufacturers and sales and service establishments forego income as a result.⁸



Of the boats occupying wet moorage in western Washington waters, 60 percent are greater than 26 feet in length, and therefore are not normally trailerable. As long as occupancy rates remain at or close to 100 percent, as they are in most of Puget Sound, and tenants' boat ownership patterns persist, 60 percent of new additions to the stock of moorage will be occupied by boats over 26 feet in length. At the regional level, these must be either new boats or used boats imported into the region. The majority of these boats are in the 27-32 foot length class and their average 1978 market value was approximately \$20,000. Hence, each new occupied moorage slip in the Puget Sound region generates \$12,000 of boat sales. Of boats over 26 feet in length, 10.5 percent are manufactured in Washington, resulting in \$1,260 of new, direct industrial output in the state.⁹ When indirect impacts are added, total new output is increased to \$1,450 per slip.¹⁰ In addition, brokers' fees and transportation costs amounting to 15 percent of the remaining \$10,800 sales of used and new imported boats, 94 percent of which were sold in Washington, account for at least \$1,500 of new state sales.

In addition to purchasing a boat, every new recreational boater spends an average of \$1,075 per year on operation and maintenance items. The total, direct state-wide output associated with the first year's utilization of a new wet moorage slip is therefore probably in excess of \$4,000 (1978 dollars).¹¹

Owners of power boats and many sailboats up to 26 feet in length, accounting for 40 percent of wet moorage use, have the option of trailering their vessels and storing them at home, or using dry storage at the water's edge. Wet moorage availability is not an absolute requirement for ownership of most of these smaller vessels. However, the large proportion of these owners who do elect to use wet moorage suggests that severe shortfalls in supply of wet slips would constrain ownership of trailerable vessels.

According to industry spokespersons, owners of boats in the 20-26 foot length class will become vulnerable to two trends in the economy: first, rising costs and reduced availability of fuel coupled with sharp decreases in the pulling power of family automobiles will discourage trailering recreational small-

craft. Secondly, reduction in family size and growth in number of households choosing to live in apartment houses and condominiums place many boat owners and potential boat owners in homes where storage is at a premium. For such families, then, wet moorage or dry storage close enough to water to avoid trailering will become essential requirements for boat ownership. The extent to which boat sales in the 20-26 foot length class are being retarded by shortfalls in wet moorage and dry storage is unknown, but will become increasingly significant if current trends continue.

Geographic Distribution of Moorages

Approximately 290 moorage facilities in Washington's coastal waters¹² provided approximately 30,000 wet slips and dry storage spaces for commercial and recreational smallcraft in 1978. Of these, 28,000 were on the shorelines of Puget Sound (including lakes Washington and Union), the Strait of Juan de Fuca, and the San Juan Islands (including Pt. Roberts). Twelve years earlier, in 1966, this region had 16,000 wet and dry slips.¹³ There are now 81 percent more slips than in 1966. Where are these slips? Where has the growth occurred? How are they distributed in relation to the boating population?

In this section, the stock of wet marine moorage slips and dry storage spaces in all counties bordering Puget Sound, the Strait of Juan de Fuca, and the San Juan Islands is mapped and tabulated for the years 1966 and 1978. Changes in numbers of wet moorage slips and dry storage spaces over the 12-year period are analyzed to show the percentage change (shift) by county and each county's share of the region's growth. This exercise is then repeated for the number of wet slips and dry storage spaces per thousand households in each county. The purpose of presenting data in the form of slips/spaces per thousand households is to provide a measure of household accessibility to moorage and therefore to boating in nontrailered boats. Households, rather than individuals, were chosen since boat ownership is believed to be a characteristic of whole families rather than their individual members. Each county's actual number of slips is compared to the number it would contain if it conformed to the regional average number of slips per thousand households. Quantities above or below this "expected" number are tabulated and mapped to reveal regional disparities in a household's accessibility to moorage.

Distribution of Moorage in 1966 and 1978

Tables 4 and 5, and Figure 2 reveal the number of wet and dry rental moorage slips and spaces in each county available to boaters in 1966 and 1978.¹⁴ Counties are ranked for both years and the changes in rank noted in the tables. King and Pierce counties dominated the supply of moorage in both years, while Island, Mason, San Juan, and Jefferson counties had the fewest

Table 4: Rental Wet Moorage in Puget Sound and Adjacent Waters, 1966-78.

County	# Wet slips 1966	Rank	# Wet slips 1978	Rank	Change in # wet slips 1966-78	Change in rank	% Change in # wet slips 1966-78	Rank	% Share of region's change in # wet slips 1966-78	Rank
Whatcom	214	10	2,233	3	+2,019	up 7	943.5	1	19.2	2
Skagit	561	5	1,879	4	+1,318	up 1	234.9	3	12.5	3
San Juan	416	8	827	10	+411	dn 2	98.8	6	3.9	10
Island	102	12	489	11	+837	up 1	279.4	2	3.7	11
Snohomish	864	4	1,701	6	+2,277	dn 2	96.9	7	7.9	6
King	5,756	1	8,033	1	+484	—	39.6	11	21.6	1
Pierce	2,049	2	2,533	2	+467	—	23.6	12	4.6	8
Thurston	511	6	978	8	+61	dn 2	91.4	8	4.4	9
Mason	137	11	198	12	+844	dn 1	44.5	10	0.6	12
Kitsap	943	3	1,787	5	+538	dn 2	89.5	9	8.0	5
Jefferson	313	9	851	9	+898	—	171.9	5	5.1	7
Clallam	494	7	1,392	7	—	—	181.8	4	8.5	4
Total	12,360		22,901		10,682		86.3		100+	

Source: Oceanographic Institute of Washington. *Survey of Marine Boat Launching and Moorage Facilities in Washington*. Seattle, Washington, 1978.

Figure 2: Wet Rental Moorage Slips and Dry Storage Spaces: Totals by county, 1966 and 1978. Source: Tables 4 and 5

Figure 3: Wet Rental Moorage Slips: Percent Change by County and Percent of Counties' Share of Region's Change, 1966-78. Source: Table 4

Figure 4: Dry Rental Storage Spaces: Percent Change by County and Percent of Counties' Share of Region's Change, 1966-78. Source: Table 5

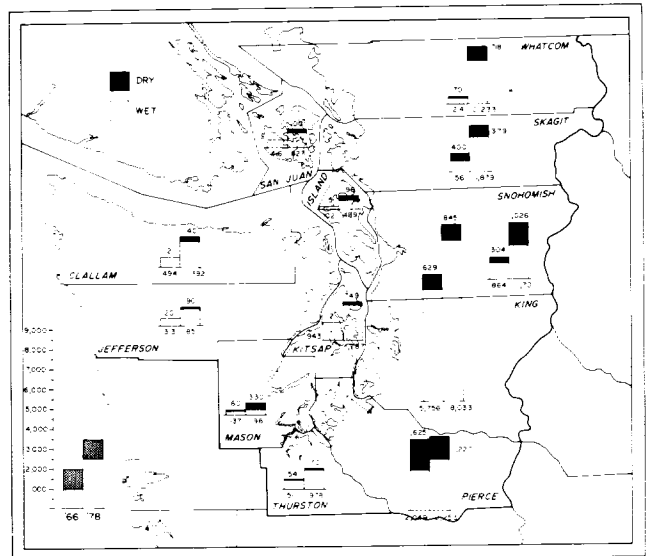


Fig. 2

Table 5: Rental Dry Storage in Puget-Sound and Adjacent Waters, 1966-78.

County	# Dry spaces 1966	Rank	# Dry spaces 1978	Rank	Change in # dry spaces 1966-78	Change in rank	% Change in # dry spaces 1966-78	Rank	% Share in region's change in # dry spaces 1966-78	Rank
Whatcom	70	8	718	4	+648	up 4	+925.7	4	31.4	2
Skagit	400	3	379	5	-21	dn 2	-5.3	11	-1.0	11
San Juan	8	11	100	10	+92	up 1	+1,150.0	3	4.5	8
Island	15	10	196	7	+181	up 3	+1,206.6	2	8.8	5
Snohomish	304	4	1,026	2	+722	up 2	+237.5	8	35.0	1
King	629	2	845	3	+216	dn 1	+34.3	9	10.5	4
Pierce	1,625	1	1,227	1	-398	--	-24.5	12	-19.3	12
Thurston	54	6	70	12	+16	dn 6	+29.6	10	0.8	10
Mason	60	5	330	6	+270	dn 1	+450.0	6	13.1	3
Kitsap	2	12	149	8	+147	up 4	+7,350.0	1	7.1	6
Jefferson	20	8	90	11	+70	dn 3	+350.0	7	3.4	9
Clallam	21	7	140	9	+119	dn 2	+566.6	5	5.8	7
Total	3,208		5,270		+2,062		+64.3		100.1	

Source: Oceanographic Institute of Washington. *Survey of Marine Boat Launching and Moorage Facilities in Washington.* Seattle, Washington, 1978

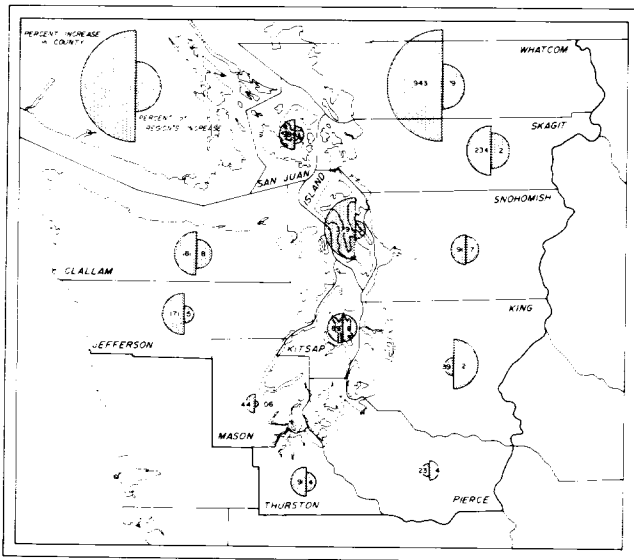


Fig. 3

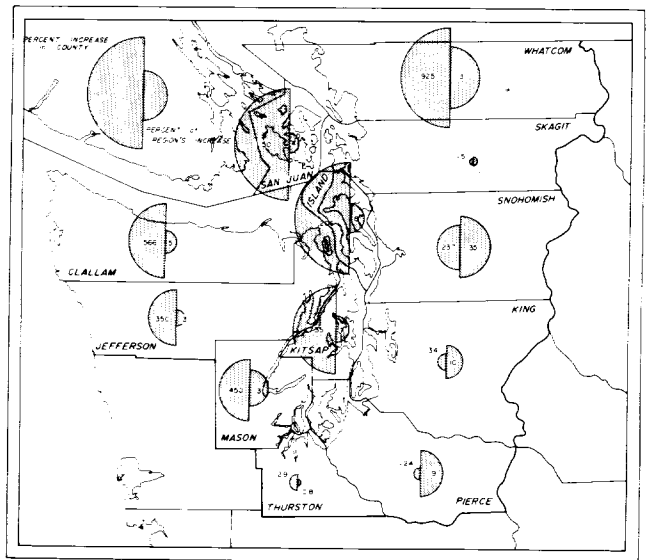


Fig. 4

slips. Only Whatcom County moved substantially in rank--up seven places.

