Economic Impact of the Rhode Island Boating Industry

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Contents·

Preface

In this study of the Rhode Island boating industry. 132 firms have been interviewed by mail in order to estimate the economic impact of the industry on the state. "Boating industry" is here defined as the collection of Rhode Island firms that build and service pleasure boats primarily. plus as many firms as could be identified that supply products or services specific to recreational boats.

The work was undertaken at the request of the Rhode Island Marine Trade Association and funded by the University of Rhode Island Sea Grant College Program. the Rhode Island Agricultural Experiment Station. and the Rhode Island Marine Trade Association.

The authors wish to thank the people from the boating industry who participated and willingly supplied data. and Mr. John Nahigian. President. and Mr. Jock West. Executive Director. Rhode Island Marine Trade Association. for their support and cooperation. Thanks also to Dr. Thomas Weaver for helpful comments on the manuscript.

Summary

A study of 132 Rhode Island firms that together make up the state's boating industry shows considerable impact on the Rhode Island economy in two important ways. First, the industry is a net exporter of goods and services and as such channels money into the state's economy. Second, the proportion of sales revenue that is available to pay for the basic resources used in the industry (value added) is substantial. The boating industry produces about the same amount of value added as the fishing industry, and it has total sales roughly equivalent to industry groups such as Toys and Sporting Goods or Apparel in Rhode Island.

The information below consists of commonly used measures of economic impact. The most valuable ones refer to income, value added, and exports.

Economic Impact Measures for the Rhode Island Boating Industry, 1981

		For details, see pages:
Total Sales	$102,908,134	8-9
Total Economic Activity Generated (sales times multiplier)	226,397,895	15-16
Total Personal Income Generated (sales times personal income multiplier)	82,326,507	15-16
Employment (number)	1,715	8
Total Payroll	29,709,102	10, 12
Total Payroll per Employee	17,323	—
Total Value Added	36,647,199	12
Value Added per Employee	$20,786	20
Value Added as Percent of Sales	34.6	20
Net Exports	$73,518,397	13-14
Net Export as Percent of Sales	33.5	13-14

A final important characteristic of the Rhode Island boating industry is its role in improving the quality of life by easing access to boating. Thus, the boating industry makes intelligent environmental management as important to the industry and to the state economy as intelligent economic management.

The Rhode Island Boating Industry

In formulating public policy that affects land and coastal use, it is helpful to have information on the impact of various businesses or activities on a state's economy. This report presents that material for Rhode Island's boating industry. However, evidence shows that the industry has an indirect economic impact as well by helping to provide the kind of environment for marine recreation that many people look for when relocating firms. We suspect that this impact is considerable, but we have not attempted to measure it.

What is herein referred to as the Rhode Island boating industry was identified first through the mailing list of the Rhode Island Marine Trade Association; second, through lists of marinas and boatyards from previous studies; third, from the "1982 Waterway Guide";[1] and, finally, from newspaper and telephone advertising.

The data for the study are the information received from 132 firms answering a questionnaire that was mailed out during the summer of 1982. In the case of boatbuilders, the 15 respondents are estimated to account for from 90 percent to 95 percent of the total volume of boatbuilding in the state. For marinas and boatyards the 64 firms account for 98 percent to 100 percent of marina business. In the remaining three categories there is some underreporting, most of it probably in "Product Mfgrs. and Dealers," since many small firms are included there. Based on our "feel" for the industry, we would judge that about 95 percent of total sales by marine firms are accounted for in this report.

	Employment in FTE per $1,000,000 Sales*
All Firms	16.7
Boatbuilders	22.2
Marinas and Boatyards	15.7
Product Mfgrs. and Dealers	16.5
Boat Sales	9.5
Other Firms	9.6

*Source: Tables 1 and 2.

[1]Waterway Guide, 93 Main St., Annapolis, Maryland.

Table 1. Firms and Employment in Rhode Island Boating Industry, 1981

	All Firms	Boatbuilders or Mfgrs.	Marinas and Boatyards
Number of Firms	132	15	64
Employment:			
Full-time	1.594	1.132	272
Part-time	367	19	284
FTE	121	6	94
Total FTE[1]	1.715	1.138	366

	Product Mfgrs. or Dealers	Boat Sales	Other Firms
Number of Firms	15	18	20
Employment:			
Full-time	95	93	77
Part-time	35	47	63
FTE	12	16	21
Total FTE	107	109	98

[1]FTE: Full-time equivalent personnel, assuming part-time people work an average of four months of the year.

