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Impacts of Recreation in the Coastal Area:

Demand and Supply of Recreation in Wisconsin's Coastal Counties

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IMPACTS OF RECREATION IN THE COASTAL AREA

DEMAND AND SUPPLY OF RECREATION IN WISCONSIN'S COASTAL COUNTIES

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This report is one of five studies which comprise the IMPACTS OF RECREATION IN THE COASTAL AREA. The remaining five deal with the economic impacts of recreation, large recreational home developments, economic impact and needs of Great Lakes boaters, and policy issues and recommendations. Each of the first four reports is designed to provide documentation and support for the policy recommendations.

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ABSTRACT

This study reviews and projects the demand for selected summer recreation activities and presents a summary of the supply of facilities in the coastal counties and communities.

Projections for 1980, 1985, and 1990 indicate significant increases in the demand for boating, fishing, hiking, camping, and sightseeing. The demand for these activities is projected to increase between 115-210 percent in the twenty-year period from 1970 to 1990. The demand for swimming is projected to show a 61 percent increase during the same period.

The two activities with the greatest dependency on the Great Lakes, boating and fishing, also show the greatest projected growth in demand. The demand for boating is projected to increase by 210 percent and the demand for fishing is projected to increase by 150 percent during the 1970-1990 period.

Other studies, as well as the supply information presented in this study, indicate crowding of boating and fishing facilities in many of Wisconsin's coastal communities. Thus the development of additional boating and fishing facilities is identified as a priority coastal recreational need in this study.

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SUMMARY

This report analyzes existing information on demand and supply of recreation in Wisconsin's fifteen coastal counties.

The level and projected growth of demand is determined for six recreation activities, using information generated over the past several years. The activities selected for review and analysis are: swimming, boating, fishing, sightseeing, camping, and hiking. These activities are the most popular (in terms of percent of families participating) recreational interests among Wisconsin residents, as well as travelers to the Great Lakes region.

Among the six activities surveyed, boating, hiking, and fishing are the fastest growing recreational interests among regional households. In the coastal counties, boating participation on an average weekend day is projected to more than double between 1970 and 1980. Projections for hiking and fishing indicate that demand will increase by 102 percent and 82 percent, respectively, over the same period.

Projected levels of demand for 1990 indicate that boating participation on an average weekend day will increase by 210 percent between 1970 and 1990. The number of people fishing and hiking is projected to increase by 150 percent and 147 percent, respectively, during the same period. The demand for camping and sightseeing is expected to go up by 133 percent and 115 percent, respectively, during the 1970-1990 period. Finally, the projections for swimming indicate that demand will increase by only 61 percent over the same period.

The supply section of this report identifies selected types of recreation facilities in the coastal counties. Fourteen percent of Wisconsin's Great Lakes shores are in public ownership, with 58.5 miles of parklands along the shore. There are 52 public beaches to accommodate Great Lakes swimmers and 234 miles of hiking trails are provided in the coastal counties.

Wisconsin's coastal communities provide a total of 3,190 slips at 47 Great Lakes marinas. For the Great Lakes boaters using public boat launch sites, 245 ramps are provided at 160 sites.

A study of Great Lakes boaters* conducted during the summer of 1975 for Wisconsin's Coastal Zone Management Program identifies the inadequacy of existing boating facilities. During the summer of 1975, all Great Lakes marinas surveyed were operating at full capacity and 1,031 boaters were on marina waiting lists.

The same study identifies the crowding at public launch facilities, especially along the southern Lake Michigan shore, and in Brown and Door Counties. Only 42 percent of the boaters surveyed ranked existing Great Lakes launch facilities as adequate. The need for additional ramp and parking spaces, as well as the need for improved rest rooms and other facilities at or near the launch site were mentioned by a majority of the boaters surveyed.

If the demand projections presented in this report are accurate, there needs to be a significant response from the public sector to meet facility needs of a 200 percent increase in boaters by 1990.

---

*Ayse Somersan, Economic Impact and Needs of Wisconsin's Great Lakes Boaters, Wisconsin CZMDP, January, 1976.

Identifying the individual recreational facility needs of coastal communities is outside the scope of this report. This information is mostly available in community and county recreation plans.

A very limited survey of selected public officials in coastal communities was conducted during the fall of 1975 to provide an overview of crowding and other problems associated with coastal recreation. As a part of this survey effort, a public official (planning, recreation, or engineering department, or University Extension) was identified in each coastal community. This local cooperator was asked to contact other city or county departments for information not readily available to him. The usable responses to the survey can be summarized under two headings: 1) crowding and/or deterioration of Great Lakes recreation facilities, and 2) specific problems associated with recreationists and tourists in Great Lakes communities.

The questionnaire was completed by one or more local officials in 13 coastal communities.* Admittedly, the views and biases of the local officials completing the questionnaire influenced the answers to some of the judgemental aspects of the questions. Given the financial and time constraints, however, this type of bias in the information could not be avoided.

The information from 13 communities on the use and condition of their water based recreation facilities can be summarized as follows:

---

*Kenosha, Racine, Milwaukee, Port Washington, Sheboygan, Manitowoc, Kewaunee, Algoma, Sturgeon Bay, Green Bay, Oconto, Marinette, and Superior.

GREAT LAKES RECREATION FACILITY USE AND CONDITION

Boating

City	Overcrowded?	Overcrowding Due To Tourists?	Physically Deteriorating?
Kenosha	Yes	Yes	No
Racine	Yes	No	No
Milwaukee	Yes	No	No
Port Washington	Yes	Yes	No
Sheboygan	No	No	No
Manitowoc	Yes	Yes	No
Two Rivers	-	-	-
Kewaunee	Yes	Yes	No
Algoma	No	No	No
Sturgeon Bay	Yes	Yes	Yes
Green Bay	Yes	No	Yes
Oconto	No	No	No
Marinette	Yes	No	No
Superior	Yes	No	Yes

Fishing

City	Overcrowded?	Overcrowding Due To Tourists?	Physically Deteriorating?
Kenosha	-	-	-
Racine	Yes	No	Yes
Milwaukee	No	No	No
Port Washington	Yes	Yes	No
Sheboygan	No	No	Yes
Manitowoc	Yes	Yes	No
Two Rivers	-	-	-
Kewaunee	-	-	-
Algoma	No	No	No
Sturgeon Bay	Yes	Yes	Yes
Green Bay	No	No	No
Oconto	No	No	No
Marinette	No	No	No
Superior	No	No	Yes

Swimming

City	Overcrowded?	Overcrowding Due To Tourists?	Physically Deteriorating?
Kenosha	No	No	No
Racine	No	No	Yes
Milwaukee	Yes	No	No
Port Washington	No	No	No
Sheboygan	Yes	No	No
Manitowoc	No	No	No
Two Rivers	-	-	-
Kewaunee	-	-	-
Algoma	No	No	No
Sturgeon Bay	No	No	Yes
Green Bay	Yes	No	No
Oconto	No	No	No
Marinette	Yes	No	No
Superior	No	No	Yes

Local officials responding to the questionnaire considered boating facilities overcrowded in 10 out of 13 communities. The overcrowding was especially pronounced on weekends and holidays. Only five respondents considered the overcrowding of boat launch facilities to be due to tourists. Boat launch facilities are physically deteriorating in Sturgeon Bay, Green Bay, and in the City of Superior.

The overcrowding of fishing facilities appears less widespread than the overcrowding of boating facilities along the Great Lakes coasts. Seven communities report overcrowding at their fishing facilities. In Port Washington, Manitowoc, and Sturgeon Bay, the overcrowding of fishing facilities is reported to be due to nonresident (or tourist) activity, while in Racine the large number of resident

fishermen is the major cause of the overcrowding of existing facilities. Fishing facilities are reported to be deteriorating in Racine, Sheboygan, Sturgeon Bay, and Marinette.

The swimming beaches on the Great Lakes are reported to be overcrowded during peak-use periods in three communities. In all three communities (Milwaukee, Sheboygan, and Green Bay) the overcrowding is a result of resident use. Racine, Sturgeon Bay, and Superior report their swimming facilities to be physically deteriorating.

Community Perceptions of Great Lakes Recreation Related Problems

Tourism provides small communities with services of quality restaurants and retail establishments which could not be supported by the permanent residents of these communities without the base provided by tourists. Also, in a unique tourist area like Door County, the summer residents of communities and the tourists attract a whole range of cultural activities such as symphonic concerts, theater groups, not to mention the summer resident artists with their painting, sculpture and pottery displays. Most of these activities are a direct result of the summer residents being there or are induced by the anticipated tourist population which moves into the area during spring, summer, and fall.

There are, on the other hand, social and environmental effects associated with the influx of tourists and summer residents which are of concern to the permanent residents of tourist area.

The primary cause of local complaints and a major social and environmental impact is related to seasonal congestion. The crowding of roads, parks, boating, swimming, and fishing facilities by non-residents creates resentment among residents of small communities.

The mechanized equipment used by tourists and recreationists is frequently identified as a source of noise and other types of pollution and is considered an intrusion into the natural scene.

Trespassing, property damage, and litter along the shoreline in the form of beer cans and fish cleanings are major causes of complaints directed at the Great Lakes shore fishermen. The erosion of river banks is another consequence of the increased popularity of shore fishing which is frequently cited by local officials and residents as an environmental cost associated with Great Lakes recreation.

A major local complaint against the Great Lakes boaters is the locational congestion associated with this group of recreationists. Mainly because of the inadequacy of parking facilities at or near launch sites and marinas, especially in the smaller coastal cities, the trailered cars are parked along city streets. This makes passage difficult, parking becomes a problem for the non-boaters and complaints commence.

As expected, the complaints about the nonresident users of facilities by permanent residents are more pronounced in the relatively sparcely populated tourist areas. Along the southern coast of Lake Michigan, for example, where residents are used to heavy concentrations of people and vehicles, the tourists blend in and are almost unnoticed. Only during major events such as Summerfest or a Coho Derby does locational congestion become noticeable and somewhat of a problem. But even in such instances, the traffic, law enforcement, and other problems created by large numbers of nonresidents are relatively smoothly handled by local officials who are both prepared for them and are adept at the handling of large crowds.

In the smaller coastal communities the situation is different. Although the law enforcement forces are expanded during the tourist season, the increase is frequently not in proportion to the temporary increase in the numbers of people. The psychological threshold of the residents of sparcely populated areas is also different from their counterparts in the urban areas. For residents who are used to parking within ten feet of the retail establishments on main street, the block or more walk necessitated by the nonresident cars taking up a lot of parking spaces in the shopping district creates resentment.

The social impacts of recreation-tourism are subjective in nature and, therefore, are not easily quantified. In a lot of instances, it is even difficult to judge the extent to which social resentment is widespread short of a referandum! The vocal group of residents who attend public meetings and voice their concerns may or may not be representative of the total community opinion.

The recreation-tourism related problems identified by local officials and citizens are basically a result of inadequate access, inadequacy of existing facilities, and/or law enforcement deficiencies. Most of the coastal communities want to encourage tourism as a source of additional income and employment (thirteen out of fourteen communities surveyed local officials expressed the desire to encourage tourism). Therefore, the solution to the problems identified by local officials and residents lie not in keeping the tourists away but in organizing to take proper care of these temporary residents of the Coastal Zone.

The major problems relating to Great Lakes recreation-tourism identified by the local officials surveyed in coastal communities are

summarized on the following pages. The reader will note at first glance that the most frequently identified problem group is the shore fishermen. The major problems associated with this group are litter, traffic congestion, and shoreline damage and damage to park areas due to overcrowding. Trespassing is also a major problem with this group of recreationists and is a major source of complaint in some coastal areas.

GREAT LAKES RECREATION-TOURISM RELATED PROBLEMS OF

WISCONSIN'S COASTAL COMMUNITIES

	STURGEON BAY	MANITOWOC	TWO RIVERS	KEWAUNEE
I. Great Lakes Recreation-Related Problems:				
A. Problem Group(s)	Shore Fishermen	Shore Fishermen	High Speed Boats & Water Skiing	Campers/Fisherman
B. Nature of Problem	Litter, Overcrowding causing Physical Deterioration	Litter, Traffic Congestion and Trespassing	Property Damage	Traffic Congestion & Parking Problems
C. Suggested Action	Increased Law Enforcement & Better Refuse Handling	(1) Charge Fees (2) More Off-street Parking (3) Double the capacity of Commercial Street Ramp. State should take a more active role in assisting local governments on capital improvements to permit better use of Great Lakes.	Set up No-Wake Buoys	Provision of Camping Area under Study
II. Other Problems and/or Costs	Trespassing by Shore Fishermen	--	--	Disposal of fish wastes at launching ramp area

(Cont'd.)

	SHEBOYGAN	PORT WASHINGTON	MILWAUKEE
I. Great Lakes Recreation-Related Problems:			
A. Problem Group(s)	Fishermen	(1) Smelt Fishermen (2) Boaters	Boaters
B. Nature of Problem	Litter	(1) Litter, Traffic Congestion and Trespassing (2) Parking	Traffic Congestion and parking problems
C. Suggested Action	Increased number of containers	(1) No action is necessary because the season is short (2) Expansion of parking facilities	Construct additional boating facilities
II. Other Problems and/or Costs	--	Harbor is unsafe. It is not a harbor of refuge. No overnight mooring is available.	--

(Cont'd.)