The region's number of wet slips increased 81 percent in 12 years with all counties gaining, but some more dramatically than others. Whatcom County increased almost tenfold, while King and Pierce counties increased 40 percent and 24 percent, respectively. But the populous central Puget Sound counties had many more slips in the base year than did the rural counties and, therefore, while their percentage increase was smaller than the region's, they held their rank positions.

Snohomish, King, and Pierce counties, the region's most metropolitan counties, accounted for 34 percent of the region's growth. Whatcom and Skagit counties had, combined, an almost equal share of 31 percent of the region's growth; and Pierce County's share (4 percent) was exceeded by all but three counties--San Juan, Island, and Mason. Each county's percentage change and its share of the region's growth in wet moorage are mapped in Figure 3 and tabulated in Table 4.

Table 5 and Figure 4 repeat for dry storage the analysis applied above to wet moorage. Again, Whatcom County's share (31 percent) of the regional growth is exceeded by only one county--this time, Snohomish (35 percent), rather than King. Skagit and Pierce¹⁵ counties show an absolute decline of dry storage; Kitsap (7 percent), Island (8 percent), and Mason (13 percent) counties all show strong contributions to regional growth.

Changes in Households' Accessibility to Slips, 1966-1978

A California study of boating facilities¹⁶ and a theoretical analysis of participation in outdoor recreation¹⁷ both conclude that demand for recreational facilities is strongly influenced by the supply of those facilities, and further, that distance to those facilities from place of residence has a marked attenuating effect on the household's participation in boating activities. Symonds (1975, p. 87) noted that this distance effect is particularly potent on participation in nontrailered boating.

An important consideration in assessing supply of moorage in Puget Sound and adjacent waters, then, is to measure households' accessibility to moorage. The population of the region is confined by topographic features and historic development patterns to cities and towns close to saltwater, and, with the exception of north King and south Snohomish counties, those cities lie within one county. The county was therefore chosen as the geographic unit of inquiry. Furthermore, population census data and projections are readily available at the county level.

Wet Rental Moorage Slips

Table 6 and Figure 5 document the number of wet rental moorage slips per thousand households by county in 1966 and 1978. During the 12-year period, the re-

gional average number of wet slips per thousand households increased 45 percent from 19.1 to 28.1, but vast disparities are evident within the region: San Juan County had 21 times more wet slips per thousand households than King County in 1966, and nearly 15 times more in 1978. In 1966, the range was from 6.4 slips per thousand households (Whatcom) to 345 slips per thousand households (San Juan); in 1978 the range was reduced only a little from 18.8 wet slips per thousand households (Snohomish) to 287 (San Juan).

A clear pattern of distribution is evident: the most populous urbanized counties (King, Pierce, and Snohomish) have the fewest wet slips per thousand households, while the rural counties, led by San Juan and Jefferson, have the most. Further, the gap has widened during the 12-year period. The five counties with the greatest increase in slips per thousand households are all rural (Whatcom, Skagit, Island, Clallam, and Jefferson).

Another way to understand these regional disparities is to calculate how many slips each county would be expected to have if it conformed to the regional average number of slips per thousand households, i.e., if every county had the same ratio of slips to households; then to compare this expected number with the actual number of slips. The term "expected number" (of slips) refers only to the result of the calculation performed in Table 6 and is not meant to be understood as a desired norm. The number of slips/spaces above or below the number expected are relative values useful for regional comparisons among counties. This procedure is commonly used by geographers to measure regional distributions of, say, employment in a specific industry in order to determine where that industry is concentrated or specialized. Figure 6 displays the results of this calculation. It should not be inferred that there is any surplus of slips in Puget Sound counties. Occupancy rates are close to 100 percent in this region and waiting lists are the rule at most facilities.

The number of wet slips in King, Pierce, and Snohomish counties is much lower than the expected numbers and, in each case, these differences have grown since 1966. Clallam, Jefferson, San Juan, Whatcom, and Skagit counties all have far more wet slips than the expected numbers, and these differences too have increased since 1966. Thurston, Island, and Mason counties are close to the expected number and have changed little during the 12-year period. Kitsap is the only central Puget Sound county to have had a significant and increasing number of wet slips above the expected number.

Dry Rental Storage Spaces

The meaning of the data on dry storage spaces presented in Table 7 and Figure 7 is less clear than that for wet moorage. The corresponding increase in accessibility to dry storage spaces between 1966 and 1978



Table 6: Rental Wet Moorage in Puget Sound and Adjacent Waters, 1966-1978.

Summary Comparison 1966-78	County	Change in rank of # wet slips/ 1000H's	Change in rank of # wet slips above or below expected #
	Whatcom	up 7	up 8
	Skagit	up 1	up 4
	San Juan	--	dn 3
	Island	up 3	up 1
	Snohomish	--	up 1
	King	dn 1	--
	Pierce	dn 4	dn 2
	Thurston	dn 2	dn 2
	Mason	dn 2	dn 2
	Kitsap	dn 1	dn 4
	Jefferson	--	dn 1
	Clallam	dn 1	--
	Total	--	--



1966	County	# Wet slips	# House holds ¹	# Wet slips/ 1000H's	Rank	Expected # wet slips	# Wet slips above or below (-) expected #	Rank
	Whatcom	214	24,765	8.6	12	472	-258	10
	Skagit	561	16,345	34.3	4	311	250	5
	San Juan	416	1,206	344.9	1	23	393	1
	Island	102	6,893	14.8	10	131	-29	8
	Snohomish	864	67,976	12.7	11	1,295	-431	11
	King	5,756	350,984	16.4	9	6,688	-932	12
	Pierce	2,049	109,834	18.7	8	2,093	-44	9
	Thurston	511	21,511	23.8	6	410	101	6
	Mason	137	5,962	23.0	7	114	23	7
	Kitsap	943	29,346	32.1	5	559	384	2
	Jefferson	313	3,275	95.6	2	62	251	4
	Clallam	494	10,530	46.9	3	201	293	3
	Total	12,360	648,627	19.1	--	12,360	--	--

1978	County	# Wet slips	# House- holds ¹	# Wet slips/ 1000H's	Rank	Expected # wet slips	# Wet slips above or below (-) expected #	Rank
	Whatcom	2,233	32,446	68.8	5	912	1,321	2
	Skagit	1,879	19,714	95.3	3	554	1,325	1
	San Juan	827	2,881	287.0	1	81	746	4
	Island	489	12,802	38.1	7	360	129	7
	Snohomish	1,701	90,357	18.8	11	2,539	-838	10
	King	8,033	410,089	19.5	10	11,524	-3,491	12
	Pierce	2,533	136,156	18.6	12	3,826	-1,293	11
	Thurston	978	35,971	27.1	8	1,011	-33	8
	Mason	198	8,670	22.8	9	244	-46	9
	Kitsap	1,787	44,964	39.7	6	1,264	523	6
	Jefferson	851	5,094	167.1	2	143	708	5
	Clallam	1,392	15,809	88.0	4	444	948	3
	Total	22,901	814,953	28.1	--	22,901	--	--

¹Numbers of households in 1966 and 1978 were estimated by linear trend extrapolation of U.S. Census of Population, 1960, 1970, county population and household size statistics.

Table 7: Rental Dry Storage Spaces in Puget Sound and Adjacent Waters, 1966-1978.

Summary Comparison 1966-78	County	Change in rank of # dry spaces/ 1000H's	Change in rank of # dry spaces above or below expected #
	Whatcom	up 4	up 8
	Skagit	dn 3	dn 3
	San Juan	up 2	dn 2
	Island	up 3	--
	Snohomish	dn 1	up 6
	King	--	--
	Pierce	dn 6	dn 2
	Thurston	dn 4	dn 2
	Mason	up 2	dn 1
	Kitsap	up 2	up 1
	Jefferson	--	dn 4
	Clallam	up 1	dn 2
	Total	--	--



1966	County	# Dry spaces	# House- holds ¹	# Dry spaces/ 1000H's	Rank	Expected # dry spaces	# Dry spaces above or below (-) expected #	Rank
	Whatcom	70	24,765	2.8	7	122	-52	9
	Skagit	400	16,345	24.5	1	81	319	2
	San Juan	8	1,206	6.6	4	6	2	5
	Island	15	6,893	2.2	9	34	019	6
	Snohomish	304	67,976	4.5	6	336	-32	8
	King	629	350,984	1.8	11	1,736	-1,107	12
	Pierce	1,625	109,834	14.8	2	543	1,062	1
	Thurston	54	21,511	2.5	8	106	-52	9
	Mason	60	5,962	10.1	3	29	31	3
	Kitsap	2	29,346	0.1	12	145	-143	11
	Jefferson	20	3,275	6.1	5	16	4	4
	Clallam	21	10,530	2.0	10	52	-31	7
	Total	3,208	648,627	5.0	--	3,208	--	--

1978	County	# Dry spaces	# House- holds ¹	# Dry spaces/ 1000H's	Rank	Expected # dry spaces	# Dry spaces above or below (-) expected #	Rank
	Whatcom	718	32,446	22.1	3	210	508	1
	Skagit	379	19,714	19.2	4	127	252	5
	San Juan	100	2,881	34.7	2	19	81	7
	Island	196	12,802	15.3	6	83	113	6
	Snohomish	1,026	90,357	11.4	7	584	442	2
	King	645	410,089	2.1	11	2,652	-1,807	12
	Pierce	1,227	136,156	9.0	8	680	347	3
	Thurston	70	35,971	2.0	12	233	-163	11
	Mason	330	8,670	38.1	1	56	274	4
	Kitsap	149	44,964	3.3	10	291	-142	10
	Jefferson	90	5,094	17.7	5	33	57	8
	Clallam	140	15,809	8.9	9	102	38	9
	Total	5,270	814,953	6.5	--	5,270	--	--

¹Numbers of households in 1966 and 1978 were estimated by linear trend extrapolation of U.S. Census of Population, 1960, 1970, county population and household size statistics.