Employment. The 132 firms had total employment of 1.961, of which 367 were part-time. Assuming that part-time employees work four months per year, the full-time-equivalent (FTE) employment was 1.715, or an average of 13 per firm. To see how labor-intensive the various groups are, we computed employment related to sales (see listing on page 7).

Boatbuilders are by far the most labor-intensive of the groups when total sales are used as the standard. They show more than twice the employment per unit of sales as do boat sales and other firms. Marinas and product firms fall between these extremes in labor used per unit of sales.

Sales or Income. The Rhode Island boating industry had sales of $102.9 million in 1981 (Table 2). The group with the largest sales was the boatbuilders with $51.3 million, followed by marinas with $23.3 million. The group with the lowest sales was boating products. A considerable portion of sales was made to individuals or firms from states other than Rhode Island. Most of the these sales ($44.3 million) were to

Table 2. Sales by Residence of Buyer, Rhode Island Boating Industry, 1981

	All Firms	Boatbuilders or Mfgrs.	Marinas and Boatyards
Sales in R.I.	$29,389,737	$4,869,196	$13,545,996
Sales in Rest of New England	44,340,421	26,491,453	7,760,076
Sales Outside New England	29,177,976	19,966,382	2,020,234
Total Sales	$102,908,134	$51,327,031	$23,326,306

	Product Mfgrs. or Dealers	Boat Sales	Other Firms
Sales in R.I.	$2,863,513	$5,650,081	$2,460,951
Sales in Rest of New England	1,564,044	4,443,939	4,116,909
Sales Outside New England	2,122,411	1,371,833	3,661,117
Total Sales	$6,549,968	$11,465,853	$10,238,977

other New Englanders, but a significant proportion of income also came from outside the region ($29.2 million). These "outside" sales (exports) bring money into the state's economy. As can be seen in Table 2, exports were heavily influenced by the boatbuilders.

Costs. The costs paid out by firms become income to other firms and to the community. We are interested in sorting out primarily those costs that become income to local areas because that provides the best measure of direct economic impact. In Table 3, each column of costs adds up to total sales or income as given in Table 2. To arrive at the numbers, we requested information on the first six cost items in Table 3 and on the percent of materials and supplies that were purchased out of state. The sum of the first six items was then subtracted from total sales for the group, to yield the last two items, distributed according to the percentage the firm indicated. This causes a built-in exaggeration of the amount spent for supplies and materials. Since supplies here is a residual, it includes items such as profit, depreciation, utility bills, and miscellaneous expenses. It was felt that the cost items we did ask for were the most important, and that one could not push further on a mail questionnaire even with a group that had faith in the integrity of the researchers.

The major loss to the aims of the study was that profit

Table 3. Distribution of Total Sales (Costs) in Selected Categories. Rhode Island Boating Industry. 1981

	All Firms	Boatbuilders or Mfgrs.	Marinas and Boatyards
Payroll[1]	$29.709,102	$20.527,900	$5.112,682
Interest	3,248,646	1,525,693	1,168,223
Rent	1,636,349	418,040	872,202
Property Taxes	1,053,102	443,953	483,177
Contracts in R.I.	3,422,987	1,552,444	849,673
Contracts Outside R.I.	770,641	562,259	95,043
Supplies in R.I.[2]	24,788,186	5,878,111	9,589,115
Supplies Outside R.I.	38,279,121	20,418,031	5,156,191

	Product Mfgrs. or Dealers	Boat Sales	Other Firms
Payroll[1]	$1,221,399	$1,507,984	$1,339,137
Interest	55,786	304,717	194,227
Rent	98,567	110,950	136,590
Property Taxes	33,282	25,471	67,219
Contracts in R.I.	16,900	226,669	777,300
Contracts Outside R.I.	850	36,091	76,399
Supplies in R.I.[2]	1,154,339	3,796,601	4,369,420
Supplies Outside R.I.	3,968,845	5,457,369	3,278,685

[1] *Includes wages, salaries, and commissions.*

[2] *Percent out of state from questionnaire. Total supplies is residual from subtracting all other costs from total income. Therefore, it also includes profit, depreciation, utilities, and miscellaneous expenses.*

and depreciation could not be included in the computation of value added. Hence, the economic impact measure is conservative and would appear lower than value-added measures computed according to the U.S. Department of Commerce, which subtracts from gross income the costs of supplies, materials, goods for resale, services and utilities. Unfortunately, the U.S.D.O.C. does not routinely compute value added for service industries. Some attempts at comparisons will be made in the next chapter.

