861314

SHORELAND UPDATE LEGISLATIVE REFERENCE LIBRARY

Report 8

SHORELAND RESIDENTS -A QUESTIONNAIRE SURVEY



LEGISLATIVE REFERENCE LIBRARY 645 State Office Building Saint Paul, Minnesota 55155

DEPARTMENT OF TO NATURAL RESOURCES Division of Maters 330 .C63 1986

TC

TC330 .C63 1986

00062 2129

FLOOD PLAIN/SHORELAND MANAGEMENT SECTION

1986

INNESOTA

This document is made available electronically by the Minnesota Legislative Reference Library as part of an ongoing digital archiving project. <u>http://www.leg.state.mn.us/lrl/lrl.asp</u>

(Funding for document digitization was provided, in part, by a grant from the Minnesota Historical & Cultural Heritage Program.)

UPDATE PROJECT REPORTS

REPORT NUMBER	TITLE
1	Shoreland Management Effectiveness: A Questionnaire Survey of Shoreland Managers
2	Evaluation of Shoreland Management Based On Sample Counties and Townships
3	Local Official Recommendations for Shoreland Program Improvements
4	Shoreland Development Trends
5	A River Classification System
6	County Pilot
7	Resort Trends
8	Shoreland Residents – A Questionnaire Survey
9	Shoreland Data Documentation and Description

SHORELAND UPDATE PROJECT

Report No.8

SHORELAND RESIDENTS -A QUESTIONNAIRE SURVEY

by Philippe S. Cohen Deborah Karasov

1986

St. Paul, Mn.

Minnesota Department of Natural Resources Division of Waters

Flood Plain/Shoreland Management Section

-93 p. .

ACKNOWLEDGEMENTS

What success this report achieves would not have been possible without the contributions of others. The questionnaire itself would not have been possible without the persistence and tenacity of Jeff Stitt. Jeff was the major architect of the questionnaire, its distribution and the data collection. There were many nights when janitors wondered if he was the only person in the Division working a grave-yard shift. Special thanks is also extended to Glen Radde for re-writing a horrendous computer program into one that made sense and save money. Without Glen, the computers might still be churning away. Glen and his comrade-in-arms, Tim Kelly, helped us in properly interpreting statistical results of the study. While the final interpretations are ours, their willing assistance and guidance kept us from some serious errors. We also extend our gratitude to Steve Prestin and Ron Harnack for their editorial comments, without which, there would have dozens more "this", "that", and "the results also show." Jim Zicopula made the graphics possible - providing relief and added cogency to an endless succession of tables and numbers. We must not forget Felicia White, without whose tolerant disposition, excellent word-processing skills and an uncanny ability to interpret arcane scribblings made it possible to go through several drafts. Finally, we must extend our gratitude to the Legislative Commission on Minnesota Resources and the Center for Urban and Regional Affairs, without whose funding and support, the questionnaire survey could not have been done. Of course, responsibility for the content and quality of this report rest squarely on the shoulders of the authors.

i



ABSTRACT

In order for the Shoreland Management Program to be effective, it must be able to identify the attitudes and issues important to shoreland residents. In this survey, a broad range of questions were asked, ranging from expenditure patterns to attitudes of about shoreland zoning. The survey provided important demographic information about shoreland residents such as their education and income levels. Findings of this report also provided important insights about how shoreland residents view current shoreland management and helped identify those problems of greatest concern. Finally, this survey helped focus attention on important trends in spending and recreational activity patterns.



Table of Contents

Ι.	Introduction	1
II.	Executive Summary A. Shoreland Residents B. Shoreland Development Characteristics C. Expenditure Patterns D. Recreational Use Patterns E. Perception of Land Use Problems F. Satisfaction With Shoreland Zoning G. Perception of Lake Problems H. Shoreland Crowding I. Conversion to Permanent Use	4 4 5 5 6 7 7 8 8
III.	Shoreland Resident Characteristics	9
IV.	Expenditures	16
۷.	Recreational Use Patterns	23
VI.	Land Use Problems	30
VII.	The Shoreland Management Program and Resident Perceptions I. Satisfaction with shoreland zoning II. Resident attitudes about particular problem areas	40 40 43
VIII.	Shoreland Crowding	53
IX.	Conversion From Seasonal to Permanent Use	56
Append	dix I: A Shoreland Resident Questionnaire	58
Append	dix II: Distribution of Questionnaire	73

v



I. INTRODUCTION

This report is a product of the Shoreland Update Project. This Project, funded by the Legislative Commission on Minnesota Resources, was designed to update shoreland development data as well as identify and evaluate problems facing shoreland management in Minnesota. This report is one of nine that summarize the findings and conclusions of the Shoreland Update Project.