	RACINE	KENOSHA
I. Great Lakes Recreation-Related Problems:		
A. Problem Group(s)	(1) Smelt Fisherman (2) Shore Salmon Fishermen	Boaters and Fishermen
B. Nature of Problem	(1) Drinking and Litter (2) Crowding, Shorebank erosion	Fights among different users, Inadequate launch & parking facilities
C. Suggested Action	(1) Better Law Enforcement (2) More access to river, Limit salmon stocking	Need for additional facilities and Outside financial assistance
II. Other Problems and/or Costs	Insufficient funds spent on sport fishing facilities both on the river and lake. Need city and other government funding. Salmon fishermen destroyed park area along the river due to overcrowding.	--

DEMAND FOR RECREATION IN THE COASTAL COUNTIES

Project Investigator: Ayse Somersan

RECREATIONAL ACTIVITY INTERESTS OF REGIONAL HOUSEHOLDS AND TRAVELERS

Wisconsin's coastal zone offers a variety of recreational opportunities, in addition to the scenic value of the coastal area which is a resource in itself. The demand for the coastal recreational resources can be viewed as coming from resident and nonresident groups. The resident demand is the participation of the families in the coastal communities and counties in recreation activities using the coastal facilities. The nonresident demand derives from the noncoastal and out-of-state visitors who travel to a coastal destination for recreational and vacation purposes.

Most studies dealing with recreation participation have focused on the nonresident aspects of the pressures and economic benefits accruing to communities from recreation activity participation. In most cases, this method is sufficient for providing an adequate picture of the recreational costs and benefits for a community. Most of the parks and intensively studied recreation areas are away from population centers, with relatively small resident populations and, therefore, relatively small pressures on resources from the resident participators in recreation activities.

The coastal zone of Wisconsin, however, houses 43 percent of the state's population. Especially in Brown county and the southern Lake Michigan counties, resident recreation demand becomes equally, if not more, important in assessing the pressures on the coastal recreational land and facilities. It is, therefore, necessary to look at the recreation activity interests of resident (county) households, as well as those of travelers.

Unfortunately, the county level activity participation data generated by the Department of Natural Resources identifies only two components

of demand--resident (Wisconsin) and nonresident (out-of-state). A meaningful analysis and projection of demand requires separating the county resident from other Wisconsinites. Specific activity surveys planned for the summer of 1975 will break down demand into its three major components to provide further thought into the three components of demand for coastal facilities.

Recreation Activity Interests of Regional Households

The Recreation Demand Survey and Forecasts[1/] provides information on overall participation rates (percent of families participating anywhere, anytime, during a 12-month period) and participation rates of Upper Great Lakes travelers. The findings of this study are presented on Table 1 for eight outdoor recreation activities. The participation rates refer to the percent of households participating in a given activity.

A comparison of the overall participation rates with the participation rates of families on a summer trip to the Upper Great Lakes Region shows differences in the recreation activity interests of the two groups. Picnicking and bicycling are two recreation activities which are usually done in the vicinity of the family residence. About 72 percent of families went picnicking and 40 percent went bicycling during the year. But, only 12 percent went picnicking and 5 percent went bicycling while vacationing in the Upper Great Lakes region.

Sightseeing and fishing are found to be the most popular activities among the families traveling in the UGL region, followed by swimming, boating, hiking and camping. The abundance and variety of scenic resources in the area explains the interest in sightseeing. The importance of water is

1/ Somersan, A., R. Cooper, N. Enosh and S. McKinney, Recreation Demand Survey and Forecasts, Upper Great Lakes Regional Recreation Planning Study, Part 2, Recreation Resources Center, University of Wisconsin-Extension, 1974.

underscored by the popularity of fishing, swimming and boating among the families visiting the UGL region during the summer months.

Table 1. Outdoor Recreation Activity Participation Rates of Regional Households and Travelers to the Upper Great Lakes Region

Activity	Overall Participation Rate (Pct. of Regional Families, 1972)	Participation Rate While on a Summer Trip to UGL Region (Pct. of UGL travelers, 1972)	Projected Annual Increase in Participation Rates. (Pct. per year between 1972-1980)
Swimming	58.1	41.3	- 0.3
Sightseeing	62.0	46.7	2.1
Bicycling	40.0	4.9	5.3
Fishing	48.8	46.3	3.5
Picnicking	71.6	12.3	2.5
Boating	38.0	32.6	5.5
Camping	27.0	21.4	2.8
Hiking	33.6	24.8	4.8

Source: A. Somersan, et. al., Recreation Demand Survey and Forecasts, UGL Regional Recreation Planning Study, Part 2, Recreation Resources Center, Univ. of Wis.-Extension, 1974, pp. 27 & 44.

Projected Growth in Recreation Activity Participation

Projected participation rates for these eight outdoor recreation activities for 1980 are also provided in the Recreation Demand Survey and Forecasts. The projections are based on multiple regression prediction equations, using socioeconomic, supply and youth-related factors as independent variables.[1/] The annual increase in participation rates computed on the basis of the projections made available in this study are presented on Table 1, column 3.

1/ Ibid., p. 44 and pp. 77-109.

Outdoor swimming is the only recreation activity for which a slight reduction in the participation rate is projected between 1972 and 1980. The increasing indoor swimming opportunities, unreliable weather, relatively cold water temperatures, increased awareness of water quality, as well as competition from increasing availability of other recreational activity opportunities can be cited as possible reasons for the small projected decrease in the swimming participation rate.

Among the remaining seven outdoor recreation activities, boating is projected to show the greatest annual increase in participation (5.5% per year), followed by bicycling, hiking and fishing (5.3%, 4.8% and 3.5% per year, respectively).

RECREATION DEMAND IN THE COASTAL COUNTIES

Demand Data: The data base for recreation activity participation figures is the joint survey of the Department of Transportation and the Department of Natural Resources of resident and nonresident recreation activity participation occasions by county in 1970. This information is used to obtain the number of occasions by residents and nonresidents on an average summer weekend day in 1970 for each activity by coastal county.

The average number of weekend occasions is not a meaningful figure in itself. However, combined with projected increases in population, travel and activity participation rates, it allows us to determine percentage growth rates of growth of activity participation between 1970 and 1980, and provides some insight into the relative magnitude of demand by activity over the 15 counties in the coastal zone. The relative rates of growth in demand for each activity were computed independently, from other sources of information, as discussed below. This analysis did not require the use of the 1970 average weekend day participation occasions. This information,

however, was essential to give the user a feel for the absolute levels of demand under consideration in each county. Pressures created by a 100 percent increase in, say, boating occasions necessitate different responses, depending on whether one is starting from a base of 1,500 occasions or 15,000 occasions per weekend day.

From the viewpoint of a coastal survey, the most important shortcomings of the base-year demand data utilized in this section lie in its failure to distinguish between different types of boating and fishing, and in its failure to identify the local component of resident participation. Thus, boating and fishing (as well as other activities) are lumped together for each county regardless of whether the participation occurred in inland waters or on the Great Lakes. This is an especially serious shortcoming in the case of fishing and boating. The growth rate of the demand for boating on the Great Lakes is probably much faster than the growth rate of demand for boating on inland waters. The same is probably true of fishing on the Great Lakes versus fishing on inland waters. Furthermore, by lumping the demand from coastal county residents with the rest of Wisconsin under the "resident demand" category, the relative importance of local demand and pressures on facilities cannot be ascertained on the basis of this data.

Demand Projections[1/]

Most changes in recreation activity participation over time in a given location can be explained by changes in one or more of the following four factors:

1. Population: Increasing population in coastal counties and in the primary demand zone (the other states and remaining counties of Wisconsin from which each coastal county attracts recreation-

1/ See Appendix A for a detailed discussion of projection methodology, and Appendix B for 1985 and 1990 demand projections for the coastal counties.

ists) will lead to increased number of participants in various recreation activities. Increased population will increase the pressure on existing coastal facilities, even in the absence of increases in the propensity to travel or the propensity to participate in recreation activities.

2. Travel: Changing socioeconomic and demographic factors, as well as the changing nature of the family vacation from a luxury to more or less an annual necessity, increases the number of participators using the recreational facilities of a given area.

3. Popularity of Various Recreation Activities: Changes in income and education, combined with increased promotion and the demonstration effect, lead to varying degrees of increases in the participation rate for different recreation activities.

4. Supply: The establishment of a new recreational facility, be it a national lakeshore or a high-quality marina, attracts increased numbers of recreationists to that area.

The projection for activity participation in the 15 coastal counties in 1980 are based on three of these factors. Population changes, increases in vacation and recreational travel, and changes in activity participation rates are used to compute the changes in resident, nonresident and total participation in each activity for each county. Supply induced changes in demand are not built into the projection methodology because of data limitations.

Six recreation activities are discussed below in detail. These are boating, fishing, swimming, camping, hiking and sightseeing. The first three activities were selected as the primary recreational activities

for the coastal area because of their reliance on water. Sightseeing is also considered a primary activity due to the scenic features of the Great Lakes shoreline. Camping and hiking are selected as the two land-based activities which are complementary to the four primary recreation activities. Picnicking and bicycling are not discussed in detail in this report.

BOATING

Boating is one of the fastest growing recreation activities among midwestern families. The 1972 Outdoor Recreation Demand Survey found 38 percent of the region's families participating in some form of boating during the year. Projections for 1980 show the participation rate at 55 percent of families which translates into a 5.5 percent growth per year.

The increased popularity of boating can be explained with reference to many factors. Among the more important ones are the increasing levels of regional incomes, decreasing maintenance costs due to the use of fiberglass in body construction and improvements in boat design. Smaller, lighter weight engines of motor boats and the improvements in the design of all boats have reduced maintenance costs and made it easier to transport, launch and use boats. Among the different kinds of boating, the increase in the popularity of canoeing and sailing could also be tied to the overall increase in interest toward most nonenergy-using recreation activities.

Boat Licenses

Boat registration figures are often used as an indicator of interest in boating. Although boat registration figures do indicate the interest in boating, they should not be used as indicators of boating participation. The number of boats registered in a county does not necessarily correspond to the participation rate or the level of participation in boating in that county.

The Licensing Section of the Wisconsin Department of Natural Resources classifies boat licenses by two categories--originals, which refer to individually owned boats (2 or less); and fleets, which refer to licenses issued for three or more boats, mostly to recreational business operators.

Table 2 shows the number of boat licenses issued to residents of the 15 coastal counties during the 1971-73 period. A comparison of the breakdown between originals and fleet licenses among the coastal counties shows the relative availability of boats for rent and/or the existence of resorts and other establishments which offer boating opportunities as a part of the overall recreation package.

Table 2. Number of Boat Licenses, by County (1971-73)

County	Originals*	Percent of Total	Fleets**	Percent of Total	Total
Ashland	5,179	91	498	9	5,677
Bayfield	4,572	64	2,585	36	7,157
Brown	28,946	99	376	1	29,322
Door	6,025	79	1,574	21	7,599
Douglas	12,192	80	1,298	10	13,490
Iron	2,493	55	2,006	45	4,499
Kenosha	15,743	92	1,382	8	17,125
Kewaunee	1,993	97	71	3	2,064
Manitowoc	13,176	99	170	1	13,346
Marinette	8,235	88	1,161	12	9,396
Milwaukee	119,188	98	2,021	2	121,209
Oconto	5,543	83	1,097	17	6,640
Ozaukee	8,320	98	160	2	8,480
Racine	21,613	96	991	4	22,604
Sheboygan	16,135	97	479	3	16,614
Total	269,353	94	15,869	6	285,222

* Original - Licenses for two or less boats.
** Fleet - Licenses for three or more boats

Source: Wisconsin Department of Natural Resources, Licensing Section, Boat and Snowmobile Registrations.

Among the coastal counties, only three (Bayfield, Iron and Door) have over 20 percent of their total boat licenses issued to fleets. Ashland, Douglas, Kenosha and Marinette counties have between 8-12 percent of their total boat licenses issued to fleets. In the remaining seven coastal counties, fleet registrations account for very small percentages of the total number of boats registered.

For the coastal zone as a whole, fleets account for 6 percent of the total boat licenses issued during the 1971-73 period. In the remaining 57 Wisconsin counties, the share of fleets in total boat licenses is 14 percent. The larger percentage of fleet licenses issued in noncoastal areas of Wisconsin can be interpreted as reflecting the predominance of the small resorts offering boat rentals or privileges in the noncoastal recreation areas of the state. Also, one could cite the higher initial and operating costs of boats for Great Lakes use as another explanation for the relatively lower percentage of fleet licenses issued in the coastal region.

Table 3 shows the number of boats (originals) per 1,000 persons in the coastal counties. In the coastal zone as a whole, 141 boats were registered per 1,000 coastal residents during the 1971-73 period. The densely populated counties show relatively smaller numbers of boats per 1,000 persons, while the low population counties have larger numbers of boats per 1,000 residents. The suitability of the coastline, extent of second-home development, the availability of boating facilities and the effects of crowding are among the major factors which need to be investigated as determinants of the differences in per capita boat ownership among the coastal counties.

Table 3. Resident Original* Boat Licenses per 1,000 Persons (1971-1973)

County	Original Boat Licenses per 1,000 Population	County	Original Boat Licenses per 1,000 Population
Ashland	309	Manitowoc	160
Bayfield	391	Marinette	230
Brown	183	Milwaukee	113
Door	300	Oconto	217
Douglas	273	Ozaukee	153
Iron	382	Racine	127
Kenosha	134	Sheboygan	167
Kewaunee	105		
		Total, Coastal Zone	141

Source: Wisconsin Dept. of Natural Resources, Licensing Section, Boat and Snowmobile Registrations.

* Original - Licenses for two or less boats.

Boating Participation Data

Existing data on the demand for boating do not distinguish between boating on the Great Lakes and boating on inland waters. Considering the difference in the boating experience on these two types of water, as well as the differences in the type and cost of equipment which is required for these two types of boating, the existing data are, indeed, grossly inadequate for a meaningful overview of coastal boating participation.

Table 4 summarizes the currently available information on boating participation for the 15 coastal counties and presents the projections for 1980. The boating participation figures reflect the number of boating occasions on an average summer weekend day. Total boating participation is composed of resident and nonresident participation. The nonresident participation covers visitors from other states and resident participation refers to boating by Wisconsin residents.