It is worthy of note that all groups except marinas and boatyards bought more supplies and materials in other states than they did in Rhode Island. This may change for marinas in coming years, since the major Rhode Island marine hardware wholesaler is no longer in business.

Economic Impact

The activities of these marine firms have economic implications for the firms' communities and for the state. These implications, or impact, can be measured in a number of ways. "Total sales" is often used to describe impact. It is not a good measure, for its gives no idea of how the activity affects total income of people in the state or region. For example, a wholesaler of goods purchased out of state might have the same total sales as a seller of goods produced inside the state. The income impact of the goods that are produced here would be greater because a larger percentage of the value of sales is paid to people in the state for production and marketing than in the case of goods produced out of state. For the latter, only the wholesale margin is available to pay local people and services. Therefore, the value added in Rhode Island is greater for the home-produced goods.

In this study we will stress two measures of economic impact: (state) *value added* and *net exports*.

Value Added. Value added is the contribution to the economy from operation of a firm or an industry. It is the total payments to (earnings of) the production factors during the production or trading process. This translates to income for people's labor or management, for the use of their capital (interest), their property (rent), or of government services (taxes). It does not include expenses a firm may have for materials, supplies, and outside services. In this study, value added is the sum of wages, salaries, commissions, interest, rent and property taxes. That is as near as we can come to identifying direct personal income resulting from operation of these businesses without asking questions that no firm or individual would want to answer.[2]

The Rhode Island boating industry's value added of $35.6 million is heavily contributed to by the boatbuilders' group ($22.9 million), followed by the marina group, with $7.6 million (Table 4). The three smaller boating groups are about

[2]The U.S. Bureau of the Census instead subtracts the cost of materials, supplies, and services from total sales. This yields a somewhat higher value added because profits, depreciation, and business taxes would then be included.

Table 4. Components of Value Added by Type of Firm. Rhode Island Boating Industry. 1981

	All Firms	Boatbuilders	Marinas and Boatyards
Payroll	$29,709,102	$20,527,900	$5,112,682
Interest	3,248,646	1,525,693	1,168,223
Rent	1,636,349	418,040	872,202
Property Tax	1,053,102	443,953	483,177
Value Added	$35,647,199	$22,915,586	$7,636,284

	Boating Products	Boat Sales	Other
Payroll	$1,221,399	$1,507,984	$1,339,137
Interest	55,786	304,717	194,227
Rent	98,567	110,950	136,590
Property Tax	33,282	25,471	67,219
Value Added	$1,409,034	$1,949,122	$1,737,173

even with one another, in the range of from $1.4 to $1.9 million.

We can compare total value added for the Rhode Island boating industry with that of the state's fishing fleet. Studies have shown average value added for New England trawlers in 1981 to be 70.5 percent of sales.[3] We do not have information on depreciation for 1981, but during the period 1972-77 it averaged 9.3 percent for the trawlers.[4] Subtracting depreciation for comparison with our boating data yields a value-added estimate of 61.2 percent for the fishing fleet. In 1981, the Rhode Island landed value of fish was reported to be $48.8 million, and in 1982 it was $55.4 million, giving estimated value added for the two years of $29.9 million and $33.9

[3]U.S. Department of Commerce. NOAA. National Marine Fisheries Service. "Fisheries of the United States. 1981." Washington. D.C.. April 1982. p.86.

[4]Erwin Penn. "Cost Analysis of Fish Price Margins. 1972-77, at Different Production and Distribution Levels." NOAA Tech. Memorandum NMFS OF4. Economic Analysis Staff. Office of Policy and Planning. NOAA. DOC. March 1980.

million, respectively.[5] Thus, we can say that in direct value-added terms the boating industry and the fishing fleet are of about the same order of importance to Rhode Island.