Figure 5: Wet Rental Moorage and Dry Storage Spaces: Number per Thousand Households, 1966 and 1978. Source: Table 6

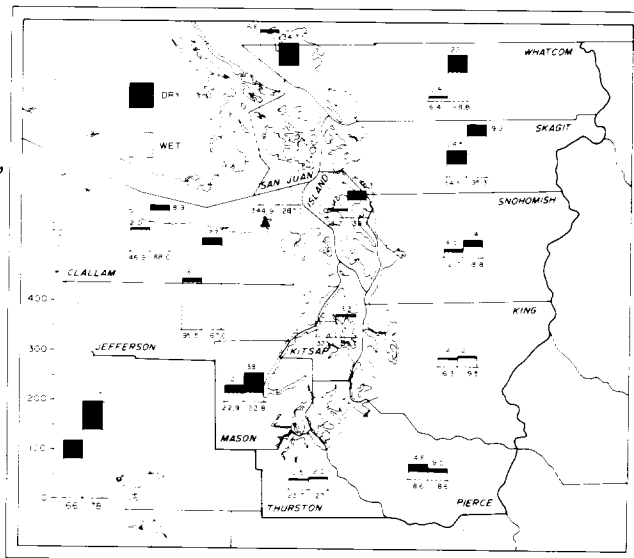


Fig. 5

Figure 6: Wet Rental Moorage: Number of Slips, by County, Above or Below the Number Expected from Regional Mean Number of Slips per Thousand Households, 1966 and 1978. Note: "Number Expected" refers only to the result of calculations performed in Table 6, and is not to be understood as a desired norm. Source: Table 6

Figure 7: Dry Rental Storage: Number of Spaces, by County, Above or Below the Number Expected from Regional Mean Number of Spaces per Thousand Households, 1966 and 1978. Note: "Number Expected" refers only to the result of calculations performed in Table 7, and is not to be understood as a desired norm. Source: Table 7

was 30.7 percent, from 4.95 to 6.47 spaces per thousand households. The range for dry spaces was from 0.1 (Kitsap) to 24.5 (Skagit) spaces per thousand households in 1966 and from 2.0 (Thurston) to 38.1 (Mason) in 1978. There are two reasons why these data are difficult to interpret: first, dry storage may be satisfying a different kind of market than wet moorage; that is, dry storage, particularly stacked dry storage adjacent to water, is largely an alternative to trailered boating. A visual inspection of one stacked dry-storage facility on Lake Union supports this contention. Secondly, it is a rather recent phenomenon responding to the difficulties encountered in construction of new or expansion of existing wet facilities, congestion at boat launch ramps, and the cost and inconvenience of transporting boats on trailers. Dry, open storage yards are often used for maintenance and repair of boats normally moored in water, or for off-season vessel lay-up. Facilities designed as real alternatives to wet moorage for nontrailerable boats are recent and rare, their economic success is as yet unproven, and their numerical significance is low.

The only significant observations to be made on the data presented are that King County, with 18 percent fewer spaces than expected, is the most poorly served by dry storage facilities and that the variation among other counties is much lower than for wet moorage.

Analysis of distribution of moorage and storage

The preceding analysis has shown that moorage and storage in the Puget Sound region is not distributed in the same manner as the region's households. There are many reasons for this:

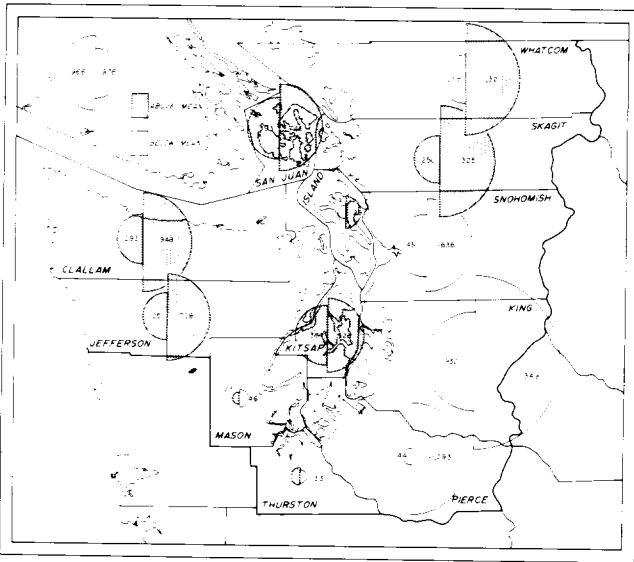


Fig. 6

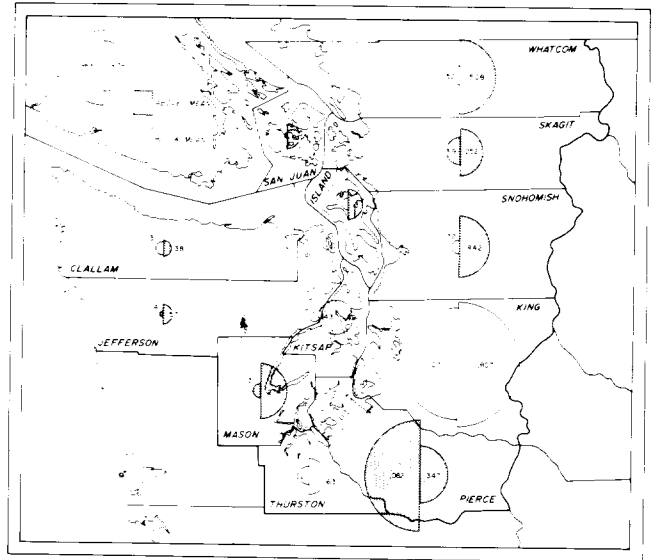


Fig. 7

First, in the private moorage sector, land costs, and therefore rates necessary to recover these costs, are higher in urbanized shorelines than in rural shorelines resulting in some deflation of demand from recreational boaters for moorage. Secondly, there may be variations in households' incomes and other demographic variables which produce variations in boat ownership among Puget Sound counties. Third, there may be differences between urban and rural households' preferences for outdoor recreation opportunities in general; boating may be favored more highly in rural areas. Fourth, certain harbors are known to be favored "gateway" harbors for cruising in the San Juan archipelago; some central Puget Sound residents, for example, favor mooring their vessels in Skagit County for this reason. Fifth, demand from Canadian boaters may account for large numbers of slips in Whatcom and San Juan counties. Finally, the most easily developable locations in urban shorelines have been either already developed for marinas, occur in areas where competing uses preclude marina development, or where environmental conservation of the remaining undeveloped shoreline is given high priority. Rural county shorelines, on the other hand, still contain sheltered sites suitable for marina development which is permitted by local shoreline regulations.

Questions concerning variations in demand for moorage and storage among Puget Sound counties will be addressed in the forthcoming Washington Sea Grant study of recreational boating in Washington's coastal zone. Problems affecting the expansion of supply of both public and private moorage and storage facilities are addressed in the next section.

Problems Affecting the Industry

Public/Private Price Disparities

As used in the study, *supply* refers to the aggregate quantity of a good (moorage) produced by sellers (marinas) at a given market price. *Demand* refers to the aggregate quantity of a good (moorage) which consumers (boaters) will purchase at a given price. All indications point to the fact that demand far exceeds supply of moorage in most of the study area at prevailing prices. Occupancy rates approach 100 percent at most marinas in Washington's coastal zone and the number of boat owners (or, in some cases, prospective boat owners) on waiting lists exceeds the number of slips in the facility. The obvious question arises: why do prices not rise to "clear" the market? That is, why are moorage operators not raising their rates to the point that the demand for their facilities falls to match their capacity? There appear to be two related sets of reasons why waiting lists for moorage persist.

First, over one-third of the moorage space in the study area is in *public* smallcraft harbors. Rates for public facilities are set by nonmarket (i.e., political) decisions. Port commissioners set policy and establish rates. As long as rates cover the costs of amortizing, maintaining, and operating the harbor facilities, the taxpayers to whom the commissioners must ultimately answer are unlikely to object, particularly where the harbor caters to a vocal, rural commercial fishing constituency. Public port authorities in most cases already own the land on which the upland portion of the facility is located; thus, land costs--a potentially large portion of amortization costs in private developments--are likely to be artificially low. Further, a large public subsidy, in the form of the Corps of Engineers' public works program, is available exclusively to the public sector. Since up to 50 percent and, in some cases, 100 percent of the cost of jetties and breakwaters is available from this federal source, the nation's taxpayers, rather than local residents, absorb this portion of facilities development costs.

Second, private marinas do not enjoy the subsidies available to public marinas, and, because they are usually smaller, they cannot gain the economies of scale available to larger public facilities. Hence, the costs of providing the same facilities are higher than in the public sector. The moorage fees charged by a private marina must ensure a profit to the operator. They must cover costs, including a fair return on investment.

Weighted average monthly rates for wet open moorage are shown in Table 8. Within Puget Sound and adjacent waters, average private, wet, open moorage in 1978 rented for over twice the corresponding public rate.¹⁸ The average public rate in the region was \$.86 per slip foot per month; the range is from a low of \$.50 to a high of \$1.51. The average private rate was \$1.77 per slip foot per month, with a range of \$1.25 to \$3.34.