Table 4. Boating Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent change in total 1970-1980
Ashland	744	1,706	2,450	1,597	3,720	5,317	117.0
Bayfield	4,251	3,764	8,015	9,123	8,261	17,384	116.9
Brown	1,084	659	1,743	2,326	1,429	3,755	115.4
Door	3,678	3,064	6,742	7,893	6,659	14,552	115.8
Douglas	3,572	2,731	6,303	7,666	5,984	13,650	116.6
Iron	1,396	4,035	5,431	2,996	8,755	11,751	116.4
Kenosha	1,157	7,519	8,676	2,483	16,320	18,803	116.7
Kewaunee	585	294	879	1,255	638	1,893	115.4
Manitowoc	1,611	67	1,678	3,457	147	3,604	114.8
Marinette	3,605	1,271	4,876	7,736	2,808	10,544	116.2
Milwaukee	1,454	285	1,739	3,120	621	3,741	115.1
Oconto	4,994	670	5,664	10,717	1,471	12,188	115.2
Ozaukee	155	65	220	333	128	461	109.5
Racine	1,543	1,122	2,665	3,311	2,442	5,753	115.9
Sheboygan	608	677	1,285	1,305	1,469	2,774	115.9

Percent change in total participation between 1970-80 is shown on the last column of table 4. For the coastal zone as a whole, the total number of boating occasions on an average weekend day are expected to increase by about 115 percent between 1970 and 1980. The slight variation among the coastal counties in the percent change of total boating occasions between 1970 and 1980 is due to the composition of out-of-state demand and the differing population growth rates in various primary demand areas.1/

Table 5 shows nonresident boating occasions as a percent of total participation in 1970. The information provides a feel for the extent to which out-of-state demand adds to existing pressures from local and state boaters. Several variables can be cited as important in determining the relatively high share of nonresident boaters in some of the coastal counties. Proximity to a major population center (Kenosha, Racine, Sheboygan and Douglas counties, existence of a nationally known recreation area (Ashland and Bayfield) or the availability of a diversified recreational base (Door county) probably contribute to the relatively high percentage of out-of-state boaters selecting specific areas in Wisconsin.

Great Lakes Boating

As stated previously, boating participation data which distinguishes between boating on the Great Lakes and inland waters are extremely hard to come by. A notable exception to this is the survey data generated by R. Ditton and T. Goodale for purposes of studying marine recreational uses of Green Bay.2/ The survey, among other questions, queried respondents

1/ The primary demand area is defined as the states from which a county received its visitors during the summer of 1972.

2/ R. Ditton and T. Goodale, Marine Recreational Uses of Green Bay: A Survey of Human Behavior and Attitude Patterns, University of Wisconsin Sea Grant Program, Report #17, December 1972.

Table 5. Nonresident Boating Participation as a Percent of Total Participation by County, 1970

County	Nonresident Boating as Percent of Total (1970) (Average Summer Weekend Day)
Ashland	69.6
Bayfield	47.0
Brown	37.8
Door	45.4
Douglas	43.3
Iron	74.3
Kenosha	86.7
Kewaunee	33.4
Manitowoc	4.0
Marinette	26.1
Milwaukee	16.4
Oconto	11.8
Ozaukee	29.5
Racine	42.1
Sheboygan	52.3

from five Lake Michigan counties on the location of most boating, fishing and swimming participation. The following locations were identified in the survey: Green Bay, elsewhere on Lake Michigan, Inland Lake, Stream and River.

For the total sample, the location preferences of boaters were evenly divided between inland lakes and Green Bay (41% each).[1/] Thirteen percent of boaters identfied streams and rivers, while only 4 percent of boaters identified "elsewhere on Lake Michigan" as the location most frequently used for boating. The boaters identified proximity, water quality, good facilities and visual qualities as the major determining factors in their choice of location.[2/]

For purposes of this study, the locations identifed by boaters are aggregated to show the percent of boaters using Lake Michigan (locations

1/ R. Ditton and T. Goodale, Ibid., p. 124.

2/ Ibid., p. 75.

on Green Bay and elsewhere on Lake Michigan). This information is presented on table 6 by county of residence. The importance of proximity is evident in the case of Door County boaters. The Bay side of the Peninsula and elsewhere on Lake Michigan are the locations selected by 96 percent of the Door County boaters. In the remaining four counties, the availability of other water resources within close range and the low quality of Green Bay water are the factors which lead to increases in the use of inland waters for recreational boating purposes. Ditton and Goodale report that among the boaters who did most of their boating on inland lakes, 58 percent described the Bay as "dirty."[1/]

Table 6. Percent of Boaters Using Lake Michigan

County of Residence	Percent of Boaters Using Lake Michigan
Brown	39.47
Door	95.85
Kewaunee	56.25
Marinette	32.15
Oconto	36.59
Total	45.00

Source: R. Ditton and T. Goodale, Marine Recreational Uses of Green Bay: A Study of Human Behavior and Attitude Patterns, U. W. Sea Grant Program, Report #17, Dec. 1972.

FISHING

Fishing is one of the most popular outdoor recreation activities among midwestern families. The 1972 Outdoor Recreation Demand Survey found 49 percent of the region's households participating in this activity. Projections for 1980 indicate that the fishing participation rate will increase to over 62 percent of households, i.e., a 3.5 percent annual growth in the participation rate.

1/ Ibid., p. 81.

Great Lakes Fishing

Sport fishing in the Great Lakes is considered to be the fastest growing element of fishing participation. The introduction of salmon species in Lake Michigan, the increase in fish populations and the introduction of new devices, such as the sensing mechanisms used to identify the location of the fish, have increased the success and, therefore, the attractiveness of fishing in the Great Lakes.

The best evidence of the growth of sport fishing in the Great Lakes is the dramatic increase in the numbers of charter fishing services which operate from at least 20 coastal cities. In the Lake Superior area, Bayfield County has the largest concentration of charter fishing services. In the Lake Michigan region, Milwaukee, Kewaunee and Door counties have the largest concentrations of charter fishing services. Over 100 charter fishing services operate from numerous cities on Lake Michigan.

A study on the charter fishing industry of Lake Michigan estimates that in 1973 Lake Michigan charter boats carried 33,418 individuals who caughts 84,642 sports fish.[1/] As this industry, which is still in its infancy, increase in size and as the success stories are related by the fishermen to friends and neighbors back home, the number of individuals involved in this sport can be expected to continue increasing at a very fast rate.

As in the case of boating, very few studies of recreation demand (participation occasions) in the midwest have attempted to distinguish between fishing in the Great Lakes and fishing in inland waters. Once again, the Ditton and Goodale study on the recreational uses of Green Bay provides some insight into the location preferences of fishermen.

1/

1/ R. B. Ditton, W. A. Strang, M. T. Dittrich, Wisconsin's Lake Michigan Charter Fishing Industry, U. W. Sea Grant College Program, Advisory Report #1, March 1975, p. 17.

Table 7 shows the percent of fishermen using Lake Michigan by county of residence. The information, which is adapted from the Ditton-Goodale survey findings,[1] indicates proximity as a major factor behind the large percentage of fishermen from Door and Kewaunee counties who select a Great Lakes location. Needless to say, there is more to the location preferences of fishermen than proximity to a given area. For example, when the percent of fishermen using Lake Michigan is compared to the percent of boaters using Lake Michigan, we find larger percentages using inland lakes and streams for fishing than for boating purposes in all counties, except among Kewaunee county residents. This is in line with the observations of Ditton and Goodale that success plays as important a role as proximity in determining the location preferences of fishermen. The authors state that "...fishermen are somewhat less apt to fish in an area because it is close by than are boaters to boat an area, or swimmers to swim it."[2]

Table 7. Percent of Fishermen Using Lake Michigan

County	Percent of Fishermen Using Lake Michigan
Brown	35.29
Door	82.49
Kewaunee	68.18
Marinette	18.53
Oconto	19.35
Total	35.00

Source: R. Ditton and T. Goodale, Marine Recreational Uses of Green Bay: A Study of Human Behavior and Attitude Patterns, U. W. Sea Grant Program, Report #17, December, 1972.

1/ R. Ditton and T. Goodale, Op. Cit., pp. 168-177.

2/ Ibid., p. 77.

Among Kewaunee county fishermen who use Lake Michigan, only 20 percent fished on the Bay side, while the remaining 80 percent fished "elsewhere on Lake Michigan." The large number of charter fishing services which operate out of Kewaunee and Algoma could be cited as support for the Ditton-Goodale findings.

As in the case of boating, there is a need to identify the differences in the fishing experience between the Great Lakes and inland waters. Future surveys are planned to focus on this aspect of fishing participation so as to determine the degree of substitutability between the two types of fishing experiences. Questions relating to the displacability of demand can be addressed once this information is generated.

Fishing Licenses

During 1973, of the 958,704 fishing licenses sold in Wisconsin, 58 percent were purchased by Wisconsin residents and 42 percent by out-of-state fishermen.

Table 8 shows the breakdown between resident and nonresident fishing licenses sold in the coastal zone and in the remaining 57 counties. The percentages can be interpreted to mean greater preference of inland-lake-fishing among out-of-state fishermen visiting Wisconsin. The figures can also be interpreted as showing a relatively higher participation rate for fishing among coastal residents as compared to the residents of noncoastal areas. Finally, the percentages could be interpreted as showing a greater propensity

Table 8. Proportion of Resident/Nonresident Fishing Licenses Issued, 1973

Area	Resident	Nonresident	Total
Coastal Zone	79%	21%	100%
Rest of Wisconsin	52%	48%	100%
Total	58%	42%	100%

Source: Wisconsin Dept. of Natural Resources, Licensing Section, Madison, Wisconsin, 1974.

among the Wisconsin fishermen (from coastal and other areas) to visit coastal counties while on a fishing trip.

The breakdown of resident (Wisconsin) and out-of-state visitor families by destination, based on the 1972 Outdoor Recreation Demand Survey data lends support to an interpretation based on the destination preferences of resident and nonresident travelers. As shown on Table 9, Wisconsin residents who take trips lasting more than two days tend to select a destination in the coastal zone, while out-of-state visitors tend to favor the noncoastal counties to a relatively greater extent.

Table 9. Proportion of Resident/Nonresident Visitors by Destination

Area	Resident	Nonresident	Total
Coastal Zone	61%	39%	100%
Rest of Wisconsin	54%	46%	100%
Wisconsin	55%	45%	100%

Source: The Outdoor Recreation Demand Survey, U.G.L. Regional Recreation Planning Study, 1972.

Among other reasons behind the greater preference shown by out-of-state fishermen for inland water fishing we can cite the greater popularity of the inland-water-fishing-experience, higher costs associated with sport fishing on the Great Lakes and, possibly, the fear of large bodies of water.

Table 10 shows the numbers of resident and nonresident fishing licenses sold in the 15 coastal counties during 1973. The breakdown between resident and nonresident fishing licenses sold in the coastal counties suggests four basic county groupings. First, there are the coastal counties where over 90 percent of the fishing licenses were purchased by Wisconsin residents. Sheboygan, Racine, Milwaukee, Manitowoc and Brown are in this county grouping. At

the other extreme, we find a group of counties where over 50 percent of fishing licenses were purchased by nonresidents. Bayfield and Iron counties fall into this group. In Door, Douglas and Kenosha counties, there is a more or less even distribution of fishing licenses between residents and nonresidents. And, finally, the group consisting of Ashland, Kewaunee and Oconto counties, where 25-40 percent of fishing licenses were purchased by out-of-state fishermen.

Table 10. Fishing Licenses Sold In Coastal Counties, 1973

County	Resident Licenses	Percent of Total	Nonresident Licenses	Percent of Total	Total
Ashland	3,005	65	1,587	35	4,592
Bayfield	3,253	35	6,112	65	9,365
Brown	13,581	98	315	2	13,896
Door	5,176	51	5,070	49	10,246
Douglas	6,243	57	4,748	43	10,991
Iron	2,146	28	5,645	72	7,794
Kenosha	11,403	53	9,980	47	21,383
Kewaunee	2,698	75	906	25	3,604
Manitowoc	9,209	92	839	8	10,048
Marinette	7,663	63	4,420	37	12,083
Milwaukee	77,347	97	2,448	3	79,795
Oconto	6,653	73	2,273	27	9,101
Ozaukee	4,594	92	425	8	5,019
Racine	15,185	92	1,285	8	16,470
Sheboygan	11,437	94	718	6	12,155

Source: Wisconsin Department of Natural Resources, Licensing Section, Madison, Wisconsin, 1974.

Fishing Participation Data

The county level information on resident and nonresident fishing participation refers to Wisconsin residents as the resident participators. The out-of-state fishermen are classified as nonresident participators. Table 11 summarizes the currently available information on fishing participation for the 15 coastal counties and presents the projections for 1980. The total number of fishing occasions on an average summer weekend

Table 11. Fishing Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent change in total 1970-1980
Ashland	676	1,655	2,331	1,231	3,061	4,292	84.1
Bayfield	5,346	3,862	9,208	9,732	7,190	16,922	83.8
Brown	761	551	1,312	1,385	1,013	2,398	82.8
Door	3,953	2,733	6,686	7,196	5,038	12,234	83.0
Douglas	3,520	3,421	6,941	6,408	6,359	12,767	83.9
Iron	1,807	1,460	3,267	3,290	2,687	5,977	83.0
Kenosha	949	7,194	8,143	1,728	13,245	14,973	83.9
Kewaunee	1,336	291	1,627	2,432	536	2,968	82.4
Manitowoc	1,585	116	1,701	2,885	216	3,101	82.3
Marinette	7,210	2,090	9,300	13,125	3,917	17,042	83.2
Milwaukee	2,462	536	2,998	4,482	991	5,473	82.6
Oconto	7,707	2,390	10,097	14,030	4,450	18,480	83.0
Ozaukee	1,423	242	1,665	2,590	404	2,994	79.8
Racine	939	1,227	2,166	1,709	2,265	3,974	83.5
Sheboygan	1,497	821	2,318	2,725	1,511	4,236	82.7

day are projected to increase in all coastal counties between 1970 and 1980. The increases range from 80 percent in Ozaukee to 84 percent in Ashland county.