According to the 1977 *Census of Manufacturing* put out by the U.S. Bureau of the Census, the fishing and boating industries individually are somewhat higher in value added than knitting mills ($30.5 million), less than bakery products ($45.2 million), and equal to basic steel products ($34.8 million) in Rhode Island.

Net Exports. With the previous measure, valued added, we were concerned with where the money spent for boats, equipment, and service went in the local economy—was it paid to individuals for use of their labor, land, or capital, or did it pay for "things" from other firms? We saw that money spent for some production items such as labor and rent are more important to the state's economy than are the firm's purchases of supplies such as fiberglass, resins, or hardware, which frequently are made in some other state and therefore produce little value added here.

Now we want to add to this picture the question of where the money comes from and where the firms spend it. Money that is earned as value added by people in other areas and spent in this area benefits the state to the extent that it provides value added here. Conversely, money that is earned in Rhode Island and spent somewhere else fails to stimulate this state's economy. The difference between imports and exports (net export) is therefore an important measure of the extent to which a firm or industry stimulates our economy through the net inflow of money from other areas.

As a group, the marine firms under study bring considerable money into the state (Table 5). A total of $73.5 million worth of boats and boating services were "exported" in 1981 to people living in other areas. The Rhode Island firms that brought in this trade, in turn, "imported" $39.0 million in supplies, goods for resale, and services. This leaves a net export of $34.4 million, or 34 percent of sales, a very favorable "balance of trade."

[5]U.S. Department of Commerce. NOAA. National Marine Fisheries Service. "Fisheries of the United States. 1982." Washington. D.C.. April 1983. p.4.

Table 5. Components of Net Export by Type of Firm. Rhode Island Boating Industry. 1981

	All Firms	Boatbuilders	Marinas and Boatyards
Total Sales	$102,908,134	$51,327,031	$23,326,306
Out-of-State Sales	$73,518,397	$46,457,835	$9,780,310
Out-of-State Sales (%)	71	91	42
Out of-State Purchases	$39,049,761	$20,980,290	$5,251,233
Net Exports	$34,468,636	$25,477,545	$4,529,077

	Boating Products	Boat Sales	Other
Total Sales	$6,549,968	$11,465,852	$10,238,977
Out-of-State Sales	$3,686,455	$5,815,771	$7,778,026
Out-of-State Sales (%)	56	51	76
Out-of-State Purchases	$3,969,695	$5,493,459	$3,355,084
Net Exports	$283,240	$322,312	$4,422,942

On the average. 71 percent of boating sales are made to out-of-state people or firms. Again, boatbuilding leads, with 91 percent, whereas marinas and boatyards are lowest, at 42 percent. Since marina services are offered at the specific site, they are, of course, more likely to have an in-state clientele than are those firms whose services or products can be used either here or elsewhere.

Previous studies have shown some variation of estimated "exports" by marinas and boatyards: 1967, 28 percent; 1970, 43 percent; 1974, 36 percent; and the latest, 1981, 42 percent.[6] All but the 1974 measure were estimates made by marina owners during the surveys. The 36 percent in 1974

was derived by drawing a 25 percent sample of the addresses of marina and boatyard customers from the firms' files. It is likely that this method missed the expenditures of visitors who did not stay long enough to become regular customers, and so led to an underestimate. Although most people in the industry. and the authors, feel that the export-percentage has increased, the data here do not offer firm evidence of what the increase has been.

The Effect of Re-spending. From Table 3 we see that builders and marinas together spend $26.2 million annually on materials or services bought out of state. Generally speaking, the more of this that could be transferred to in-state purchasing, the better it would be for the state's economy. Net exports would be higher, and there would be greater re-spending of the money consumers spend on boating (multiplier effect). with a resulting higher income effect. At the same time, it is important to remember that multipliers are not sufficient in themselves as indicators of which business and industry to attract. There is no final magic number. economic or otherwise, that makes automatic the decision of best economic mix for an area or best resource use.