The boater, then, faces a market with two prices for the same good. Naturally, he will choose the lower price if the good is available or may become available in the future. Given two identical moorages, side by side, one administered by a public port authority, the other privately owned, the boater will

	Average ¹ public (\$/slip/foot/ month)	Average ¹ private fee	Public to private ratio	Table 8. Average Monthly Fees for Wet Open Moorage, by County and Ownership, 1978.
<u>Puget Sound and Adjacent Waters</u>				
Whatcom	.75	2.07	1:2.8	
San Juan	.75	1.46	1:2.0	
Skagit	.99	1.51	1:1.5	
Island	.80	1.25	1:1.6	
Snohomish	.93	1.08	1:1.2 ²	
King	1.51	3.34	1:2.2	
Pierce	.50	1.72	1:3.4	
Thurston	N/A	1.58	—	
Mason	.69	2.06	1:3.0	
Kitsap	.96	1.27	1:1.4	
Clallam	.87	4.26 ³	1:4.9 ³	
Jefferson	.68	1.41	1:2.1	
Region average ⁴	.86	1.77	1:2.1	
<u>Coastal and Columbia River</u>				
Grays Harbor	1.12	1.15	1:1.0	
Pacific	.60	N/A	—	
Wahkiakum	.40	N/A	—	
Cowlitz	1.75	.47 ⁵	—	
Clark	.80	N/A	—	

Source: OIW (1978)

¹ Calculated thus: County Average fee/slip foot/month =

$$\frac{\sum_{i=1}^n \$s/\text{slip ft./mo.} \times \#\text{slips/facility}}{\sum_{i=1}^n \#\text{slips/facility}}$$

where n = # facilities in each county.

² Only one private-sector marina in Snohomish County provided rental fee data to the OIW study in 1978.

³ Most private moorage in Clallam County is rented by the day and available only in the summer months, hence the anomalous, high fee.

⁴ Clallam and Jefferson Counties are excluded in computing the regional average rates.

⁵ Cowlitz County private rate is anomalous.

choose the public moorage. Only when the supply of public moorage is exhausted will he rent the higher priced private slip. Further, if there is a reasonable chance that, due to turnover of boats or expansion of the public facility, a slip will become available at some time in the future, the boater will put his name on a waiting list for a public slip. The rational boater, presently moored at a private marina, will have his name on waiting lists at every public facility within reasonable distance from his home, simply because he would be better off. As long as the public/private price disparity persists, so will waiting lists, and the larger the price disparity, the longer the waiting lists will be. Demand is greater when prices are lower.

Some public port authorities require a deposit as a condition for placing a person's name on their marina waiting list. As a result, some lists have shrunk, but no systematic study of the results has been performed.

Among the names on waiting lists at public facilities are people who do not own boats. These names comprise "latent demand" for moorage, that is, people who would own a boat¹⁹ were the moorage available at a price they would be willing to pay. This price would be below the private market price.²⁰

The reasoning, so far, fails to explain the existence of waiting lists at private facilities. Since the exact market clearing price for moorage rental is not known, private marina operators will charge prices below "what the traffic will bear" in order to avert the risk of losing customers, and thus assure a steady income stream uninterrupted by seasonal market fluctuations. In this fashion, excess demand, due to lower prices, provides a cushion of safety to the private marina operator. During periods of rapid inflation, the costs of new developments are appreciably higher than was the case for older facilities, but for noneconomic reasons, operators may be reluctant to capture potential profits by raising their prices to those charged by adjacent new facilities. Where slips are leased annually, "last year's prices" may still be in effect until current leases expire. The smaller marina operator may run his business for reasons other than profit maximization; "nautical" lifestyle, friendly relations with customers, and a "reasonable" living may be more attractive criteria for running a marina than strictly entrepreneurial ones. For all these reasons, prices charged in many private moorage facilities may fall below market clearing levels, induce excess demand, and create waiting lists.

One further reason for waiting lists at private facilities arises from the mobility of the population. When a boating household moves into or within the region, it may seek a new or more convenient moorage, and for this reason may have its name on waiting lists at several marinas. These boating households comprise "relocation demand."

For those planning new moorage facilities or expansion of existing ones, reliance on waiting lists for assessing demand presents two risks. First, constructing new public moorage, priced significantly below private rates, will result in overbuilding for reasons cited above. Boaters currently moored at private facilities will vacate their slips to gain the advantage of lower prices at the public facility. Where growth in demand is strong, the excess supply may be a short-run phenomenon only; but where demand is stable, or growing slowly, slip vacancies at private facilities may persist, with serious consequences for the private sector operators.

Secondly, expansion of private moorage to satisfy apparent demand, revealed by waiting lists at public facilities, will also result in overbuilding for similar reasons: an undetermined, but potentially significant, proportion of those boaters already occupy private moorage, which they would be unlikely to vacate at new, private facility prices.

Shoreline Land Costs and Availability

Shoreline land in urban areas is under intense development pressure from many competing uses, pushing prices as high as \$12.00 per square foot for uplands and \$6.00 per square foot for submerged lands in central waterfronts.²¹ Even in undeveloped rural shorelines, prices of \$.50 to \$1.00 per square foot are commonly found. Unlike other real estate, marinas have limited flexibility in the intensity with which land may be utilized.²² Slip sizes, maneuvering space, entrance channels, and turning basins are necessary and relatively fixed area requirements in marinas, regardless of location. Land amortization costs (or leasehold fees) therefore consume a larger proportion of a facility's budget in urban than in rural areas and costs rise commensurately.

Some adjustment in marina geometry is possible to offset the higher urban land costs. For example, elongation of docks perpendicular to the shore would increase the submerged land to upland area ratio, but upland parking and haul-out requirements could quickly overcome this advantage. Where breakwaters are required, seaward expansion may be limited by bathymetry. Furthermore, waterward extension of docks is limited by the Outer Harbor Line in Harbor Areas, or the limit of tidelands or shorelands outside harbor areas. The costs saved by this strategy of increasing submerged-to-upland ratios derive from the leasing fee schedules which the Department of Natural Resources applies to state-owned submerged land. Current leases are set at 7 percent of fair market value per annum. The Department of Natural Resources is examining its appraisals of submerged lands, and sharp upward shifts in lease fees are occurring.

Financing

Both public and private moorage facilities require large initial outlays of capital, but their sources of capital are distinctly different. As discussed above, public smallcraft harbors are eligible for direct public subsidies: Corps of Engineers congressional appropriations for up to 50 percent and, in some cases, 100 percent of the costs of dredging, filling, breakwater and jetty construction; Land and Water Conservation Fund (LAWCF) monies administered through the Washington State Interagency Committee for Outdoor Recreation (IAC); Economic Development Administration (EDA) grants and other categorical program grants from state and federal sources. The balance of capital needed for constructing public port facilities is usually accrued through the sale of general obligation or revenue bonds by the Port district, backed by anticipated revenues from the facility being constructed.

The private marina developer, on the other hand, must secure loans from commercial or private financial institutions. Marinas are not considered conventional real estate by most banks²³ and, as a result, the interest rate charged and the developer's equity requirements are less favorable than for conventional short-term construction financing and long-term real estate mortgages. According to a local bank spokesman,²⁴ short-term capital interest rates as high as 22 percent (prime rate plus 2-3 points) and long-term (20-30 years) rates of 16-17 percent, limited to 50-60 percent of project costs, are all that is available for private marina developers. These loans are made by the business loan departments rather than the conventional real estate mortgage departments of banks. Such unfavorable lending rates and terms have forced many marina developers to seek private investor capital rather than commercial loans.

By contrast, tax exempt revenue bonds, even at current rates, can be sold at less than 12 percent interest for interim (18-24 months) financing and 8 1/2-9 percent for long-term financing of public smallcraft facilities.

In summary, then, private marina developers must pay almost twice the interest rate for short- and long-term financing compared to port districts, do not enjoy the same subsidies for wave protection structures, can borrow only 40-50 percent of equity in the project, and frequently must seek private investor capital. These conditions place private marina development at a considerable disadvantage *vis a vis* public smallcraft harbors.

Environmental Regulations and Permits

Washington State has no coherent environmental policy on the development or expansion of public and pri-

vate smallcraft harbors; yet the siting and sizing of these facilities are affected by the policies of numerous individual federal, state, and local agencies. First, there are the direct public subsidies of public smallcraft harbors identified above. Second, public port authorities construct and operate moorage facilities, usually financed by public indebtedness (revenue bonds). Third, local governments issue permits under their zoning and shoreline management programs. Fourth, fish, wildlife, and environmental protection agencies at state and federal levels of government issue permits or comment on permits issued by others. Finally, the Washington State Department of Natural Resources issues leases for state-owned submerged land. These multiple policies at all levels of government are often in conflict, and cast an umbra of uncertainty on marina development proposals.

A proposal to construct a smallcraft facility may receive approval by local government under its Shoreline Master Program provisions, yet be denied a federal Corps of Engineers permit because other federal (and sometimes state) reviewing agencies object. On occasion, the same state agency which "signed off" on the shoreline permit has later reversed its position when reviewing the same project for federal permit issuance.

Issuance of local, state, and federal permits is subject to appeals: to the Shorelines Hearings Board in the case of Shoreline Management Act permits, or the courts, in any case. And even if the project proponent is vindicated, litigation and delays incur costs borne by the developer, public or private.

The reasons for the uncertain fate of smallcraft harbor projects during permit review are several. First, local Shoreline Master Programs were prepared under severe time constraints and could deal with shoreline uses in only a general way. Segments of the shoreline were given "environmental designations" (Urban, Rural, Conservancy, or Natural) in which specific uses were permitted, conditionally permitted, or prohibited. Detailed attention to specific shoreline sites was not generally possible. Second, local Shoreline Master Programs, designed by professional land-use planners and citizens advisory committees, gave inadequate attention to the aquatic component of county and municipal shorelines. The nature of the marine environment, its susceptibility to impacts from man-made structures and activities, and the jurisdictional complexity of its management were all poorly understood. Third, it was virtually impossible for federal resource agencies to consult adequately on all local Master Programs, as required under the Federal Coastal Zone Management Act; there were simply insufficient staff to give programs the required attention. Fourth, detailed, fine-scaled information about the nearshore environment was unavailable, or, if available, in a form unsuitable for application to local Master Program development. Only during individual project review



does essential environmental information become available through consultants' reports, agency investigations, and citizen input at public hearings. The development proponent, in complying with state and federal environmental review requirements, produces information hitherto unavailable which influences the permit decision. Finally, federal agencies' regulations change. For example, recent proposed revisions to the Fish and Wildlife Coordination Act, which empowers the U.S. Fish and Wildlife Service to review any government action for impacts on fish and wildlife, would put more teeth into that agency's reviewing authority. The so-called "equal consideration" provision of the proposed regulations would require that nonmonetary effects of federal projects (e.g., public smallcraft harbors) receive equal consideration with monetary ones, that is, losses of fish and wildlife resources having no measurable market value must be considered equally with monetary benefits flowing from the project. Approval of these regulations would further diminish the likelihood of marina construction in areas of significant biological value such as wetlands, mudflats, or clam beds.