Table 12 shows the nonresident component of total participation in 1970.

Table 12. Nonresident Fishing Participation as a Percent of Total Fishing Participation, by County, 1970 and 1980

County	Nonresident Fishing as a Percent of Total (1970)
Ashland	71.0
Bayfield	41.9
Brown	42.0
Door	40.9
Douglas	49.3
Iron	44.7
Kenosha	88.3
Kewaunee	17.9
Manitowoc	6.8
Marinette	22.5
Milwaukee	17.9
Oconto	23.7
Ozaukee	14.5
Racine	56.6
Sheboygan	35.4

The nonresident fishing participation as a percent of total fishing occasions, when compared with the nonresident fishing licenses as a percent of total for each county, shows sufficient discrepancy to underscore a point--namely, license sales are not a good indicator of where people fish. For example, only 2 percent of total licenses sold in Brown county were identified as nonresident licenses whereas 42 percent of fishermen on an average weekend day were nonresidents. Despite the different time periods and different years to which the two sets of information refer, one can still conclude that there is a low correspondence between where licenses are purchased and where people go fishing.

SWIMMING

Next to sightseeing, swimming is the most popular recreation activity in the midwest region in terms of the percent of households in which one or more persons engage in the activity. The 1972 Outdoor Recreation Demand Survey determined the swimming participation rate to be about 58 percent among households in a 9-state area of the Upper Midwest. Projections for 1980, based on socioeconomic, supply and other variables, however, indicate a slight decline of 0.25 percent per year in the outdoor swimming participation rate between 1972 and 1980.

The leveling off and slight decline in the swimming particpation rate can be attributed to a combination of several factors. First, the increased availability of indoor swimming facilities, both in population centers and in overnight lodging establishments, has resulted in a shift from outdoor to indoor swimming. All the uncertainties associated with outdoor swimming (uncertain weather conditions, water temperatures and water quality considerations) are removed when the swimmer goes indoors. Although the contribution of the sun and other natural elements is removed from the swimming experience, a large number of swimmers seem willing to make the trade-off. There is also a habit component in the outdoor-to-indoor shift in swimming. The outdoor swimming season is, at the most, three months long in the Upper Midwest. During the remaining nine months the only readily available swimming opportunities are indoors. It is safe to assume that a large number of swimmers get used to the conveniences offered by indoor pools and begin to regard the constant air and water temperatures, as well as the clear blue water, as the basic ingredients of the swimming experience.

Secondly, increasing competition from numerous other recreation opportunities has been taking over some of the leisure time devoted to swimming.

Another reason for the anticipated decline in outdoor swimming can be found in changing attitudes toward water quality. Except for the very young who will splash in any kind of water, the awareness of the quality of water has increased among most groups over the past decade. Ditton and Goodale report that the attitude survey indicates the greater importance of "cleaner water" as a reason for selecting a location among swimmers as compared to boaters and fishermen.[1/]

Swimming in the Great Lakes

Table 13 shows the percent of swimmers using Lake Michigan by county of residence. The percentages are adapted from the Ditton-Goodale survey findings[2/] and vaguely indicate the continued importance of proximity as a determinant of location preferences. Door and Kewaunee county residents continue to use Green Bay and Lake Michigan more than the residents of the remaining three counties. There is, however, a decrease in the percent using Lake Michigan from boating to fishing to swimming. In Kewaunee county, for example, the number of swimmers using pools is greater than the number using the Bay and other locations on Lake Michigan. Pool usage is also high among residents of Green Bay and suburbs and in the rest of Brown County. On the other hand, inland lakes are the most preferred swimming locations among Marinette and Oconto county swimmers.

For the five counties as a whole, the location preferences of swimmers are dominated by inland lake locations (48%) followed by swimming pools (23%), Green Bay (17%), streams and rivers (9%), and, finally, elsewhere on Lake Michigan (3%).[3/]

1/ R. Ditton and T. Goodale, Op. Cit., p. 77.

2/ Ibid., pp. 188-199.

3/ R. Ditton and T. Goodale, Ibid., p. 124.

Table 13. Percent of Swimmers Using Lake Michigan

County	Percent of Swimmers Using Lake Michigan
Brown	18.52
Door	60.00
Kewaunee	33.36
Marinette	13.17
Oconto	17.06
Total	20.00

Source: R. Ditton and T. Goodale, Marine Recreational Uses of Green Bay: A Study of Human Behavior and Attitude Patterns, U. W. Sea Grant Program, Report #17, December 1972.

Swimming Participation Data

The swimming participation data for 1970 and the projections for 1980 are presented on Table 14. The total number of swimming occasions is projected to increase by about 30 percent in most coastal counties by 1980. The projected increase in swimming occasions is less than the projected increases in boating and fishing occasions during the same period due to the slight decline in the swimming participation rate.

The share of nonresidents in total swimming occasions during 1970 is shown on Table 15. Kewaunee, Milwaukee and Brown counties have the lowest nonresident participation, while Kenosha, Ashland and Iron have the highest nonresident swimming occasions.

In Brown county the swimming occasions by nonresidents are very low as compared to nonresident participation in boating and fishing. The same is true in Kewaunee county. On the other hand, the extremely low nonresident participation figures for boating and fishing in Manitowoc county (4% and 7%, respectively, in 1970) jump to 28 percent in the case on nonresident swimming occasions. Among the three water-based activities,

Table 14. Swimming Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent change in total 1970-1980
Ashland	894	2,048	2,942	1,154	2,686	3,840	30.5
Bayfield	6,327	5,883	12,210	8,167	7,767	15,934	30.5
Brown	6,185	978	7,163	7,984	1,275	9,259	29.3
Door	13,081	10,764	23,845	16,886	14,071	30,957	29.8
Douglas	6,673	6,395	13,068	8,614	8,429	17,043	30.4
Iron	1,457	3,062	4,519	1,881	3,996	5,877	30.1
Kenosha	5,262	18,086	23,348	6,792	23,612	30,404	30.2
Kewaunee	4,764	451	5,215	6,150	589	6,739	29.2
Manitowoc	2,054	788	2,842	2,651	1,041	3,692	29.9
Marinette	9,026	4,206	13,232	11,651	5,890	17,541	32.6
Milwaukee	22,695	3,190	25,885	29,296	4,184	33,480	29.3
Oconto	8,461	4,267	12,728	10,922	5,633	16,555	30.1
Ozaukee	3,412	1,013	4,425	4,404	1,199	5,603	26.6
Racine	6,641	4,294	10,935	8,573	5,622	14,195	29.8
Sheboygan	7,105	3,562	10,667	9,172	4,649	13,821	29.6

the highest nonresident participation is also found in swimming in Oconto county. The availability of numerous inland lake locations and the large number of youth camps located in these counties is the most likely reason behind the high nonresident swimming participation in these counties.

Table 15. Nonresident Swimming Participation as a Percent of Total Swimming Participation by County, 1970

County	Nonresident Swimming as a Percent of Total (1970) (Average Summer Weekend Day)
Ashland	69.6
Bayfield	48.2
Brown	13.7
Door	45.1
Douglas	48.9
Iron	67.8
Kenosha	77.5
Kewaunee	8.6
Manitowoc	27.7
Marinette	31.8
Milwaukee	12.3
Oconto	33.5
Ozaukee	22.9
Racine	39.3
Sheboygan	33.4

CAMPING AND HIKING

The major recreational attractions of the coastal areas lie in their unique scenic qualities and in the availability of water-based recreational opportunities. However, a number of land-based activities also need to be introduced into our survey because of their complementarity with some or all water-based activities. Camping and hiking are the two major land-based activities which fall into this category.

Camping participation is expected to increase at an annual rate of 2.8 percent until 1980.[1/] This indicates that interest in camping is leveling off somewhat as compared to the 1960's. Such a generalization, however, does not apply to all types of camping. Wilderness camping can be expected to continue to increase in popularity at a much faster rate than the increasing participation for camping in general.

Hiking, on the other hand, is fast becoming one of the most popular recreation activities among midwestern households. The increased levels of environmental awareness, as well as the increased interest in body conditioning, can be cited as the major factors behind the increasing popularity of this nonenergy consuming activity. The hiking participation rate is projected to increase by 4.8 percent per year until 1980 among midwestern families.[2/]

As travel to coastal counties increases, as Great Lakes fishing and boating increase in popularity, we can also expect increased numbers of people camping and hiking in coastal areas.

Camping and hiking, taken individually, can be considered displaceable recreation activities for the coastal area, in the sense that neither recreation activity requires utilization of the coast or the Great Lakes. They do, however, enter the coastal recreation picture because of their complementarity with fishing and boating participation of families. According to a study of the travel and activity participation patterns of midwestern families,[3/] the correlations between the two water-based

1/ Somersan, A., et. al., op. cit., p. 44.

2/ Ibid., p. 44.

3/ A. Somersan, R. Christiansen, R. Cooper, S. Staniforth, A Regional Study of Recreation Travel Behavior and Participation Patterns, Economic Research Service, USDA, Recreation Resources Ctr., Univ. of Wis.-Ext. and Dept. of Agric. Economics, College of Agric. and Life Sciences, U. of Wis. May 1975. p. 42.

Table 16. Camping Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent Change in Total 1970-1980
Ashland	277	480	757	475	836	1,311	73.2
Bayfield	2,751	2,374	5,125	4,715	4,161	8,876	73.2
Brown	0	295	295	0	511	511	73.2
Door	6,216	5,284	11,500	10,652	9,170	19,822	72.4
Douglas	525	3,444	3,969	900	6,027	6,927	74.5
Iron	1,026	891	1,917	1,758	1,544	3,302	72.2
Kenosha	0	2,388	2,388	0	4,139	4,139	73.3
Kewaunee	1,656	66	1,722	2,838	114	2,952	71.4
Manitowoc	271	407	678	464	714	1,178	73.7
Marinette	3,273	1,158	4,431	5,609	2,043	7,652	72.7
Milwaukee	381	272	653	653	474	1,127	72.6
Oconto	906	42	948	1,553	74	1,627	71.6
Ozaukee	818	206	1,024	1,402	208	1,610	57.2
Racine	326	1,807	2,133	559	3,141	3,700	73.5
Sheboygan	1,264	2,670	3,934	2,166	4,626	6,792	72.6

Table 17. Hiking Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent Change in Total 1970-1980
Ashland	1,165	410	1,575	2,356	842	3,198	103.0
Bayfield	2,183	2,784	4,967	4,415	5,758	10,173	104.8
Brown	858	306	1,164	1,735	625	2,360	102.7
Door	4,103	6,583	10,686	8,297	13,481	21,778	103.8
Douglas	1,373	2,414	3,787	2,776	4,985	7,761	104.9
Iron	689	1,791	2,480	1,393	3,662	5,055	103.8
Kenosha	1,171	2,224	3,395	2,368	4,549	6,917	103.7
Kewaunee	983	250	1,233	1,987	511	2,498	102.6
Manitowoc	1,440	325	1,765	2,912	673	3,585	103.1
Marinette	3,503	1,867	5,370	7,084	3,887	10,971	104.3
Milwaukee	6,683	1,653	8,336	13,515	3,397	16,912	102.9
Oconto	2,296	1,071	3,367	4,643	2,215	6,858	103.7
Ozaukee	1,612	502	2,114	3,260	931	4,191	98.2
Racine	1,365	1,433	2,798	2,760	2,939	5,699	103.7
Sheboygan	1,871	1,153	3,024	3,784	2,357	6,141	103.1

activities and camping and hiking are higher than the relationships observed for most other pairings of activities.

Tables 16 and 17 show the participation in camping and hiking on an average weekend day in 1970, and the projections for 1980, for the 15 coastal counties. The total number of camping occasions is expected to increase in all coastal counties between 1970 and 1980. The increases vary between 57 percent for Ozaukee and 74.5 percent for Douglas county. Kenosha and Brown counties did not have any resident participation in camping in the 1970 DNR survey and, therefore, projections for 1980 are based only on nonresident campers. Hiking participation is projected to increase by over 100 percent between 1970 and 1980.

Table 18 shows nonresident camping and hiking occasions as a percent of total participation occasions in 1970. Nonresident camping occasions as a percent of total are lowest in Kewaunee and Oconto counties. Nonresident hiking occasions are lowest in Milwaukee and Manitowoc counties.

Table 18. Nonresident Camping and Hiking Participation as a Percent of Total Participation by County, 1970

County	Camping 1970	Hiking 1970
Ashland	63.4	26.0
Bayfield	46.3	56.0
Brown	100.0	26.2
Door	45.9	61.6
Douglas	86.8	63.7
Iron	46.5	72.2
Kenosha	100.0	65.5
Kewaunee	3.8	20.3
Manitowoc	60.0	18.4
Marinette	26.1	34.8
Milwaukee	41.7	19.8
Oconto	4.4	31.8
Ozaukee	20.1	23.7
Racine	84.7	51.2
Sheboygan	67.9	38.1

SIGHTSEEING

The sightseeing opportunities offered by the numerous scenic areas throughout Wisconsin's coastal zone have to be considered as major attractions in any survey of recreational resources. Sightseeing is an integral part of almost any family recreational outing. Scenic qualities of an area and accommodating the interests of most family members are among the most important considerations in selecting a vacation destination.