Based on studies of the southern New England area done in 1965 and 1975,[7] we can estimate average Rhode Island multipliers for the boating industry:

Gross Multiplier   2.2
Personal Income Multiplier   .8

A gross multiplier of 2.2 means that a dollar of sales from that sector can be expected to generate an additional $1.20 worth of sales in the area from other businesses (1.0 + 1.20 = 2.2). The personal income multiplier of .8 means that $.80 of the $2.20 would be personal income.

[6]1967: Niels Rorholm. Harlan C. Lampe. and Joseph F. Farrell. "A Socio-Economic Study of Narragansett Bay. R.I.," a report to the Federal Water Pollution Control Administration. URI. 1969. 1970: Niels Rorholm and Sidney Feld. "Rhode Island Marinas and Boatyards." Dept. of Resource Economics. Occasional Papers 71-001. URI. 1971. 1974: Robert Kelley and Niels Rorholm. "An Analysis of the Rhode Island Marina Industry." Marine Technical Report 29. URI. 1974.

[7]Niels Rorholm. H.C. Lampe. Nelson Marshall. and J.F. Farrell. "Economics of Marine Oriented Activities—A Study of the Southern N.E. Marine Region." Economics of Marine Resources Pub. No. 7. Bulletin 396. URI. 1967: and Thomas A. Grigalunas and Craig A. Ascari. "Estimation of Income and Employment Multipliers for Marine-Related Activity in the Southern N.E. Marine Region." *Journal of the Northeast Agricultural Economics Council.* XI(1): 25-34 (Spring 1982).

Using these multipliers, we can estimate that the Rhode Island boating industry is the cause of a minimum of $226.4 million business activities in the state and that $82.3 million of this is personal income. We can also say that the export earnings of the boating industry are responsible for $161.7 million of gross business, of which $58.8 million is personal income. While the export numbers are of particular interest when we are thinking of economic growth, it should be remembered that they are included in the totals at the beginning of this paragraph and must not be added to those.

It is in combination with miltipliers that the export characteristics of a business become important to the state. The exports bring in money to the area; a high value-added percentage of the exporting businesses ensures that sufficient amounts of money are available to pay for the locally owned resources (people are themselves resources); and, finally, a high multiplier effect in those businesses indicates that the money brought in is put to work in the community to generate business and income in other industries as well. The net effect is a healthier state economy.

Summary of Impact. On the whole, the boating industry in Rhode Island makes a very good contribution to the state's economic well-being in that it produces substantial net exports and value added. Without question, the boatbuilding sector, certainly the largest of any state in the Northeast, has become the leader by economic criteria among the Rhode Island boating sectors.

The term "economic impact" is used for many measures of economic activity. These are not all equally meaningful. In the opinion of the authors, if high economic impact is meant to be economically beneficial to the population of a given area, then the term "impact" must address the income of that population. Preferably, a favorable economic impact should raise per capita income, but even increased total income is acceptable.

The following listing shows values derived from this study for various terms that are frequently used as measures of impact. We prefer those with asterisks because they have meaning in terms of either individual or state income.

Various Economic Impact Measures for the Rhode Island Boating Industry, 1981

Total Sales	$102.908.134
Total Economic Activity Generated (sales times multiplier)	226.397.895
*Total Personal Income Generated (sales times personal income multiplier)	82.326.507
*Employment (number)	1.715
*Total Payroll	29,709,102
*Total Payroll per Employee	17.323
**Total Value Added	35.647.199
**Value Added per Employee	20.786
*Value Added as Percent of Sales	34.6
**Net Exports	$73,518,397
*Net Export as Percent of Sales	21.0

*Income-related measures
**"Better" measures

Some Comparisons. We have indicated a preference for a measure of economic impact such as value added that gives an idea of the impact on income. We have measured value added as well as we could. But is it high or low for the industry or per employee?

Unfortunately, it is difficult to find comparisons among different industries for the value-added measures. Below are some fisheries-related measures of value added that have been computed in a way similar to the one used here; i.e., excluding depreciation, profit, and taxes other than property taxes. These comparisons have some relevance, for fisheries-related firms occasionally compete with boating facilities for coastal space. Given the disparity in sources, one cannot say without further, detailed study which use would be "best" for an area. Besides, the "best" would nearly always turn out to be a mixture of uses. All three—boating, charter fishing, and commercial fishing—seem to present good value added per employee for resources that are not essential for other economic activities.