The federal role in marina siting is being stressed here because, contrary to popular belief, the Shoreline Management Act has done little to retard marina development in Washington State. Two years ago a study found that, of 242 permits for marinas processed by local government, only 2 were ultimately denied under the SMA.²⁵ However, many of these projects have been delayed or stopped by federal agency objections or lawsuits.

Nonetheless, the number of rental moorage slips did increase 81 percent between 1966 and 1978, while the number of households in the same period grew only 26 percent. Thus, despite permit delays, conditions, and denials, the number of slips/spaces per thousand households has increased 47 percent for wet moorage and 30 percent for dry moorage during those 12 years.



Changes in Commercial Fishing Fleets

Impacts on Smallcraft Harbors

Harbor facilities are impacted by fishing vessels in several ways: first, by changes in the composition of the fleet (length, numbers of vessels, and gear types); second, by changes in the spatial distribution of the fleet among the state's harbors; third, by the frequency and duration of the vessels' times in port (home port, transient, and temporary utilization of moorage); and finally, changes in the requirements of fishing vessels for ancillary services, such as elec-

tricity, water, ice, gear lockers, net sheds, pump-out facilities, etc. Interactions between the commercial fishing fleet and recreational boaters can be particularly troublesome also. When peak fishing vessel census and peak recreational boating visitations coincide, capacities of harbors become overstressed. For example, the number of seiners and gillnet vessels fishing the Fraser River sockeye salmon run during July and August is at least double the winter census of those vessels in North Sound and the San Juan Islands harbors. Friday Harbor, a favored temporary harbor for this fleet, experiences concurrent peak recreational boater moorage demand.²⁶ Similar peak moorage demand from charter boats and the salmon troll fleet is exacerbated by other homeport and transient recreational and commercial vessels seeking moorage at Westport and Ilwaco harbors.²⁷ Consequently, during winter months, capacity designed for peak summer moorage is unoccupied and revenue varies seasonally.

A major concern of smallcraft harbor managers, particularly in the public sector, is the impact that developing fisheries might have on their facilities. Fears are expressed concerning the adequacy of existing harbor facilities to moor and service the larger vessels entering new fisheries in the U.S. 200-mile extended jurisdiction of the northeast Pacific. In particular, the bottomfish "bonanza" believed by hopeful fishermen and port officials to be imminent, may result in a vessel construction boom comparable to that which has occurred in the Alaska king and tanner crab fleet during the last 5 years. Trawlers or multigear vessels in the over-100-foot length class tax the available space in smallcraft harbors designed for traditional fishing vessels, which rarely exceed 40 feet in length. In many cases, piers and floats are too lightly constructed to absorb the stresses imposed by moorage of larger vessels.

In the short run, these fears, or hopes, appear to be groundless, as the following analysis shows.

Salmon Fishery

Moorage requirements by smaller fishing vessels will be determined primarily by trends in the salmon fishery. In the past, salmon prices rising faster than general inflation has caused large increases in the number of vessels, even though the salmon fishery was severely over-capitalized. It is unlikely that this trend will continue, at least for the near-term. During 1979, many processors were left with unsold inventories. In Bristol Bay, some salmon could not be processed quickly enough, due to a shortage in processing facilities. The result was wastage of fish and, in some cases, delivery of inferior products. This has made buyers skeptical of Pacific coast salmon. One result may be that it will be difficult to sell the larger Alaska run expected in 1980. As Alaska salmon dominates the entire market for canned and frozen salmon, these trends in the Alaska market will be directly reflected in the Washington

and Oregon salmon Fisheries. Furthermore, Washington, Alaska, and most recently Oregon, have passed moratoria on new salmon licenses, making it unlikely that improved economic conditions in the future will increase the number of vessels.

The single most important long-term influence on the number and type of salmon vessels, and hence on moorage requirements, will be the manner in which the Indian fishing rights issue is finally resolved, specifically the measures chosen to mitigate the impact on non-Indian salmon fishermen. If resource enhancement is the primary method chosen, then the Washington salmon fleet may remain at or near its present size. However, to the extent that government "buy-back" of vessels is relied upon, the non-Indian fleet will decline in numbers. For the most part, this would result in a net decline in number of salmon vessels moored at traditional locations, in some cases releasing moorage slips for recreational vessels. Growth in the Indian fisheries will, if the past is any guide, consist of smaller vessels operating out of tribal harbors. Also, a significant share of the Indian harvest may be taken by set nets operated from land or small skiffs.

Thus, for both large and small vessels, it appears unlikely that there will be significant increases in fisheries-related moorage demand in the near-term resulting from expansion of traditional salmon fisheries in the northeast Pacific.

Other Traditional Fisheries

The mainstays of the Pacific Northwest and Alaskan fishing industries other than salmon have been shellfish and bottomfish, including halibut. Recently, species such as herring and sablefish have also become important. Because Pacific Northwest and Alaskan fisheries are so closely interrelated, in many cases consisting of the same vessels, any analysis of fisheries-related moorage requirements in Washington must consider both regions.

The immediate future in the market is not very bright for the traditional U.S. fisheries in the northeast Pacific. During 1979, there was a sharp break in the price of Alaska king crab, from about \$1.40 per pound at the beginning of the season to \$1 per pound at the end. This price decline was a major factor in the almost complete cessation of larger (100'+) crab boat construction in Washington shipyards. The traditional Pacific coast trawl fishery for bottomfish is also having market troubles. Processors have put bottomfish trawlers on limits recently, due to an inability to sell their products in west coast fresh-fish markets. In part, this is due to increased imports of Canadian fish and in part due to an influx of new trawlers. Regardless of the cause, the effect is to reduce the profitability of the fresh fish trawl fishery, to retard its further development, and to discourage the near-term construction of large vessels. Hence, in the

short run, no significant new demands will be placed on smallcraft harbors by these other traditional fisheries.

Developing Fisheries

In the longer term, however, a U.S. bottomfish/ trawl fishery will eventually develop to serve a frozen whitefish market. However, prices of frozen whitefish blocks and fillets will have to rise significantly before it will be financially feasible to build significant numbers of new vessels for this purpose. The few operations that have begun have all exploited the economic advantage of using existing vessels and plants. Even with this cost advantage, they are having difficulties. The only major exceptions are the Soviet and Korean joint ventures that buy whole fish from U.S. trawlers.

When the U.S. offshore bottom fishery develops, it will include a significant catcher-processor sector which will produce frozen products at sea. The vessels in this fishery will be large, ranging from 160 feet (the largest of the current generation of crabbers) to 300 feet. These vessels will produce frozen fillets and fillet blocks for U.S. or European markets, or frozen surimi for the Japanese market. They may also produce semi-finished products. For example, headed and gutted groundfish might be frozen at shore plants. Headed and gutted fish may also be salted or dried ashore for consumption in southern Europe or developing countries.

This offshore fishery will concentrate on the sources that are different from those delivered to existing communities and shoreside plants, principally in the Aleutian chain and Bering Sea. It will also concentrate on those species that deteriorate rapidly when held in the round, particularly Alaska pollock and Pacific hake. Generally, because of the lack of support facilities in Alaska, this fishery (like the king and tanner crab fleet), will be based in Seattle.²⁸ From the standpoint of moorage requirements for larger vessels (100'+), the following can be said:

1. In the near term, there are not likely to be significant new requirements for the moorage of such vessels. Nor are there likely to be significant shifts in the fishing patterns (hence moorage demand) of the existing fleet.
2. In the longer term, when and if frozen groundfish prices rise significantly, Seattle will most likely be the home port for several 160-300 foot U.S. flag factory trawlers. These vessels will operate principally in Alaskan waters, but may also trawl off the Pacific coast. Their moorage requirements will be concentrated in Washington, but will be rather limited, as they will make deliveries of frozen products only every 30 to 50 days. Further, they will be at sea nearly year-round.

Remedies to Problems Affecting the Industry

Public/Private Price Disparities

As long as waiting lists at public facilities are perceived as evidence of unsatisfied demand for moorage, then the public/private disparities evident in the study area will remain a problem for those planning new or expanded facilities. If they are (correctly) perceived as evidence of an "artificial" stimulation of demand for a particular kind of good offered at prices below the private market clearing price, they can be dismissed in the calculation of "real" demand for private moorage. Waiting lists at private facilities may be more reliable indicators of demand, but in counties where public port authorities are the predominant supplier of wet moorage, reliance upon waiting lists at private facilities for assessing unsatisfied demand might understate its magnitude.

Were the public smallcraft harbor facilities priced on par with comparable (in quality and location) private facilities, waiting lists of the former should shrink back to reveal "real" unmet demand. Ports would accrue higher revenues, some of which could be allocated to a capital improvement fund and the rest redistributed to local taxpayers in the form of amortizing general obligation bonds for other port improvements or reducing the ports' dependence on general tax levies.

Attempts to raise public moorage rates to equal private-sector rates would raise considerable opposition from tenants, both pleasure boat and commercial vessel owners. A uniform system for computing public smallcraft harbor moorage rates to ensure cost recovery was adopted at the Spring, 1980 meeting of the Washington Public Ports Association. This system will not cause rates at public moorages to become uniform, however; variations in age, lay-out, and costs among public smallcraft harbors preclude such uniformity.

While public/private price disparities exist, the fears of the private-sector moorage industry will remain. The private marina operator is, to some extent, at the mercy of public port authorities. Any massive new construction or expansion of public moorage may cause a relocation of boats from private marinas, with potentially disastrous economic consequences for the private operators. Industry spokespersons allege this occurred in Lake Union when Shilshole Marina first opened in 1960.