Table 19 shows the share of nonresident occasions in total sightseeing occasions. Resident and nonresident sightseeing participation for 1970 and 1980 are shown on table 20. Sightseeing in the coastal counites is projected to increase by about 62 percent over the 10-year period. Nonresident sightseeing as a percent of total occasions is lowest in Kewaunee County and highest in Kenosha and Douglas Counties.

Table 19. Nonresident Sightseeing as a Percent of Total Participation by County, 1970

County	Nonresident Sightseeing as a Percent of Total (1970)
Ashland	62.6
Bayfield	53.5
Brown	23.7
Door	63.8
Douglas	81.3
Iron	62.0
Kenosha	83.3
Kewaunee	6.6
Manitowoc	30.4
Marinette	54.3
Milwaukee	22.8
Oconto	27.6
Ozaukee	22.3
Racine	38.7
Sheboygan	43.2

Table 20. Sightseeing Participation in Coastal Counties (Average Summer Weekend Day)

County	1970 Resident	1970 Nonresident	1970 Total	1980 Resident	1980 Nonresident	1980 Total	Percent Change in Total 1970-1980
Ashland	1,003	1,680	2,683	1,617	2,739	4,356	62.4
Bayfield	1,720	1,979	3,699	2,714	3,265	6,039	63.3
Brown	4,667	1,451	6,118	7,526	2,364	9,890	61.7
Door	5,593	9,837	15,430	9,019	16,064	25,083	62.6
Douglas	865	3,754	4,619	1,395	6,181	7,576	64.0
Iron	318	519	837	512	846	1,358	62.2
Kenosha	1,554	7,755	9,309	2,506	12,648	15,154	62.8
Kewaunee	927	66	993	1,495	108	1,603	61.4
Manitowoc	1,646	720	2,366	2,654	1,189	3,843	62.4
Marinette	2,078	2,474	4,552	3,351	4,107	7,458	63.8
Milwaukee	22,374	6,618	28,992	36,081	10,845	46,926	61.9
Oconto	1,005	384	1,389	1,621	633	2,254	62.3
Ozaukee	3,132	897	4,029	5,051	1,326	6,377	58.3
Racine	3,475	2,192	5,667	5,604	3,585	9,189	62.1
Sheboygan	2,196	1,668	3,864	3,541	2,719	6,260	62.0

SUPPLY OF RECREATIONAL FACILITIES IN THE COASTAL COUNTIES AND COMMUNITIES

Project Investigator: Michael Neuman

SUPPLY*

An indication of the supply of recreational facilities for the Great Lakes is the topic of this section. Most of the discussion, for readability's sake, is in the form of regional analysis. The Lake Superior region includes the counties of Douglas, Bayfield, Ashland (excluding the Apostle Islands), and Iron. The upper Lake Michigan region includes the counties of Marinette, Oconto, Brown, Door, Kewaunee, Manitowoc, and Sheboygan. Ozaukee, Milwaukee, Racine, and Kenosha constitute the lower Lake Michigan counties. Specific county supply information is provided in Appendix C. The distribution of some recreational sites is shown in Figures 1 - 3.

In dealing with the supply of recreation, it is necessary to have knowledge of the types of facilities and users involved:

User	Facility
Shore fishermen	Piers, breakwaters, bridges, fishing areas, parking, roads, trails, sanitary facilities.
Boaters (cruisers, sailors, fishermen)	Ramps, slips, harbors of refuge, storage facilities, docks, mooring, parking, roads, sanitary facilities.
Swimmers, hikers, bikers	Beaches, trails, picnic areas, bathhouses, life guards, roads, trails, sanitary facilities.
Sightseers	Outlooks, waysides, scenic areas, roads, trails, sanitary facilities.
Overnight users	Campsites, motels, hotels, resorts.

For the purposes of this section, the facilities have been categorized for discussion purposes. The categories include: 1) harbors of refuge and marinas, 2) boat ramp sites, 3) charter-fishing services, 4) facilities for land-based water-oriented activities, 5) lodging facilities.

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* The supply data appearing in this section was compiled for use in the Public Access report as well as in this study. Thus, some of the information in this section also appears in the Public Access report by Michael T. Neuman.

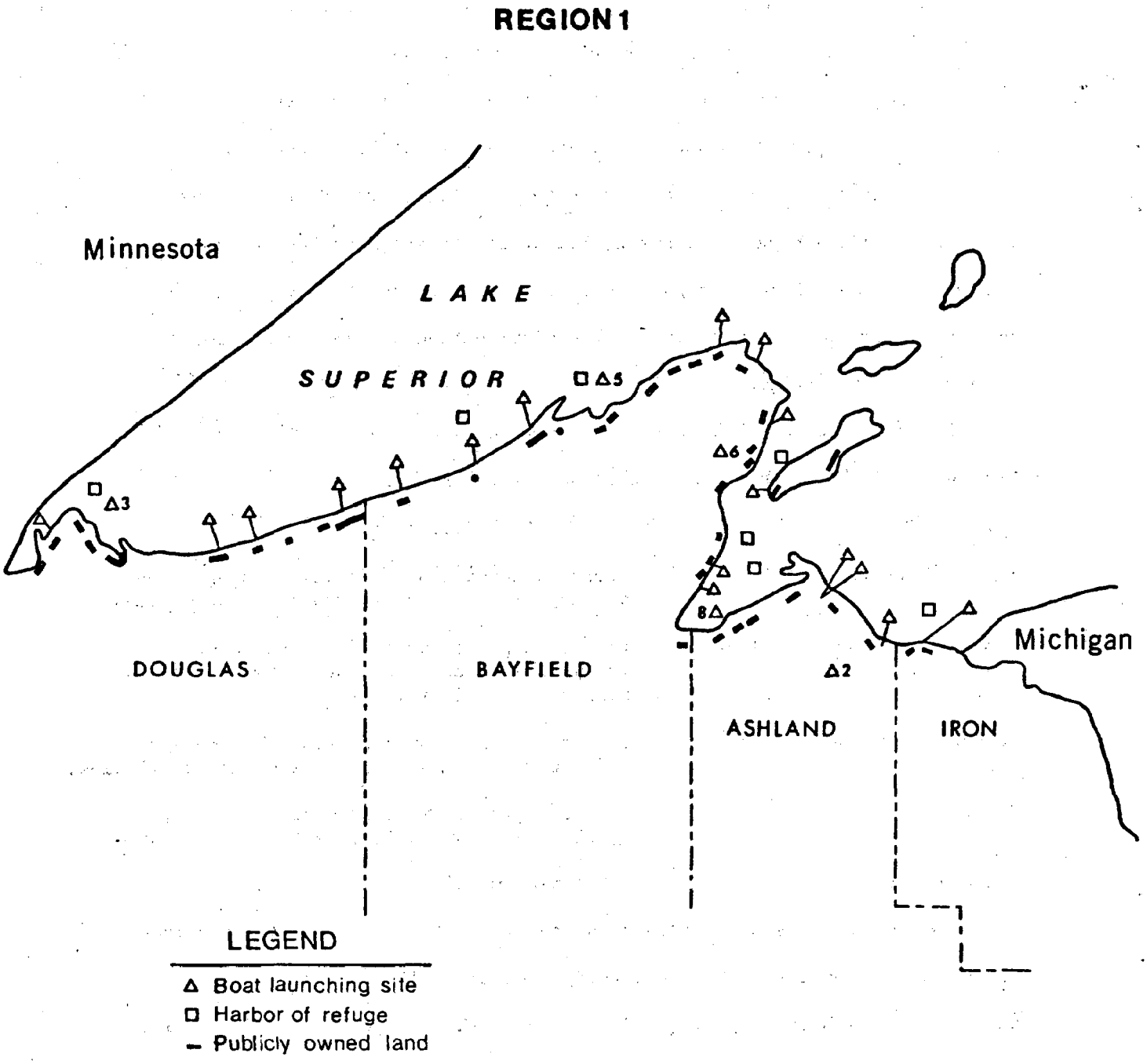
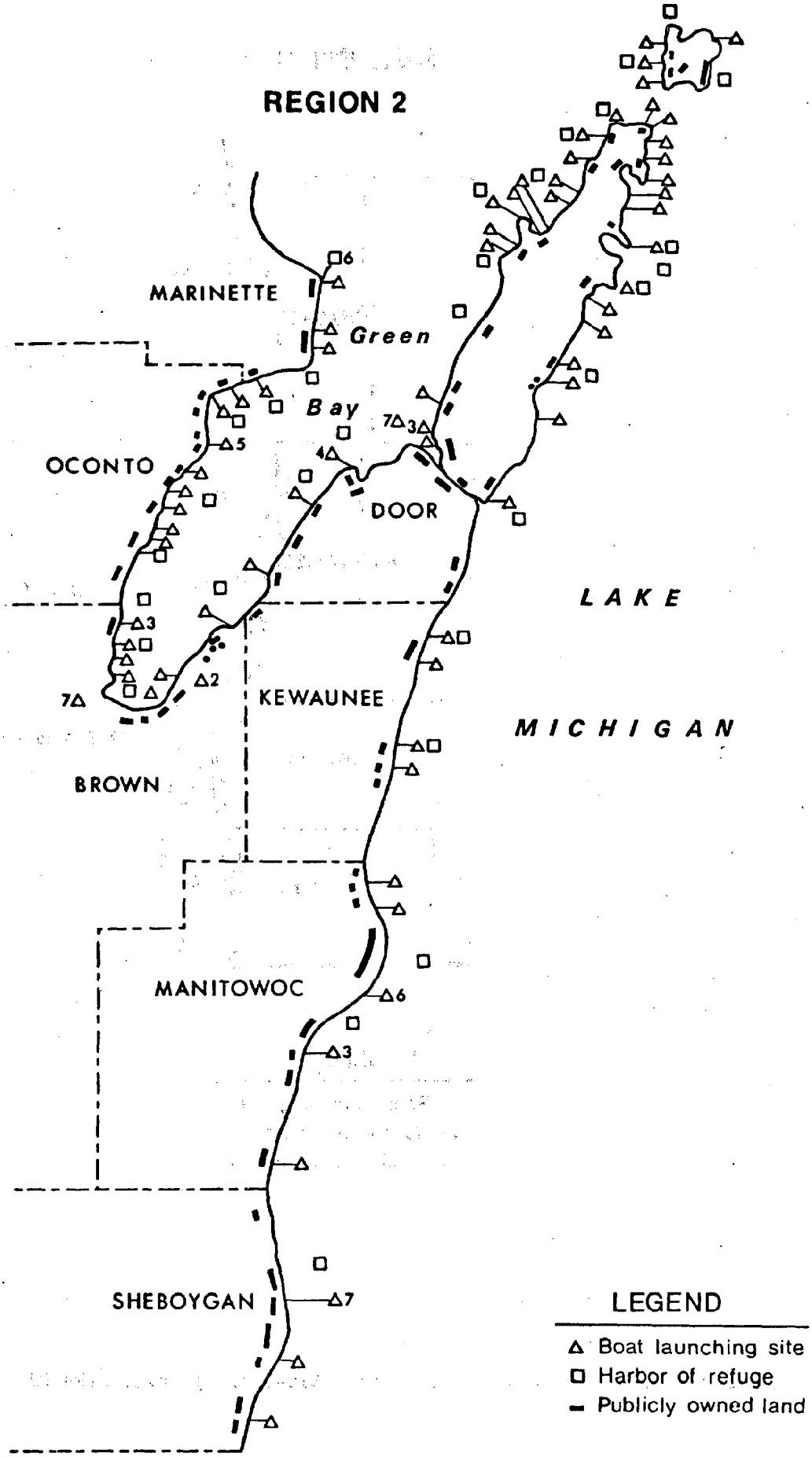


Figure 1. Distribution of Recreational Sites along Lake Superior

Figure 2. Distribution of Recreational Sites along upper Lake Michigan



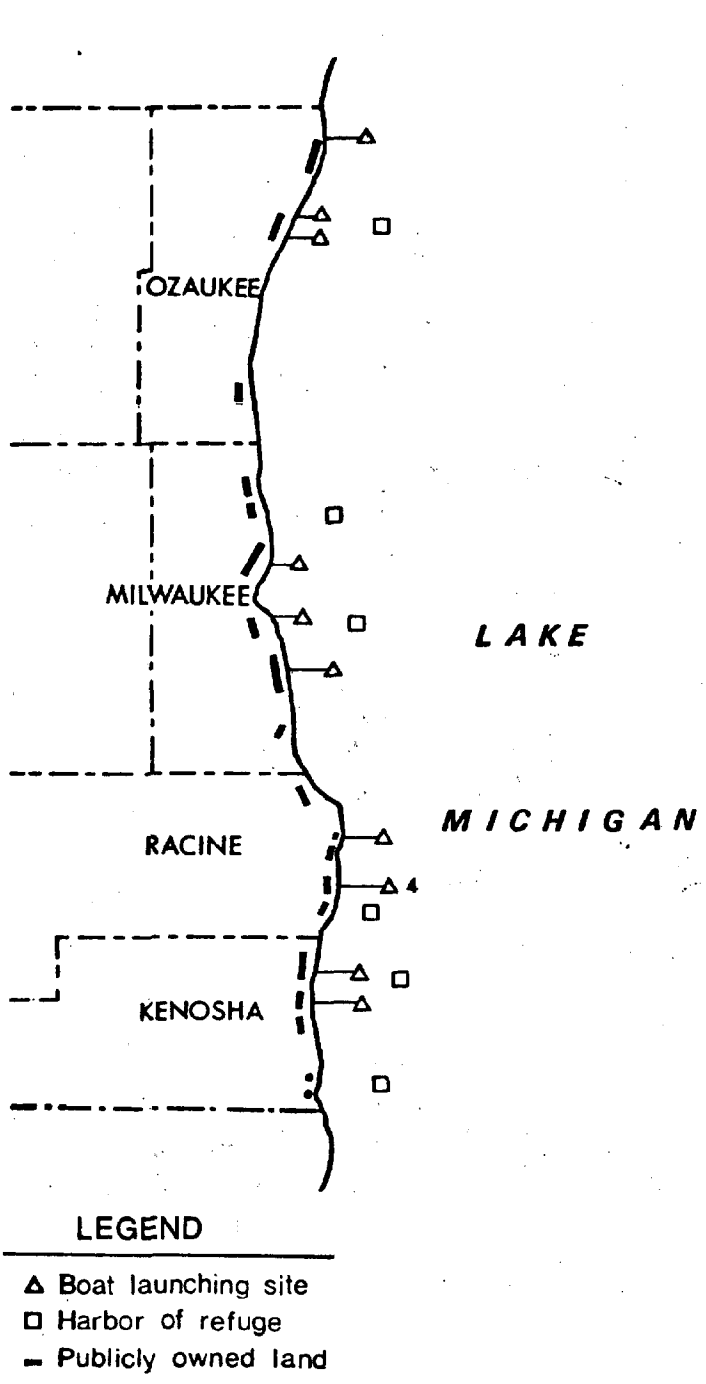


Figure 3. Distribution of Recreational Sites along lower Lake Michigan

SMALL BOAT HARBORS (MARINAS)

The distinction between marinas and small boat harbors is that there are often more than one marina in a harbor area. Thus, if more than one marina is located in a harbor, they are treated as one small boat harbor facility. The marina information is aggregated by region in table 1.