1. The *most profitable* combination of trips (242 half-day and 18 all-day trips) computed for a vessel typical of the

Connecticut fleet of charter fishing vessels showed a potential value added of $20,024 per person in 1979, not including depreciation.[8]

2. Data from a small sample of New England otter trawlers indicated value added, again without depreciation, of $31,469 per person for 18 average-sized vessels.[9]

3. The same information for eight smaller vessels showed a value added of $16,202 per person.[9]

Since those who catch the fish do not pay for the fish as such, the value added as a percent of sales should be a great deal higher in the commercial fish-catching sector than in other industry groups. This seems to be true on the more efficient vessels, but the boating industry's average of $20,786, not counting depreciation, holds up well to comparison.

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[8]Margaret E. Thursland, M.A. Altobello, and N.K. Bender, "The Connecticut Charter Boat Fleet: Its Characteristics, Costs and Returns," College of Agriculture and Natural Resources, Univ. of Conn., Storrs, 1982.

[9]J.M. Gates, et al., "An Inventory of Cost Relationships for Fishing Vessels: New England Otter Trawls," Staff Paper No. 83-1, Dept. of Resource Economics, URI, 1983.

The Boating Industry and the State Economy

The end result of having many industry groups with high value added per employee in a state is likely to be a state with generally high incomes and an ability to pay for desirable public services.

Table 6 shows value added related to employees and sales of the five groups of firms.

As an average for the industry, 34.6 percent of gross income is available to pay for the basic resources used in the firms—land, labor, management, and capital. It will be remembered that this amount is the basis for economic impact. Again, boatbuilders have the largest relative impact, with 44.6 percent of sales available for income payments. Marinas and boatyards have a higher value added per employee, indicating a slight edge in ability to pay higher wages or salaries. The difference is not enough to mean much and it could be caused by somewhat higher capital requirements of boatbuilders.

If we look at Table 6 with state economic development in mind, it might appear that we should not choose to entice any firms who would fall in the last three categories to move to or develop in the area—their value added, both per employee and as a percent of sales (income), is below average. But this hasty decision fails to take into account two other factors that are important; namely, possibility for any development (is there a market?) and availability of the resources (would a shift in resource use mean a net economic loss?).

Is There a Market? At this writing, there is probably no market, within reasonable shipping distance, for more recreational boats than can be built by the existing firms in Rhode Island. Enticing new firms to the area would most likely just lead to more firms competing for the same market share. There are some exceptions to this, for Rhode Island boatbuilders do not all compete in the same market, but, generally, the state's boatbuilding physical plant is not fully utilized. In the case of marinas and boatyards there probably is a market, as long as prices do not increase too drastically relative to people's incomes, and the same is true for the three smaller groups of firms. But what about the second factor—interference with other activities or resource availability?

Table 6. Value Added per Employee and as Percent of Sales, Rhode Island Boating Industry, 1981[1]

	Value Added	
	Per Employee	% Sales
All Firms	$20,786	34.6
Boatbuilders	20,136	44.6
Marinas and Boatyards	20,864	32.7
Boating Products	13,168	21.5
Boat Sales	17,882	17.0
Other Firms	17,726	17.0

[1]*Source: Tables 1, 2, 4.*

Resource Conflict. There are three ways Rhode Island and/or the marina and boatyard sector can meet the present need for more slip and mooring space. First, increase prices until the desire disappears, which is the normal market way of dealing with what appears to be excess demand. However, in this case, where private businesses are the primary gateways to public waters, where the quality of boating is perceived as an important part of the quality of life, and where boating forms the base for a substantial tourism industry, this would not seem to be the best alternative.

Second, state policy could encourage the building of additional marinas, but this would require more of our scarcest and most expensive resource—coastline—and would typically interfere with present uses. Third, expansion in marina capacity could come about through better use of existing areas already in marina use. It is probably safe to say that a 20 percent increase in total capacity could be brought about in this way. This means of growing would result in increased value added earned by our limited shoreline, and would thus benefit the state economy as well as the marina firms (assuming the expansion can pay for itself).