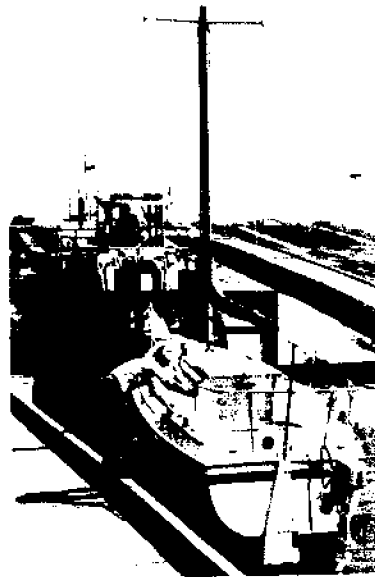
Alternatives to Wet Moorage

Large numbers of trailerable smallcraft occupy wet moorage which could be released for larger vessels re-



quiring such space. Dry open or dry stacked (multi-story) storage adjacent to waterways could relieve this inefficient use of wet facilities. Public port authorities could adopt an explicit policy of restricting wet moorage to craft requiring it, perhaps by expanding existing dry storage facilities to absorb the displaced craft. Boat manufacturing industry spokespersons allege that, as the Detroit fleet of automobiles shrinks in horsepower and weight to meet federal guidelines, the pulling power of a typical family automobile will fall below that necessary to trailer larger (20-26') boats.²⁹ Consequently, the demand for moorage and storage for these boats at sites adjacent to water can be expected to increase significantly.

New technologies in handling vessels on dry land, as exemplified by a new facility located between Everett and Marysville,³⁰ offer alternatives to wet moorage for nontrailerable vessels. Smallcraft stored on a flat upland lot at this facility are launched by large, tractor-like fork lifts. Problems associated with handling larger vessels, the potential for structural or cosmetic damage, as well as the economic efficiency of this type of facility, need careful monitoring by the industry. Dry upland storage appears to be an attractive alternative to wet moorage for some non-trailerable boat owners, however, and the environmental risks and impacts of such facilities are significantly less than wet facilities. The U.S. Fish and Wildlife Service, commenting on the one extant example mentioned above, said: "The proposal is a less environmentally damaging solution to the enormous recreational boating demand in Puget Sound than many we have received."³¹



Financing Innovations

Condominium Moorage

Private moorages historically have been developed for the rental market: a boat owner leases a slip for a fixed monthly rental fee for a specific period of time. The moorage owner/operator arranges leases, collects fees, and attempts to remain at 100 percent occupancy. A new trend is becoming established where slips are sold on a condominium basis to boat owners or investors. The advantages of this arrangement are two-fold. First, the present value of the slip is immediately capitalized, relieving the developer of long-term financing obligations. Because of federal tax law, a moorage slip is an attractive investment: it can be depreciated faster than real estate, over 12 years, vs. 20-25 years. Further, the investor is eligible for an Investment Tax Credit. Depending upon the tax bracket in which the investor finds himself, a return on investment as high as 57 percent is possible, despite a "paper" negative cash flow (monthly moorage income receipts minus monthly expenses).³² Second, because it becomes the responsibility of the individual slip owner rather than the operator to maintain occupancy of his slip, administrative costs

are reduced. Unsold slips, of course, may be leased in the conventional manner.

Low-Interest Loan Programs

While they provide over one-half of the moorage slips in Puget Sound and adjacent waters, private marina developers are at a disadvantage in securing capital financing compared to public port authorities. This problem also exists in California, and is being partially resolved by an innovative financing process. This process could possibly serve as a model for the Puget Sound region.

The California moorage industry successfully lobbied the California Assembly for a special loan program. Assembly Bill AB1284 provides for a state Recreational Marina Revolving Account from which low-interest, subordinated loans may be made for private marina construction. One million dollars would be appropriated for loans, which could be used as leverage to secure other federal government loans, for example, from the Small Business Administration (SBA). Existing marina facilities expansion and improvement needs are given first priority in the legislation. Limits on moorage fees, to be established through regulation, will be imposed on marinas benefiting from the state's loan program. Interest rates, too, will be established through regulation. The source of the loan fund appropriation is the Harbors and Watercraft Revolving Fund, administered by the California Department of Boating and Waterways.³³ Until passage of AB1284, these monies could be used only for public smallcraft facilities construction loans. The SBA has reviewed the program, pronounced it workable, and sees it as a prototype for other states and industries.

Loans to private marina operators from the state Recreational Marina Revolving Account will help remove the competitive disadvantage faced by private marina developers in securing financing for upgraded or new boating facilities, but the appropriation seems small for the task at hand. The industry should monitor the effectiveness of the California program to determine the applicability of comparable legislation in Washington State. Forthcoming regulations governing ceiling prices for moorage at facilities constructed using these subordinated state loans should be assessed for any adverse impact on profitability. Suppressed moorage rates, which would retard capital formation, could tarnish the industry's fiscal reputation and reduce its ability to secure conventional loans. High prices signal short supply and increased profitability, and encourage competitors to enter the market; low prices stimulate demand, retard capital formation, and inhibit competition. The private moorage industry is no exception in its response to the inexorable laws of microeconomics.

Public/Private Joint Ventures

A growing trend in marina development is the public/private joint venture. Public port authorities

use their bonding capacity and local governmental status to sell revenue bonds and secure Corps of Engineers public works appropriations for harbor infrastructure development--breakwater, jetties, shore protection, etc. The construction, operation, and maintenance of docks, piers, gas, and grocery retail outlets, etc., is handed over to the private sector on the basis of competitive bidding. In this fashion, the advantages of being a public harbor and of being profit-motivated are combined. Local public indebtedness is minimized, while eligibility for federal construction funds is maintained.

Environmental Regulation

It is unlikely that any major changes will be made in the near future to existing permit procedures for new moorage projects. Nor is it likely that the number of permits required will be reduced; environmental regulations are here to stay. In spite of favorable treatment of marinas under the Shoreline Management Act (SMA), projects still become bogged down during federal permit review. No statutory authority exists for local or state government to compel a federal agency to issue a permit against its own mandate, and virtually all marina projects require Corps of Engineers' permits.

Prudent marina developers, public or private, will ensure, therefore, that "front-end" engineering design costs are minimized by seeking informal review of their proposals prior to making application for permits. Such reviews by permit staff in local, state, and federal agencies are readily available and may be arranged without the use of a consulting firm (see Northwest Marine Trade Association, *Marina Development Handbook*, forthcoming). Problem areas, such as sensitive environments, important fish and wildlife resources, and poor ambient water quality, can be identified early, permitting revisions of initial design concepts to be made before expensive engineering work has begun.

State Policies Affecting Marinas

Several efforts are underway to rationalize state policies affecting smallcraft harbor development. The Department of Ecology, under the aegis of its Coastal Zone Management Program, is examining shoreline management policy affecting aquatic uses in the state's coastal zone; the Department of Natural Resources is revising its marine lands management policies for leases issued for uses of submerged lands; and the Washington State Department of Fisheries, following two years of studying the effects of marinas on commercially important fish and shellfish, is expected to issue revised guidelines for marinas.

Policies of the two state agencies most influential in managing the state's shorelines favor marina development sited in or close to urban areas. The De-

partment of Ecology's (DOE) *Final Guidelines* to the SMA place priority on construction of marinas in areas close to heavy demand (i.e., urban areas). The Department of Natural Resources' (DNR) leasing policies for state-owned submerged lands permit marinas to use Harbor Areas and First Class Tidelands, again reinforcing urban location of marinas. The author's analysis of geographical distribution of supply and changes in the supply of moorage would lead to agreement with the policies of these two agencies: urban-area boaters are underserved by present facilities to a far greater extent than are rural boaters.

Concerns for fuel conservation and social equity expressed in the 1979 State-wide Comprehensive Outdoor Recreation Plan (SCORP) led the Interagency Committee for Outdoor Recreation (IAC) toward policies and actions favoring the development of recreational facilities close to urban areas. Funds distributed by the IAC, however, are restricted in their use to public facilities construction and are unavailable for private ventures.

While state SMA guidelines and DNR leasing policies influence marina siting decisions, the planning responsibility falls on the local governments through their Shoreline Master Programs (SMP's).³⁴ Research has shown that local governments' interpretation of SMA guidelines has been liberal and that great variation exists among local cities' and counties' treatments of marinas in their SMP's.

A similar problem has arisen in siting aquaculture developments, threatening the viability of aquacultural enterprises, particularly the mechanical harvesting of certain clam species. As a result, a concerted effort is underway by DOE and DNR, with federal agencies and local government participating, to revise the SMA *Final Guidelines* dealing with aquaculture. If approved, the revisions would require local governments to amend their SMP's to conform to these changes in state policy.

A similar in-depth reassessment of the *Final Guidelines* for marinas warrants careful attention. Ideally, data on present and projected unmet demand for moorage facilities would be used to estimate the number and size of facilities needed in specific geographical regions, say counties. This information, together with more comprehensive SMA *Final Guidelines*, would be used by local governments to allocate sufficient shoreline area in their jurisdiction for new or expanded moorage facilities, tailored to accommodate a mix of vessel types and sizes, in the least environmentally damaging manner. Upland dry storage yards and stacked dry storage adjacent to waterways would be encouraged in order to relieve the pressure on wet moorage facilities.

Such state/local collaborative planning for marinas would be much aided by the results of the current Corps of Engineers' studies described below. In fact, if the Corps' findings are to be implemented success-

fully, local government action would become necessary: proposals to develop marinas in sites identified by the Corps would require compliance with local SMP's.

Federal Policies Affecting Marinas

At the federal level, the U.S. Army Corps of Engineers, Seattle District, is conducting a boating facilities study for Puget Sound and adjacent waters. The Corps' study is designed to evaluate a large number of sites for smallcraft harbor development, and to perform an environmental assessment on each site, during which the views of local, state, and federal permit-reviewing agencies will be sought. The corps feels that this identification of suitable sites will remove much of the uncertainty confronting public smallcraft construction projects.

Because the Corps issues two critical permits for construction in navigable waters and wetlands (Section 10 Rivers and Harbors Act 1899; Section 404 Clean Water Act, 1972 as amended) and is responsible for coordinating the comments of other federal and state reviewing agencies, it is in a unique position to initiate advanced long-range planning for development.

However, the Corps' study and actions will affect *only* public smallcraft harbor siting; private marina developers are unlikely to gain an increase in certainty of approval for their projects through the Corps' findings, unless, of course, a predesignated site was not developed by a public port authority and was available for private venture. The Corps' process would not waive the requirement for compliance with State and National Environmental Policy Acts (SEPA, NEPA); environmental assessments or full impact statements would still be required of the developer, public or private. Detailed site-specific environmental information could, conceivably, reveal unanticipated adverse impacts leading to permit denial or delay. Nevertheless, the Corps' boating facility study for Puget Sound and adjacent waters is the most promising of any agency action addressing the moorage problem to date.