There appears to be no problem as far as the basic physical characteristics of marinas. The problem lies in the inadequacy of the present facilities in satisfying all the boaters who wish to rent slip spaces. For example, the Economic Impact and Needs of Wisconsin's Great Lakes Boaters (1976), (hereafter referred to as the boater survey) found that during the summer of 1975, all marinas surveyed were operating at full capacity. There were 1,031 boaters on marina waiting lists on the Great Lakes.

Table 1. Marinas

Region	Number of marinas	Slips	Average Slip Length
LS	9	576	less than 30 ft.
ULM	31	1,220	greater than 30 ft.
LLM	7	1,394	greater than 30 ft.
Total	47	3,190	

Some factors which have hampered development of marina facilities have been identified in the boater survey. Common problems of both public and private marina managers were: Difficulty in securing operating and expansion capital, lack of state assistance to marinas, difficulty in obtaining qualified help, weather and the short seasons (p. 59).

Harbors of refuge are particularly important for boaters who travel along the coast of the Great Lakes. Storms come up fast and furious on the lakes and boaters must find places of safety during these times. An approximation of the extent of refuge harbors, aggregated by region, is given in table 2.

Table 2. Distance Between Harbors*

LS	Average of one harbor every 30 miles of shore
ULM	Average of one harbor every 13 miles of shore
LLM	Average of one harbor every 12 miles of shore

Source: Derived from Great Lakes Basin Framework Study, Recreational Boating: Appendix R. 9.

* The statistics for distribution of the facilities relate the existing supply of facilities to the length of shoreline. Since the information is aggregated, it cannot be assumed that at a given location on the coast, a harbor of refuge will be no further away than the distance cited above. For example, between Kewaunee and Two Rivers there are 26 miles of shore not having a harbor of refuge.

BOAT RAMP SITES

Boat ramp information is aggregated by region in table 3. Many boat ramp sites have more than one ramp, especially in the LS and LLM regions. Ninety-one percent of the ramps in the LLM area are surfaced; 75 percent of ULM ramps are surfaced; but surfaced ramps account for only 56 percent of the total Lake Superior ramps. For the Great Lakes as a whole, there are 245 ramps at 170 boat ramp sites. This summary also includes ramp sites on tributaries of the Great Lakes within approximately one township from the Great Lakes water surface.

Table 3. Boat Ramp Sites

	Ramps	Sites	Parking (car-trailer)	Surfaced	Publicly owned
LS	48	30	835	27	16
ULM	161	117	3,958	120	100
LLM	36	13	954	33	33
Total	245	160	5,747	180	149

Seasonality

Boat ramps, like many other recreation facilities, suffer from problems of seasonal use. Cohee, M., (1972) found that boat ramp sites in the state were open for launching an average of 145 days (p. 41). County-owned accesses were opened for the longest periods, whereas city-owned sites the shortest. Although there is no specific data for use periods on Lake Michigan and Lake Superior, it would seem reasonable to assume that boat ramps on Lake Superior would be open less than this average due to colder climate.

Peak Use

In designing boat ramps, a decision must be made whether to design for peak use or average use, or somewhere in between. Several high use periods exist for boat ramps. Highest use occurs on weekends and holidays, on nice days, when the fishing is good, during the early morning and later in the evening, and for special events like sailing races or fishing jamborees. A combination of these factors can result in a particular boat ramp being insufficient to handle the number of persons needing to launch a boat. Parking areas are also congested during these periods.

If one assumes that the supply of ramps influences the level of demand for more ramps, designing for peak use will create needs for additional ramps. Most enterprises supplying facilities having peak use periods probably design facilities to accommodate use somewhere in between average and peak use.

Parking Capacity

Parking at boat ramp sites varies from two-car trailer spaces to 200 spaces. There are 833 spaces for 48 ramps on Lake Superior, averaging 17 spaces per ramp. For Upper Lake Michigan there are 3,958 spaces for 161 ramps, averaging 24 spaces. Lower Lake Michigan showed the greatest number of spaces per ramp. There were 954 spaces for 36 ramps, averaging 26 spaces per ramp. The total parking capacity at ramps on the Great Lakes is 5,747 at 245 ramps, averaging 19 spaces for each ramp.

Parking areas include not only surfaced parking lots, but areas reasonably near the site where parking is permitted. Some of these parking areas are little more than open fields.

Type of Ramp

As noted previously, a majority of the ramps are surfaced (69 percent). It should be noted that many surfaced ramps are clearly in need of repair. The winter ice cover often breaks up the concrete, making use of the ramp difficult.

Unsurfaced ramps are usually made of gravel. These ramps also suffer maintenance problems in that the gravel is often washed away. Deposits of sand and debris impair these ramps, as well as the surfaced ramps.

Ownership

Ownership of the boat access ramps is primarily public, except for the Lake Superior area where 67 percent of the ramps are in private ownership.

For Upper Lake Michigan and Lower Lake Michigan, 51 and 91 percent are public, respectively. Townships and cities in the Lake Superior area and Upper Lake Michigan area provide most of the public ownership of boat ramps; cities provide most of the boat ramps in the Lower Lake Michigan area with the exception of Milwaukee where the county provides essentially all of the boat ramp facilities. Many of the ramp sites were developed with state and federal financial aid from the Bureau of Aid Programs (DNR), from park and road fund aid (DOT).

Fee Charges

Most publicly owned boat ramp sites on the Great Lakes provide launching facilities at no charge to the user. For the sites requiring fees, the range is from $1.00 to $2.00 for a single launching. Rates for nonresidents (county or city, depending upon ownership) vary from $2.00 to $3.00. Season passes are also available for users at the boat ramp sites.

Distribution

The distribution of boat ramp sites along the coast is variable. Most boat ramp sites on Lake Superior and Upper Lake Michigan are distributed fairly uniformly along the coast. However, in the Lower Lake Michigan area, the boat ramp sites are primarily located in the major cities. This nonuniform distribution has caused some safety problems in the Lower Lake Michigan area. The Town of Caledonia in Racine County sees this as a particularly critical problem. The chairman of the township has stated that they need road access for purposes of providing facilities for life-saving rescue operations.

The average regional distribution of boat ramp sites related to the amount of shoreline is shown on table 4. This table gives an approximation of the extent of boat access along the shore.

Table 4. Distribution of Boar Ramp Sites*

LS Average of one ramp site every 7.1 miles

ULM Average of one ramp site every 3.5 miles

LLM Average of one ramp site every 6.3 miles

*Since this information is aggregated, it cannot be assumed that at a given location on the coast, a boat ramp site will be no further away than the distance cited above. For example, there isn't a boat ramp for approximately 24 miles from Port Washington to Milwaukee. These statistics are primarily developed to give an overall impression of the degree of ramp site development relative to shoreline frontage. Since many ramps are located in cities within relatively short distances of one another, the statistics for the total aggregated areas must account for this distribution.

CHARTER FISHING

Charter fishing services are provided at numerous cities along the Great Lakes by private interests. These services give recreationists who do not own boats a chance to participate in Great Lakes sport fishing. Table 5 presents the existing supply of these services on Lake Michigan.

Table 5. Charter Fishing Services

Cities	Number of Charter Fishing Services	Cities	Number of Charter Fishing Services
Algoma	12	Milwaukee Area	29
Ashland	3	Port Washington	10
Baileys Harbor	3	Racine	3
Bayfield	5	Sheboygan	9
Cornucopia	1	Sister Bay	1
Gills Rock	2	Sturgeon Bay	10
Green Bay	1	Superior	1
Kenosha	7	Thiensville	1
Kewaunee	18	Two Rivers	12
Manitowoc	4	Washburn	6
Marinette	2	Washington Island	2
		Total	142

Sources: The Milwaukee Journal Travel Bureau, Lake Michigan and Lake Superior Fishing Charters, May 1974; and DNR, Sport Trolling Boat Licenses, 1975-76, Feb. 1975.

LAND-BASED WATER ORIENTED FACILITIES

A necessary ingredient for recreational use of the Great Lakes is public access. Public access to the Great Lakes requires either public or private land which is open for public use. An inventory of all private lands open to the public would require an extensive survey and has not been undertaken for this publication. Table 6 identifies the amount of public shoreland and recreational areas that are available for persons interested in access to water for purposes other than boating. Recreational activities are possible wherever this access is provided; however, these activities (e.g., swimming) are desirable primarily where other facilities are provided (e.g., changing houses, sanitary facilities).

TABLE 6 Shoreland Distribution*

Miles	L. Superior	Upper L. Michigan	Lower L. Michigan	Total (Miles)
Total Shoreland	214.18	415.30	82.01	712.4
Public-Owned Shoreland	29.4 (14%)	43.7 (10%)	26.0 (31%)	99.1 (14%)
Parks Shoreland	4.1	35.4	19.0	-
Forests Shoreland	123.9	82.7	.6	-
Beach Zone Shoreland	100.8	127.1	70.7	-

* Data from the U.S. Army Corps of Engineers (1971) which used 620 miles as the total Great Lakes Shoreland and from the Wisconsin DNR.

State Parks and Forests

Parks presently provide the majority of recreational facilities. There are nine state parks located in the Great Lakes counties and each park contains facilities for many types of recreation; state forests also provide recreation facilities with access to the Great Lakes. The Wisconsin Department of Natural Resources provided the data for the regional inventory, Table 7.

TABLE 7 State Parks and Forests, Coastal Counties*

Facilities	L. Superior	Upper L. Michigan	Lower L. Michigan
Area (sq. ft.)	40,137	10,956	536
Parking (spaces)	1,270	1,262	320
Nature & Hiking Trails (miles)	16.1	75	1.8
Snowmobile Trails (miles)	38.5	49.5	1.5
Coastal Frontage (miles)	2	39	1

* Derived from Wisconsin DNR data.

The state also provides fish and wildlife areas in several areas throughout the coastal counties, most of which lie in the upper Lake Michigan region. These lands are open to the public for fishing and hunting purposes.

Beaches and Shorefishing Areas

Swimming and shorefishing are possible in any areas where access can be obtained. However, swimming is usually desirable where there is a public beach with facilities and shorefishing is desirable where there are piers, bridges, docks, breakwaters, etc.

The Army Corps of Engineers (1971) identified 12 public beaches on Lake Superior shoreline, 27 on the upper Lake Michigan, and 13 on public beaches on the lower Lake Michigan shoreline. An accurate inventory of shorefishing areas in the coastal regions is not available for existing sources because although fishing takes place on public lands, there are some private enterprises, particularly resorts and campgrounds, which allow the public to fish on their lands.

Sightseeing:

An accurate inventory of sightseeing facilities cannot be obtained from the existing sources of data. It is questionable whether such an inventory could be made with any degree of accuracy of completeness because of a diversity of supply and taste.

Units of government and civic organizations have promoted scenic areas and routes. The Wisconsin Coastal Management Development Program has published Wisconsin Coastal History Trails (Purinton 1976 a, b) which points out many scenic sites along the Great Lakes. Historical commercial storefronts, church steeples, residential architecture, waterfronts, and museums are some of the scenic sites inventoried. In the coastal counties, the major scenic routes include the south shore of Lake Superior (Superior to Ashland), the Door County peninsula, and the Milwaukee County parkways. This selection of scenic routes serves as a guideline in developing the state scenic easement program. Wisconsin, through help from the Transportation Department, is considered a pioneer in the use of scenic easements.

The National Scenic Highway Study has found that the routes along the Great Lakes that are considered scenic are: Superior to Ashland, Marinette to Oconto, Green Bay to Egg Harbor, Fish Creek to Sheboygan,

and Cedar Grove to Thiensville. These routes sporadically provide visual access to the Great Lakes. Visual access can be obtained from the above roadways when physical access is not available (i.e., outlooks); but consideration also must be given to the visual aesthetics of looking at the shoreline from the water.

For the purposes of this section, trails will include biking, hiking, snowmobile, and cross-country ski trails.

Table 8 provides trail supply data, aggregated by region, from the DNR's "Wisconsin Trail System Plan" (unpub.). The number of trails or miles which provide recreational access to the Great Lakes cannot be obtained from existing inventory sources.