From the above discussion of Table 6, we see that it is quite possible that the best route for economic development through marine recreational firms is to stimulate in-state location of the "secondary firms"—those that produce or sell supplies to boats or to boatbuilders.

Conclusion

Accounting for $35.6 million annual direct personal income, or $82.3 million if the re-spending effect is included, the Rhode Island boating industry is not a dominant direct factor in the state's economy ($9.1 billion in 1980). But it has characteristics that make it important to economic development. The reasoning is as follows:

1. The boating industry is a necessary ingredient for high-quality boating. The resources needed to provide excellent boating recreation are the coasts and waters, the climate, the participants, and the boat service industry. If any one of these is inferior, the resulting boating experience will be inferior to some degree.

2. Boating is an important part of the marine recreation that people seek. In this sense, its availability is part of the so-called "quality of life" which is sought by people who have choices in where to locate. This environment for living is important in decisions on business and industry location.[10]

3. It follows from 1 and 2 above that the economic role of the boating industry is greater than is indicated by measurement of its direct economic impact. The authors have come to believe that the indirect economic effect, brought about by helping to create an environment for living which attracts economic activity, is greater even than the direct effect.

If we accept both the direct and indirect economic impacts as being important, then this gives us some guidance in "using" the boating industry for state economic development purposes while simultaneously assisting the industry. For example, knowing the critical role of the physical environment to boating, and having indications that the demand for boating recreation is price-inelastic,[11] we can say that improvements in the marine environment even at some cost to boating participants would most likely increase the

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[10]Norton Berman, Director, Rhode Island Department of Economic Development, personal communication.

[11]Meaning, for example, that in response to a price increase consumers would reduce their boating by less than the percent increase in price. This seems to be true for Rhode Island boating activities, but no formal study has been made.

economic impact of boating. Also, improving the image and the reality of Rhode Island as a "complete boating center" will tend to attract service and product firms. This will make it easier for builders and marinas to do business here and will add to the re-spending effect of exports and consumer expenditures for boating.

Boating recreation is a pervasive user of the marine environment, but, except for occasional issues of "territoriality," the conflicts with other uses such as fishing and shipping are few. This means that state-local natural resource agencies, boating industry groups, and boat owner groups should work very closely together in ensuring that the boating industry and the boating environment grow toward a flourishing industry and improved recreation.

Some of the marinas and boatyards included in the study did not wish to provide data on their dollar volume of business. Using data from firms that gave complete answers, a regression equation was developed for marinas and boatyards using a stepwise regression model. The dependent variable (Y) represents total gross income in 1981. The survey information was used to generate a data set using the DATA step on the SAS 79 statistical analysis software on the URI computer system. Using PROC STEPWISE and PROC GLM statements in the same package, it was possible to generate a reasonably accurate linear regression equation for the purpose of predicting total gross income for a group of marinas.

The independent variables utilized in the initial exploratory analysis were a) number of moorings, b) number of slips, c) average boat length, d) number of boats in inside storage, e) number of boats in outside storage, f) units of wet storage, g) total storage, h) total length of boats in feet, and i) total employment. These independent variables were chosen because they were elements which could be determined from a visit to the facilities and did not include what might be considered sensitive information.

Four of the above variables were finally selected for the resulting general linear regression model. These variables $(X_1 \ldots X_4)$ are, respectively, total winter storage (number of boats), total number of moorings, total number of slips, and average length of boats at the particular facility.

The following linear regression equation was computed:

$$Y = -868046.82 + 5813.54X_1 - 1709.49X_2 - 1905.62X_3 + 32562.76X_4$$

This equation produces a multiple R^2 of .83, which means essentially that 83 percent of gross income is explained by the four independent variables. The variables are expressed in dollars. The intercept is statistically significant at a 90 percent confidence level, as is X_4. X_1 is statistically significant at the 95 percent confidence level. X_2 and X_3 are not statistically significant.

It can thus be seen that while these coefficients are not always reliable when taken separately, as a whole they can explain 83 percent of variation in gross income with a ± 10 percent accuracy. It is important to note here that it is not possible to arrive at this type of accuracy level for any indi-

vidual firm, only for a group of firms taken as an aggregate. The above equation was applied to the group of marinas and boatyards (18) that had omitted information on total sales. The resulting estimate was added to the sales information given by the other firms.