New NEPA regulations (August 1979) may reduce the fragmented process of federal agencies reviewing marina proposals by requiring an early scoping session to be sure all issues of importance to government agencies are included in environmental assessment.³⁵ Such scoping should reduce interagency conflicts and last-minute objections. Ironically, both federal and state agency permit reviewing personnel have been doing just that in Washington State for over two years. Labeled the Muskoxen Club, agency personnel meet informally to provide early scoping of developers' proposals *before* formal permit approval is sought.³⁶

Capital financing for public marinas is tied closely to the Corps of Engineers' recommendations.

Further, federal outdoor recreation funds, disbursed through the IAC, are influenced by identification of needs in the current edition of the state SCORP. This document treats boating facilities in a very general way and does not identify at fine geographic scale the unmet need for marinas. Nonetheless, the SCORP was assembled from the most recent and comprehensive household survey on outdoor recreation and its findings with respect to boating facilities appear consistent with the supply analysis reported above. The Corps' study, based in part on a more recent household survey of recreational boaters, would complement the SCORP findings and could influence the disbursement of outdoor recreation capital improvement funds (e.g., Land and Water Conservation Fund).

In conclusion, then, the means are available for establishing a more coherent set of state and federal policies on marina development, for implementing those policies through existing programs and, at least in the public sector, for tying capital improvement funds to areas of high need.

Recommendations

Moorage Supply Data Management

Accurate, current records of the stock of moorage in Washington's coastal zone should be maintained. The Seattle District, U.S. Army Corps of Engineers Permit Section currently processes permits and verifies construction of facilities consistent with approved permits. The Navigation and Coastal Planning Section conducts feasibility studies of new federal harbor projects. The District Engineer should explore the possibility of creating, maintaining, and annually updating a computer file containing the following information on the stock of moorage:

- o Facility name
- o Location (zip code, county)
- o Ownership (public, private)
- o Number of wet, enclosed slips
- o Number of wet, covered slips
- o Number of wet, open slips
- o Number of dry, covered slips
- o Number of dry, open slips

This information, aggregated to the county level, should be made available to the public. More detailed information should be made available under controlled circumstances to public agencies and academic researchers in a manner consistent with state and federal public disclosure and freedom of information statutes.

If new and expanded moorage facilities, particularly public smallcraft harbors, are to be planned

effectively, then current, accurate information on the existing stock of moorage is essential. Between 1966 and 1978 no systematic monitoring of current stocks of moorage was undertaken. Private consulting organizations maintain their own estimates, but this information is both privileged and not easily verifiable.

Refining State Policy on Marinas

The Washington State Department of Ecology should review and refine its Final Guidelines to the Shoreline Management Act for marinas. To the extent possible, these provisions should embrace criteria used by other state and federal agencies reviewing Shoreline Substantial Development and Corps of Engineers permits for marina construction.

Inconsistent treatment of marinas under local governments' Shoreline Master Programs can, in part, be attributed to inadequately specific state guidelines. A similar effort to refine the final guidelines for aquaculture is underway in the Department of Ecology.

Policies to Ameliorate Regional Shortfalls in Wet Moorage

Local governments' Shoreline Master Programs and the policies of other public agencies reviewing marina development proposals should recognize the potential role for dry storage facilities where significant numbers of wet slips within the marina's service area are occupied by trailerable boats.

Public marinas should consider reserving wet moorage space for vessels which cannot conveniently and safely be stored in dry storage facilities. Both public and private marina developers should consider expanding dry storage capacity as an alternative to new wet moorage construction.

Fewer suitable undeveloped sites will become available for smallcraft harbor development. New technologies are extending the size of vessels capable of being stored on dry land and a larger number of currently trailered boats will seek storage at shoreside facilities in the future.

A Role for the Washington Public Ports Association

The WPPA's Marina and Cooperative Development Committees should play active roles in assisting public agencies direct public smallcraft harbor construction funds to the areas of shortest supply identified in this report, and the areas of highest demand substantiated in later reports.

Fiscal tightening at the federal level is likely to affect the level of appropriations for public smallcraft harbors. The Corps of Engineers will soon have identified sites suitable for smallcraft harbor development where the shortfalls in supply are greatest. Local sponsorship by public port authorities will be required before planning and construction can occur. The WPPA's Cooperative Development Committee, in cooperation with the Marina Committee, could provide lead-

ership in ensuring that public appropriations are used in the most efficient and equitable manner possible.

Public Moorage Rates

Public port authorities and other public bodies that develop and operate moorage facilities should charge rates to cover, at a minimum, a fair return on locally managed capital investment in their facilities.

Less than total cost recovery on publicly funded marinas results in a transfer of wealth from average taxpayers to boating households. Since owners of larger, nontrailerable boats have incomes usually much higher (\$25-30,000³⁷) than the median household income (\$15,000³⁸) in the ports' taxing district, the resulting transfer of wealth would seem inequitable.

Phased Expansion of Public Smallcraft Harbors

Where the size of a new public facility adds significantly to the total stock of moorage within its service area, consideration should be given to phased construction and occupancy of slips in order to minimize adverse impacts on private marina facilities.

Almost 60% of moorage and storage space in the study area is provided by the private-sector marina industry. Compared to public port authorities this industry is at a disadvantage in securing adequate capital financing. Major new or expanded moorage facilities, offered at subsidized rates, can and have had serious economic consequences for private facilities nearby.

Bank Financing for Private Marinas

Banks and other commercial lending institutions should explore "package" financing for marinas, treating the whole facility as a real property eligible for more favorable interest rates.

Banks currently view marinas as a combination of a business, real property, and capital equipment. As a result, acquisition of loans is complicated, interest rates are higher, and equity requirements are more stringent than for conventional real estate loans. The developer is thus forced into private venture capital markets.

Analysis of Waiting Lists for Moorage

The WPPA Marina Committee should conduct a systematic study of waiting lists for public moorage. At a minimum, this analysis should include:

- o *Geographic distribution of prospective tenants*
- o *Proportion of prospective tenants owning boats*
- o *Power/sail, length class distribution of boats*
- o *Proportion of boat-owning prospective tenants currently occupying wet moorage*
- o *Proportion currently occupying dry storage*
- o *Proportion currently trailering their boats*
- o *Number of other waiting lists on which prospective tenants have their names*

Waiting lists would be a more reliable measure of unfilled demand if more were known about duplication of names on lists, boat-ownership patterns, and geographic distribution of prospective tenants.

Changes in Recreational Boating Behavior Survey

A telephone survey of boat-owning and non-boat-owning households should be undertaken to determine the causes and kinds of changes in the ownership and use of recreational smallcraft, including:

- o *Effects of fuel price inflation on frequency, duration, and location of boat use*
- o *Effects of reduction in pulling power of the private automobile fleet*
- o *Market trends in boat purchases--length, propulsion, hull materials, horsepower, engine type*

While industry spokespersons assert boating behavior and ownership is changing, no quantitative assessment of these changes has been undertaken in this state. Planning new moorage, storage, and launching facilities to cope with these changes requires better information.

Glossary

Dry storage space

A space at a moorage facility, on dry land, or on a platform over water, assigned to store a single boat. This may be on open ground, in covered sheds, or in a special facility designed to stack boats vertically.

Marina

Same as a moorage facility.

Moorage facility

A waterfront facility operated by either a public agency such as a city or public port authority, or by a private-for-profit business, or by a private yacht club, at which wet moorage or dry storage is leased, rented or owned (condominium style) by recreational or commercial smallcraft owners. Private, single docks owned by shoreline residents are excluded.

Smallercraft harbor

A moorage facility operated by a public agency for smallercraft of any type.

Wet moorage slip

A pier, float or shed at a moorage facility designed to moor afloat a single boat. This may be open to weather, covered by a roof, or entirely enclosed. Linear, non-slip moorage is excluded. (In 1978 approximately 15,000 feet of non-slip linear moorage was assigned for permanent wet moorage rental, the equivalent of 500, 30-foot slips in Washington's coastal waters).

Appendix A

Computation of Impacts of a New Marina on State and Local County Economies

Suppose a new marina is to be located in a Type II county (see Figure 1) and has estimated annual revenues of \$150,000. Problem: compute the statewide and county impacts of the marina.

Compute direct and indirect statewide impacts:

The output, income and employment multipliers statewide, for Marinas/Moorage are 1.29, .96 and 57.7 (per \$1 million final demand) respectively.

$$\text{\$150,000 final demand} \times 1.29 = \text{\$193,500 statewide output (sales)}$$

$$\text{\$150,000 final demand} \times .96 = \text{\$144,000 statewide income}$$

$$\text{\$150,000 final demand} \times \frac{57.7}{1,000,000} = 8.66 \text{ jobs statewide}$$

Compute direct and indirect county impacts:

The output, income and employment multipliers, for a Type II county are 1.03, .78 and 42.2 (per \$1 million final demand), respectively.

$$\text{\$150,000} \times 1.03 = \text{\$154,400 county output}$$

$$\text{\$150,000} \times .78 = \text{\$117,000 county income}$$

$$\text{\$150,000} \times 42.2/1,000,000 = 6.63 \text{ jobs in county}$$

Notes:

1. County and statewide sales, income and employment figures computed above cannot be summed: the statewide figures include county figures.

2. The multipliers used above, from Table 3, should be used cautiously. They are specific to the year data were gathered, 1977. Shifts in prices, wages and productivity, as well as changes in the structure of state and local economies will cause these multipliers to change through time. They are also based on statewide estimates of industry sales and purchases and may not accurately represent a particular establishments' sales and purchases.

Appendix B

Economic Analysis of Waiting Lists at Public and Private Moorages

The boat owner who wishes to lease wet moorage in the State of Washington soon discovers that he cannot do so immediately by simply paying the going price. More commonly he must enter one or more waiting lists until a slip becomes available. This may take months, or, at some of the more popular locations, even years. The delay and inconvenience of waiting is a direct welfare loss to marine recreationists, as well as a negative influence on the demand for boats and boat-related goods and services. Because the causes and consequences of moorage waiting lists are so important to the recreational industry generally, and to the overall purpose of this paper, the following brief theoretical analysis of the moorage market and the waiting list is provided. Hopefully this brief analysis will aid in the interpretation of data and the discussion of issues elsewhere in the report.