TABLE 8 Trails in the Coastal Counties

Region	Hiking (mi)	Biking (mi)	Snowmobiling (mi)	Cross-Country Skiing (mi)
L. Superior	73	-	84	36
Upper L. Michigan*	156	93	154	128
Lower L. Michigan**	84	351	84	35

* Includes Shawano and Menominee Counties

** Includes Waukesha, Washington, and Walworth Counties

Islands

There are two major groups of islands off the Wisconsin coast: the Apostle Islands and the Grand Traverse Islands. Efforts are currently underway to preserve their natural beauty and increase their availability for recreational use. Federal acquisition is currently underway to complete a 20-island chain off the Bayfield peninsula to be called the

Apostle Islands National Lakeshore (AINL). Stockton, Oak, Michigan, and Basewood Islands (area totaling 16,609 acres) were transferred to the federal government by Governor Lucey on February 2, 1976. Also included in the lakeshore will be 2,500 acres on the Bayfield peninsula. Madeline Island will not be acquired as part of the lakeshore.

The Grand Traverse Islands is a chain of 16 islands between Wisconsin's Door County peninsula and Michigan's Delta County peninsula, which is scattered across the entrance to Green Bay. Montgomery (1976) found that by excluding Washington Island, 47 percent of the remaining 15 islands is in public ownership (2,835 acres). Including Washington Island reduces the amount to 14 percent of publicly owned land in this island chain of 20,040 acres. Although these islands would be a great asset to Wisconsin and Michigan citizens, they would also be a financial burden since island parks are so expensive to maintain. Chambers Island is not considered as part of those islands.

OVERNIGHT LODGING FACILITIES

A recreation economy must provide overnight lodging facilities to accommodate recreationists and tourists.

Recreation Demand Survey and Forecasts (1974) estimated that 17 percent of the total visitors to the nine-state upper Great Lakes region come from outside the area. Trips originating from out of Wisconsin constituted 45 percent of the total trips in Wisconsin. The number of trips by non-state residents to the coastal zone counties was 39 percent. The number of trips to the coastal zone region from noncoastal counties in Wisconsin cannot be ascertained from the study.

The supply of lodging facilities, by region, is identified in Table 9. Capacity statistics on lodging and other facilities are provided in Appendix C. Camping facilities are included as lodging facilities, although camping is also a form of recreation.

TABLE 9 County Lodging Facilities

	Hotels, Motels (Rooms)	Resorts (Rooms)	Campsites (Sites)
LS	1,732	2,397	2,259
ULM	6,349	2,102	4,171
LLM	10,005	377	1,141

COASTAL ORIENTATION OF FACILITIES

For policy considerations, it may be of importance to know which areas in the coastal zone are highly oriented to the Great Lakes. Many counties have a large number of recreational facilities that are located outside of the coastal townships. The degree of coastal orientation* is a measure of the ratio of the number of facilities located in the coastal townships to the total number of facilities in the county.

Boating, swimming, and lodging facilities were chosen to demonstrate the coastal orientation of recreational facilities in the counties. Table 10 lists the coastal orientation of facilities in each coastal county. Low coastal orientation means less than 33 percent of the

* Coastal orientation is probably influenced by the amount of county surface area not in the coastal township, the amount of shoreline, the number of inland lakes, scenic areas, and other tourist attractions.

county's recreational facilities are located in the county's coastal township. The respective percentages for the medium coastal orientation is between 33 and 66 percent. High coastal orientation means greater than 66 percent of the county's recreational facilities are located in the county's coastal townships.

TABLE 10 Coastal Orientation

County	Ramps	Beaches	Lodging Capacity	Average
		Lower Lake Michigan		
Kenosha	L	L	M	L
Racine	L	L	L	L
Milwaukee	H	L	H	M
Ozaukee	H	L	M	M
		Upper Lake Michigan		
Sheboygan	M	L	L	L
Manitowoc	M	M	H	M
Kewaunee	H	M	H	H
Door	H	L	H	H
Brown	H	L	H	M
Oconto	L	L	L	L
Marinette	L	L	L	L
		Lake Superior		
Iron	L	L	L	L
Ashland	M	L	L	L
(Ashland)*	M	L	L	M
Bayfield	L	L	L	L
Douglas	L	M	H	M
Average	M	L	M	M

L = low coastal orientation
M = medium coastal orientation
H = high coastal orientation

* Includes Apostle Islands

The table identified Kewaunee and Door Counties to have the highest coastal orientation. Most recreational facilities in these counties are in the coastal townships. Medium coastal-oriented counties are located in all three regions of the coastal zone (LS, ULM, LLM). Similarly, the low coastal-oriented counties are not solely in any one region. The policy issue would be whether or not to promote additional recreational development in the high coastal-oriented counties, or to encourage more recreational development in the counties having a lower coastal orientation.

APPENDICES AND BIBLIOGRAPHY

APPENDIX A

DEMAND PROJECTION METHODOLOGY

In a highly simplified framework, necessitated by data limitations, the growth in demand (number of activity occasions) is tied to three factors: population growth, increases in the probability to travel and changes in the probability to participate in a given recreation activity.

Starting with the county level participation figures generated for the 1970 Outdoor Recreation Survey of the Department of Natural Resources as the base year data, the 1980 demand is calculated through an adjustment based on changes in population, travel and participation rates.

Thus, the projected level of demand is a product of base year demand and a growth factor. Symbolically, the relationship can be expressed as,

$$D'_{ij} = D_{ij} \frac{P'_i \; T'_i \; R'_{ij}}{P_i \; T_i \; R_{ij}} \qquad (1)$$

where D = Demand or activity occasions
P = Population
T = Probability to travel
R = Participation rate
i = County, 1.....15
j = Activity, 1.....6

and $'$ designates the projected values of the variables.

Total demand, however, has two components: resident demand and nonresident demand. Or,

$$D_{ij} = D^{r}_{ij} + D^{n}_{ij} \qquad (2)$$

where r stands for resident and n stands for nonresident activity occasions, in a given county. On the basis of equation (1), the projected level of resident demand would then be a product of current resident demand and a growth factor. The projected level of nonresident demand would be a product of current

nonresident demand and a growth factor. Hence, total projected demand can be expressed as,

$$D'_{ij} = D^{r'}_{ij} \frac{P'_{ri}}{P_{ri}} \frac{T'_{ri}}{T_{ri}} \frac{R'_{rij}}{R_{rij}} + D^{n'}_{ij} \frac{P'_{ni}}{P_{ni}} \frac{T'_{ni}}{T_{ni}} \frac{R'_{nij}}{R_{nij}} \quad (3)$$

where P_{ni} denotes the population of the primary demand area and is a weighted average of the population of those states from which the county received its visitors during the summer of 1972.

Two assumptions were necessitated by data limitations in applying the projection equation, (3). First, the regional participation rates (current and projected) were assumed to apply to residents and nonresidents, i.e.,

$$\frac{R'_{rij}}{R_{rij}} = \frac{R'_{nij}}{R_{nij}} \quad (4)$$

And, secondly, the probability to travel to a coastal county was assumed to increase at the same rate for all the coastal counties, by 21.47 percent over the 1970-1980 period.[1/]

The data utilized in the calculation of the growth factors for resident and nonresident demand for six outdoor recreation activities in the 15 coastal counties appear in Tables A-1 and A-2. Table A-1 shows the percent changes in recreation activity participation rates over the 1970-1980 period. Table A-2 shows the projected changes in the population of the states which comprise the primary demand area for each county.

1/ Somersan, A., et. al., op. cit., p. 44.

Table A-1. Projected Changes in Recreation Activity Participation Rates Among Midwestern Households, 1970 - 1980

Activity	Percent Change* 1970 - 1980
Swimming	-2.80
Boating	61.97
Fishing	37.39
Sightseeing	21.70
Camping	29.34
Hiking	52.62

Source: A. Somersan, et. al., Recreation Demand Survey and Forecasts, Upper Great Lakes Regional Recreation Planning Study, Part 2, Recreation Resources Center, U.W.-Extension, 1974, p. 44.

* The percent changes for the 1970-1980 period were recomputed from the 1972-80 percent changes in the participation rates.

Table A-2. Projected Changes in the Population of the Primary Demand Area* of Coastal Counties, 1970 - 1980

County	Percent Change in Population of Primary Demand Area - 1970-1980
Ashland	10.83
Bayfield	11.56
Brown	10.19
Door	10.46
Douglas	11.38
Iron	10.28
Kenosha	10.32
Kewaunee	10.28
Manitowoc	11.66
Marinette	12.30
Milwaukee	10.84
Oconto	11.54
Ozaukee	-
Racine	10.63
Sheboygan	10.28

* Primary demand area refers to the states from which each county received its visitors during the summer of 1972.

Source: U. S. Dept. of Commerce, Bureau of the Census, Current Population Reports: Population Estimates and Projections, March 1972.

STATES IN PRIMARY DEMAND AREA

Ashland	Wisconsin, Ohio, Indiana, Minnesota
Bayfield	Wisconsin, Minnesota
Brown	Wisconsin, Michigan, Illinois, Iowa, Minnesota
Door	Wisconsin, Illinois, Minnesota
Douglas	Wisconsin, Illinois, Minnesota
Iron	Wisconsin, Illinois
Kenosha	Wisconsin, Illinois, Minnesota, Ohio
Kewaunee	Wisconsin, Illinois
Manitowoc	Wisconsin, Michigan, Illinois
Marinette	Wisconsin, Michigan, Minnesota
Milwaukee	Wisconsin, Ohio, Michigan, Illinois, Iowa, Indiana, Minnesota
Oconto	Wisconsin, Minnesota
Ozaukee	Wisconsin
Racine	Indiana, Illinois
Sheboygan	Wisconsin, Illinois

APPENDIX B

DEMAND PROJECTIONS FOR 1985 and 1990

The projected levels of demand (activity participation occasions) for six summer recreation activities for 1985 and 1990 are presented in this appendix. The demand projection methodology is identical to that explained in detail in Appendix A, with one exception. Recreation activity participation rates for 1990 were obtained for each activity using the following formula:

$$R_{90} = R_{80} + \frac{R_{80} - R_{70}}{2}$$

where R stands for the activity participation rate and the subscript denotes the year.

Since activity participation rates were not available for 1990, this approach provided a compromise between assuming the 1980 participation rates for 1990 and projecting 1990 rates with a straight-line method.

The 1985 activity participation rates were interpolated from 1980 and 1990 rates.

Tables B1-B12 present the projected activity participation occasions for resident and nonresident users in the coastal counties for 1985 and 1990.

Table B-1. Boating Participation in Coastal Counties (Average Summer Weekend Day)

County	1985 Resident	1985 Nonresident	1985 Total	Percent total change 1970-1985
Ashland	1,932	4,478	6,410	161.6
Bayfield	11,041	9,984	21,025	162.3
Brown	2,815	1,716	4,531	160.0
Door	9,553	8,015	17,568	160.6
Douglas	9,277	7,227	16,504	161.8
Iron	3,626	10,531	14,157	160.7
Kenosha	3,005	19,631	22,636	160.9
Kewaunee	1,519	767	2,286	160.1
Manitowoc	4,184	178	4,362	160.0
Marinette	9,363	3,400	12,763	161.8
Milwaukee	3,776	761	4,537	160.9
Oconto	12,970	1,777	14,747	160.4
Ozaukee	403	146	549	149.5
Racine	4,007	2,940	6,947	160.7
Sheboygan	1,579	1,767	3,346	160.4

Table B-2. Boating Participation in Coastal Counties (Average Summer Weekend Day)

County	1990 Resident	1990 Nonresident	1990 Total	Percent total change 1970-1990
Ashland	2,313	5,301	7,614	210.8
Bayfield	13,216	11,869	25,085	213.0
Brown	3,370	2,031	5,401	209.9
Door	11,434	9,497	20,931	210.5
Douglas	11,105	8,587	19,692	212.4
Iron	4,340	12,471	16,811	209.5
Kenosha	3,597	23,244	26,841	209.4
Kewaunee	1,819	909	2,728	210.4
Manitowoc	5,008	211	5,219	211.0
Marinette	11,207	4,049	15,256	212.9
Milwaukee	4,520	877	5,397	210.4
Oconto	15,525	2,113	17,638	211.4
Ozaukee	482	166	648	194.5
Racine	4,797	3,482	8,279	210.7
Sheboygan	1,890	2,092	3,982	209.9

Table B-3. Fishing Participation in Coastal Counties (Average Summer Weekend Day)

County	1985			Percent total change 1970-1985
	Resident	Nonresident	Total	
Ashland	1,452	3,592	5,044	116.4
Bayfield	11,480	8,469	19,949	116.6
Brown	1,634	1,187	2,821	115.0
Door	8,489	5,911	14,400	115.4
Douglas	7,559	7,485	15,044	116.7
Iron	3,880	3,150	7,030	115.2
Kenosha	2,038	15,530	17,568	115.7
Kewaunee	2,869	628	3,497	114.9
Manitowoc	3,404	255	3,659	115.1
Marinette	15,483	4,623	20,106	116.2
Milwaukee	5,287	1,183	6,470	115.8
Oconto	16,550	5,241	21,791	115.8
Ozaukee	3,056	450	3,506	110.6
Racine	2,016	2,658	4,674	115.8
Sheboygan	3,215	1,772	4,987	115.1

Table B-4. Fishing Participation in Coastal Counties (Average Summer Weekend Day)

County	1990 Resident	1990 Nonresident	1990 Total	Percent total change 1970-1990
Ashland	1,700	4,160	5,860	151.4
Bayfield	13,444	9,852	23,296	153.0
Brown	1,914	1,373	3,287	150.5
Door	9,941	6,852	16,793	151.2
Douglas	8,852	8,702	17,554	152.9
Iron	4,544	3,650	8,194	150.8
Kenosha	2,386	17,990	20,376	150.2
Kewaunee	3,360	728	4,088	151.3
Manitowoc	3,986	296	4,282	151.8
Marinette	18,131	5,386	23,516	152.9
Milwaukee	6,191	1,334	7,525	151.0
Oconto	19,381	6,097	25,675	154.3
Ozaukee	3,578	499	4,077	144.9
Racine	2,361	3,080	5,441	151.2
Sheboygan	3,765	2,053	5,818	151.0