The main point of this economic analysis is that extensive waiting lists are an entirely predictable consequence of the way that moorage is supplied and priced. Specifically, it is due in large part to the existence of public and private supply sectors, each with its own motives and pricing practices.

The public moorage sector supplies a quantity of moorage determined primarily by public policy, rather than profit considerations. The prices it charges cover the costs of the moorage, less a variety of subsidies implicit in supply by a public agency. The private, profit-oriented moorage sector, on the other hand, supplies that quantity of moorage which maximizes profits at market clearing price. The interaction of these two supply sectors is illustrated in Figure 8. The public sector supplies a quantity Q_1 at Price P_1 , both of which are independently determined by public policy. Private moorage operators provide a range of quantities which are related to price by the profit maximizing rule, and will produce until the market price equals marginal costs. Given the demand for moorage and the available public moorage, the market will clear at price P_2 , and quantity $Q_1 + Q_2$, that is, at a price which elicits enough profit motivated private moorage to make up the difference between demand at that price and the fixed quantity of public moorage.

Who will be on waiting lists for public moorage? Note that consumers observe two prices in the moorage

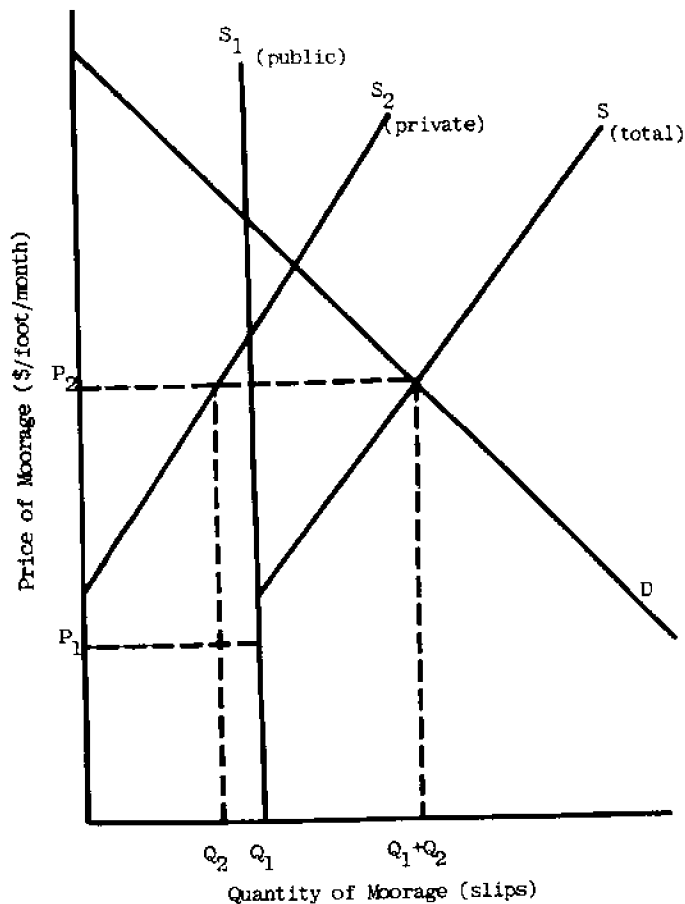


Figure 8. The market for public and private moorage.

market: P_2 for private moorage and P_1 for those able to secure public moorage. Current users of private moorage will put themselves on the waiting lists for public moorage in order to reduce the moorage rates they pay from P_2 to P_1 , provided location and other factors do not offset this cost saving. Others who prefer to store their boats on land, rather than pay P_2 may nevertheless get on waiting lists for public moorage if the lower prices makes it a preferred alternative to land storage. Those who will not buy a boat at all will also put themselves on the waiting list if they must pay P_2 . Finally, people who park boats in their driveways or who do not own a boat at all, but would like to, may go on public moorage waiting lists. They will buy their boat, or trade up to a larger one, only if they can get public moorage at the lower price, P_1 .

Even if the market cleared at P_2 , where total supply equals total demand, there would still be waiting lists. Depending upon the positions and elasticities of the relevant supply and demand curves, the number of people on the waiting lists could be any

fraction or multiple of the moorage slips available, even in what might be regarded as an equilibrium moorage market.

Although waiting times for private moorage are substantially less than for public moorages they still exist, a fact which can be explained by different economic factors. Businessmen often prefer to keep their prices below the exact market clearing price, which in the real world, they seldom know with precision. This strategy insures them a relatively constant income stream, independent from day-to-day or seasonal fluctuations in demand. Also, it permits them to choose customers that are easier, and hence less costly to deal with.

A policy implication of this model is that the efficiency, benefits and costs, or regional economic impact of adding to the supply of moorage will have to take into account the shifting of boats between public and private moorage and changes in the welfare costs of delay and waiting--factors that are not usually recognized in public discussions of the issues.

Endnotes

¹Washington Public Ports Association, Marina Committee, personal communication with membership.

²To be reported in a forthcoming Washington Sea Grant Program study of recreational boating in Washington's coastal zone.

³Puget Sound, including lakes Washington and Union; Strait of Juan de Fuca; ocean coast; and Columbia River, downstream of Bonneville Dam. See *Glossary* for definitions of moorage and storage.

⁴The CDC was organized by the public port industry when the Washington State legislature proposed to reorganize public ports under one state-wide authority. The legislature wanted to avert duplication and overbuilding of port infrastructure. Marine proposals are voluntarily submitted to CDC for review. This industry self-policing system has been used frequently.

⁵Ellis, Roy C., William B. Beyers, Robert L. Stokes, and Darrell D. Brown. *Economics of Marine Recreation in Washington State--1977*. Coastal Resources Program, University of Washington, 1979.

⁶Ellis et al. 1979, p. 27-28.

⁷Ellis et al. 1979, pp. 39 and 41.

⁸In all likelihood this "lost income" is spent in another sector of the economy, perhaps on other outdoor recreation equipment; however, if imported products are substituted for boats and equipment manufacturing in Washington State, state income is lost.

⁹Washington Sea Grant 1979 Boating Household Survey, unpublished data.

¹⁰The output multiplier for boat and trailer manufacturing is 1.15.

¹¹See footnote 10.

¹²Comparable 1966 data for Washington's ocean coasts and Columbia River are unavailable.

¹³"Pleasure Boating Study." In Puget Sound Task Force, Pacific Northwest River Basins Commission, *Comprehensive Study of Water and Related Land Resources, Puget Sound and Adjacent Waters, State of Washington, Appendix VIII, Navigation*. Vancouver, WA, 1970.

¹⁴These estimates, taken from the OIW report, have been refined and updated by the Seattle District U.S. Army Corps of Engineers and will be reported in their forthcoming "Boating Facilities Study Update."

¹⁵Missing yacht club data in Pierce County accounts for part of this "lost" dry moorage.

¹⁶Symonds, Philip J. *Equity and Efficiency in State Coastal Resource Management: An Application to Urban Recreational Boating Policy*. Center for Public Affairs, University of Southern California, 1975.

¹⁷Ciccetti, Charles J. *The Demand and Supply of Outdoor Recreation*. U.S. Bureau of Outdoor Recreation, Contract #7-07-04, June, 1969.

¹⁸Snohomish with a public/private rate ratio of 1:1.2 and Clallam with 1:4.9 are excluded for reasons cited in Table 8 footnotes.

¹⁹There may be speculators in this group: those who would immediately sublet their slip at a price close to the market price, pocketing the difference between this and the public rate.

²⁰For a formal, theoretical analysis of the waiting list phenomenon, see Appendix B.

²¹Appraised value for Roanoke Reef, Lake Union (Management and Planning Services, April 1979).

²²Exceptions, of course, are dry stacked boat storage facilities which have up to a 20:1 space advantage over wet slips (Filak, Andrew, Marina Associates, Redondo Beach, CA. "Let's Make Marinas Cost Effective," in *Proceedings, Second National Boating Facilities Conference*, Berkeley, CA, October 1979).

²³A People's Bank loan officer drew an analogy between a marina and tennis club: neither are adaptable to other uses as are conventional building structures; furthermore, marinas deteriorate quickly if not well maintained and therefore provide limited long-term loan collateral.

²⁴Douglas H. Petersen, Economic Analyst, Rainier National Bank.

²⁵Goodwin, Robert F. "Marinas Under the SMA." In: *Moorage Workshop Proceedings*. Northwest Marine Trade Association, 1977.

²⁶Oceanographic Institute of Washington. *Survey of Marine Boat Launching and Moorage Facilities in Washington*. Seattle, WA, 1978, pp. 5-49 and 5-67.

²⁷Ibid, pp. 5-51, and 5-69; and personal communication with Mr. Carl Wallin, Director, Port Trade and Development, Port of Grays Harbor.

²⁸The Port of Seattle is conducting a \$350,000 study to assess the impact of extended jurisdiction on fishing fleets using the port's smallcraft facilities.

²⁹Filak, Andrew, Marina Associates, Redondo Beach, CA. "Let's Make Marinas Cost Effective." in *Proceedings, Second Annual Boating Facilities Conference*, Berkeley, CA, 1979.

³⁰"Dagmar's Landing."

³¹Snohomish County Planning Department, *Final Environmental Impact Statement for a Dryland Marina Storage Facility*, Everett, WA, 1977.

³²Hester, Mel, Duwamish Marina Inc. Address to the Northwest Marine Trade Association, Seattle, WA, November 27, 1979.

³³*Marina and Recreation Association News for the Marina Operator*, Vol. 8, No. 11, December 1979.

³⁴Goodwin, 1977, op. cit.

³⁵Hershman, Marc. "Jurisdictional Conflict in the Coastal Zone." Washington Public Policy Notes, Vol. 7, No. 4, 1979, Institute of Governmental Research, University of Washington, Seattle, WA.

³⁶For a comprehensive source on marina development permit procedures and strategies, see: Northwest Marine Trade Association, *Marina Development Handbook* (in press).

³⁷ Unpublished data, boating household survey.
Washington Sea Grant, University of Washington, 1979.

³⁸ Washington State Office of Program Planning and
Fiscal Management, personal communication, 1978 data.

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