Table B-5. Swimming Participation in Coastal Counties (Average Summer Weekend Day)

County	1985 Resident	1985 Nonresident	1985 Total	Percent total change 1970-1985
Ashland	1,308	3,029	4,337	47.4
Bayfield	9,258	8,792	18,050	47.8
Brown	9,051	1,435	10,486	46.4
Door	19,141	15,865	35,006	46.8
Douglas	9,765	9,535	19,300	47.7
Iron	2,132	4,503	6,635	46.8
Kenosha	7,700	26,606	34,306	46.9
Kewaunee	6,971	663	7,635	46.4
Manitowoc	3,006	1,178	4,184	47.2
Marinette	13,208	6,340	19,548	47.7
Milwaukee	33,210	4,798	38,008	46.8
Oconto	12,381	6,377	18,758	47.4
Ozaukee	4,993	1,285	6,278	41.9
Racine	9,718	6,339	16,057	46.8
Sheboygan	10,397	5,238	15,635	46.6

Table B-6. Swimming Participation in Coastal Counties (Average Summer Weekend Day)

County	1990 Resident	1990 Nonresident	1990 Total	Percent total change 1970-1990
Ashland	1,440	3,297	4,737	61.0
Bayfield	10,193	9,613	19,806	62.2
Brown	9,964	1,562	11,526	60.9
Door	21,073	17,289	38,362	60.9
Douglas	10,750	10,421	21,171	62.0
Iron	2,347	4,904	7,251	60.5
Kenosha	8,477	29,299	37,776	61.8
Kewaunee	7,675	722	8,397	61.0
Manitowoc	3,309	1,288	4,597	61.8
Marinette	14,540	6,943	21,483	62.4
Milwaukee	36,562	5,088	41,650	60.9
Oconto	13,631	6,973	20,604	61.9
Ozaukee	5.497	1,339	6,836	54.5
Racine	10,699	6,906	17,605	61.0
Sheboygan	11,446	5,705	17,151	60.8

Table B-7. Camping Participation in Coastal Counties (Average Summer Weekend Day)

County	1985 Resident	1985 Nonresident	1985 Total	Percent total change 1970-1985
Ashland	554	970	1,524	101.3
Bayfield	5,502	4,849	10,351	102.0
Brown	0	592	592	100.7
Door	12,432	10,644	23,076	100.7
Douglas	1,050	7,018	8,068	103.3
Iron	2,052	1,790	3,842	100.4
Kenosha	0	4,801	4,801	101.0
Kewaunee	3,312	133	3,445	100.1
Manitowoc	542	832	1,374	102.7
Marinette	6,546	2,386	8,932	101.6
Milwaukee	762	559	1,321	102.3
Oconto	1,812	86	1,898	100.2
Ozaukee	1,636	357	1,993	94.6
Racine	652	3,646	4,298	101.5
Sheboygan	2,528	5,366	7,894	100.7

Table B-8. Camping Participation in Coastal Counties (Average Summer Weekend Day)

County	1990			Percent total change 1970-1990
	Resident	Nonresident	Total	
Ashland	643	1,113	1,756	132.0
Bayfield	6,382	5,586	11,968	133.5
Brown	0	678	678	129.8
Door	14,420	12,221	26,641	131.7
Douglas	1,218	8,081	9,299	134.3
Iron	2,380	2,055	4,435	131.4
Kenosha	0	5,509	5,509	130.7
Kewaunee	3,842	152	3,994	131.9
Manitowoc	629	958	1,587	134.1
Marinette	7,593	2,753	10,346	133.5
Milwaukee	884	625	1,509	131.1
Oconto	2,102	99	2,201	132.2
Ozaukee	1,898	392	2,290	123.6
Racine	756	4,185	4,941	131.6
Sheboygan	2,932	6,158	9,090	131.1

Table B-9. Hiking Participation in Coastal Counties (Average Summer Weekend Day)

County	1985 Resident	1985 Nonresident	1985 Total	Percent total change 1970-1985
Ashland	2,826	1,005	3,831	143.2
Bayfield	5,296	6,898	12,194	145.5
Brown	2,082	745	2,827	142.9
Door	9,954	16,086	26,040	143.7
Douglas	3,331	5,967	9,298	145.5
Iron	1,672	4,366	6,038	143.5
Kenosha	2,841	5,424	8,265	143.4
Kewaunee	2,385	609	2,994	142.9
Manitowoc	3,494	806	4,300	143.6
Marinette	8,499	4,666	13,165	145.2
Milwaukee	16,214	4,122	20,336	144.0
Oconto	5,570	2,654	8,224	144.3
Ozaukee	3,911	1,056	4,967	135.0
Racine	3,312	3,507	6,819	143.7
Sheboygan	4,539	2,811	7,350	143.1

Table B-10. Hiking Participation in Coastal Counties (Average Summer Weekend Day)

County	1990			Percent total change 1970-1990
	Resident	Nonresident	Total	
Ashland	2,863	1,007	3,870	145.7
Bayfield	5,364	6,939	12,303	147.7
Brown	2,108	745	2,853	145.1
Door	10,082	16,129	26,211	145.3
Douglas	3,374	6,000	9,374	147.5
Iron	1,693	4,375	6,068	144.7
Kenosha	2,877	5,435	8,312	144.8
Kewaunee	2,416	611	3,027	145.5
Manitowoc	3,539	810	4,349	146.4
Marinette	8,608	4,701	13,309	147.8
Milwaukee	16,422	4,022	20,444	145.2
Oconto	5,642	2,670	8,312	146.9
Ozaukee	3,961	1,012	4,973	135.2
Racine	3,354	3,515	6,869	145.5
Sheboygan	4,598	2,817	7,415	145.2

Table B-11. Sightseeing Participation in Coastal Counties (Average Summer Weekend Day)

County	1985 Resident	1985 Nonresident	1985 Total	Percent total change 1970-1985
Ashland	1,881	3,185	5,066	88.8
Bayfield	3,227	3,791	7,018	89.7
Brown	8,755	2,730	11,485	87.7
Door	10,492	18,586	29,078	88.5
Douglas	1,623	7,175	8,798	90.5
Iron	597	978	1,575	88.2
Kenosha	2,915	14,624	17,539	88.4
Kewaunee	1,739	124	1,863	87.6
Manitowoc	3,088	1,380	4,468	88.8
Marinette	3,898	4,781	8,679	90.7
Milwaukee	41,971	12,760	54,731	88.8
Oconto	1,885	736	2,621	88.7
Ozaukee	5,875	1,459	7,334	82.0
Racine	6,518	4,148	10,666	88.2
Sheboygan	4,119	3,144	7,263	88.0

Table B-12. Sightseeing Participation in Coastal Counties (Average Summer Weekend Day)

County	1990			Percent total change 1970-1990
	Resident	Nonresident	Total	
Ashland	2,162	3,621	5,783	115.5
Bayfield	3,708	4,328	8,036	117.2
Brown	10,062	3,101	13,163	115.2
Door	12,059	21,145	33,204	115.2
Douglas	1,865	8,187	10,052	117.6
Iron	686	1,112	1,798	114.8
Kenosha	3,350	16,627	19,977	114.6
Kewaunee	1,999	141	2,140	115.5
Manitowoc	3,549	1,575	5,124	116.6
Marinette	4,480	5,466	9,946	118.5
Milwaukee	48,239	14,127	62,366	115.1
Oconto	2,167	840	3,007	116.5
Ozaukee	6,753	1,587	8,340	107.0
Racine	7,492	4,718	12,210	115.5
Sheboygan	4,735	3,575	8,310	115.1

APPENDIX C

SUPPLY DATA

Table C-1. Great Lakes Boat Ramps in Coastal Townships

County	Ramps	Car-Trailer Parking
Kenosha	5	60
Racine	10	160
Milwaukee	15	600
Ozaukee	6	134
Sheboygan	11	515
Manitowoc	18	537
Kewaunee	12	400
Door	60	1,251
Brown	26	530
Oconto	18	221
Marinette	16	504
Iron	2	20
Ashland	17	300
(Ashland)*	(17)	(300)
Bayfield	19	324
Douglas	10	191
Total	245	5,747
Capacity		5,747 1/

* Includes Apostle Islands

1/ Assumption: capacity of ramp = no. of car-trailer spaces

Table C-2. Coastal Small Boat Harbors (Marinas)

County	Marinas (No.)	Slips (No.)
Kenosha	2	242
Racine	1	224
Milwaukee	3	893
Ozaukee	1	35
Sheboygan	1	61
Manitowoc	2	134
Kewaunee	2	111
Door	18	716
Brown	3	145
Oconto	3	53
Marinette	2	25
Iron	1	32
Ashland	2	231
(Ashland)*	(2)	(231)
Bayfield	5	288
Douglas	1	0
Total	47	3,190
Capacity		3,190 1/

* Includes Apostle Islands

1/ Assumption: Capacity at marinas - no. of slips.

Table C-3. Great Lakes Swimming and Shorefishing in Coastal Townships

County	Shoreland (Mi.)	Publicly Owned Shoreland (Mi.)	Publicly Owned Shoreland as a Percent of County Shoreland Miles (Pct.)	Number of Beaches (No.)
Kenosha	12.46	3.7	30	4
Racine	14.42	4.5	31	2
Milwaukee	29.40	15.5	55	6
Ozaukee	25.73	2.3	9	1
Sheboygan	26.09	4.8	18	5
Manitowoc	34.28	8.6	25	10
Kewaunee	25.63	1.4	5	3
Door	240.41	17.1	7	6
Brown	41.71	2.9	7	2
Oconto	28.78	3.9	13	0
Marinette	18.40	5.0	27	1
Iron	6.96	.8	11	0
Ashland	54.27	4.1	8	3
(Ashland)*	(194.27)	(144.1)	(74)	(4)
Bayfield	104.89	11.3	10	1
Douglas	48.71	13.2	27	8
Total	712.14	99.1	14.0 (Weighted average)	52

* Includes Apostle Islands

Table C-4. Lodging Facilities in Coastal Townships

County	Hotels, Motels (Rooms)	Capacity (Persons)	Resorts, Cottages (Rooms)	Capacity (Persons)	Campsites (Sites)	Capacity (Persons)	Total Lodging Capacity (Persons)
Kenosha	523	889	--	--	166	654	1,543
Racine	608	1,033	--	--	54	213	1,246
Milwaukee	6,682	11,359	--	--	311	1,225	12,584
Ozaukee	135	230	--	--	0	0	230
Sheboygan	455	773	15	59	165	650	1,482
Manitowoc	392	666	81	319	189	745	1,730
Kewaunee	141	240	16	63	200	788	1,091
Door	1,954	3,322	934	3,680	1,648	6,493	13,495
Brown	1,800	3,060	--	--	55	217	3,277
Oconto	39	66	37	145	60	236	447
Marinette	368	625	2	8	135	532	1,165
Iron	--	--	11	43	0	0	43
Ashland	281	477	46	181	108	426	1,084
(Ashland)*	(281)	(477)	(46)	(181)	(118)	(465)	(1,123)
Bayfield	191	325	72	284	287	113	722
Douglas	523	811	16	63	99	390	1,264
Total	14,092	23,876	1,230	4,845	3,477	12,682	41,403
Capacity		23,876[1/]		4,845[2/]		12,682[3/]	41,403

* Includes Apostle Islands

1/ Assumption: 1.7 persons per room.

2/ Assumption: 3.94 persons per room

3/ Assumption: 3.94 persons per campsite

Table C-5. Total Coastal County Facilities

County	Ramps	Beaches	Hotels, Motels	Resorts	Campsites	Total Lodging Capacities
	(No.)	(No.)	(Rooms)	(Rooms)	(Sites)	(Persons)
Kenosha	23	43	830	193	296	3,337
Racine	32	23	818	184	450	3,888
Milwaukee	15	69	8,139	0	311	15,061
Ozaukee	7	11	218	0	84	701
Sheboygan	24	26	1,056	167	820	5,685
Manitowoc	34	7	472	88	347	2,516
Kewaunee	16	6	172	23	200	1,171
Door	66	35	1,954	934	1,648	13,494
Brown	27	7	1,967	0	327	4,632
Oconto	68	30	155	475	197	2,910
Marinette	52	18	573	415	632	5,099
Iron	25	10	311	544	223	3,549
Ashland	36	15	320	343	388	3,424
(Ashland)*	(36)	(15)	(320)	(343)	(398)	(3,464)
Bayfield	91	21	444	1,137	910	8,820
Douglas	62	20	657	373	728	5,455
Total	578	341	18,086	4,876	7,561	79,742

* Includes Apostle Islands

Table C-6. Coastal Orientation of Facilities

County	Percent of Total County Facilities Located in Coastal Townships			
	Ramps	Beaches	Lodging Capacity	Average
	-Percent-			
Kenosha	22	9	46	(25)
Racine	31	8	32	(24)
Milwaukee	100	8	84	(64)
Ozaukee	85	9	33	(42)
Sheboygan	45	19	26	(30)
Manitowoc	53	58	69	(60)
Kewaunee	75	50	93	(72)
Door	90	17	100	(69)
Brown	96	28	70	(64)
Oconto	26	0	15	(13)
Marinette	30	5	23	(19)
Iron	8	0	0	(2)
Ashland	47	20	31	(32)
(Ashland)*	47	26	32	(35)
Bayfield	20	4	8	(10)
Douglas	16	40	70	(42)
Weighted Average	42	15	52	(36) (Not weighted)

* Includes Apostle Islands

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