This report is based on a questionnaire survey that was a joint effort of the Minnesota Department of Natural Resources (DNR) Division of Waters and the Center for Urban and Regional Affairs. The questionnaire (Appendix A) was designed to describe shoreland residents, their use of shoreland resources, and their attitudes about various issues related to shoreland management. Results of the survey focused on variations related to region, lake type, and residential status. The Department of Natural Resource's administrative boundaries (see map) were used to identify various regions, while shoreland zoning classifications (GD-general development, RD-recreational development and NE-natural environment) and lake size were used to distinguish different lake types and shoreland areas. Residential status refered to whether respondents were seasonal or permanent shoreland residents. Preliminary findings of this survey were previously reported,¹ but some of the conclusions drawn in certain topical areas were errant interpretations. Specifically, evaluation of shoreland resident perceptions of crowding and related shoreland problems were incomplete.

-1-

¹⁾ Joseph Stinchfield, Jeffrey Stitt, Glenn Radde, "Minnesota's Shorelands," <u>CURA Reporter</u>, XIV, 5, Nov. 1984, pp. 7-11.

While this report represents a more complete analysis of the questionnaire results, due to limited time and resources, the data was examined for only specific categories. Analysis focused primarily on those questions most directly related to evaluating the Shoreland Management Program, shoreland resident satisfaction with the Program, perceived problems, expenditure patterns, and the demographic characteristics of shoreland residents. In general, statistical analysis was restricted to crosstabulations with some factor and regression analysis. All results reflect confidence levels of .05 or less.

The shoreland resident questionnaire was mailed to 3,200 shoreland households in September of 1982. During distribution, efforts were made to ensure a balanced sampling of different lake types so valid comparisons could be made within lake types across Department of Natural Resources Administrative Regions of the state, while simultaneously maintaining a representative distribution of lake types in each Department of Natural Resources Administrative Region.

In keeping with the data collection criteria of the Shoreland Update Project, the survey excluded shoreland residents on lakes completely within governmentowned lands, Indian reservations, the Boundary Waters Canoe Area, Lake Superior, or the seven county Twin Cities Metropolitan Area (Region 6). A return rate of fifty percent was assumed (actual return rate was forty-seven percent), with the objective of receiving a minimum of thirty returns per lake. Lakes with fewer than sixty residences were completely sampled. The most highly developed lakes were sampled at a minimum rate of twenty percent. The final distribution included shoreland residents in thirty-five counties from a total of seventy-nine lakes and twenty-three river sections (Appendix B). Adjusting for inappropriately sampled residents, a total of 1,302 residents responded.

-2-

The following report is organized in a series of topical sections, beginning with a summary of the most significant findings. The report then goes on to describe the characteristics of shoreland residents, their expenditure patterns, recreational use patterns, resident perceptions of the shoreland management program and shoreland resources, and conversion of residences from seasonal to year-round use.



DNR ADMINISTRATIVE REGIONS

-3-

II. EXECUTIVE SUMMARY

A. Shoreland Residents

1. Shoreland residents are older, better educated, higher salaried, and more likely to be retired than the average Minnesotan.

2. Almost 60% of shoreland residents have one or more years of college education, as compared with about a third of residents statewide. Two of every three shoreland residents have family incomes in excess of \$20,000, as compared with less than half of the state's households. Almost three times as many shoreland residents as statewide residents earn more than \$50,000 annually.

3. Shoreland residents are more likely to be in professional or technical occupations. This is true for 41% of shoreland residents as compared with 16% of the state's population. Seasonal and non-retired households typically report the highest incomes and are more highly represented in these occupations.

B. Shoreland Development Characteristics

1. The amount of shoreline frontage on individual lots varies substantially according to lake class and region. The regions with the greatest absolute amount and density of development also reflect the smallest mean frontage sizes (e.g., Regions 1 and 3).

2. In general, mean frontages by lake class exceed standards in all but Region 5 RD lakes.

3. Some property frontages fall below minimum statewide shoreland standards. On natural environment lakes, two of every five residents have below standard frontage lengths. On recreational lakes, over half of the residents' lots are below state minimum standards. On general development lakes, only about one in four of the lots is below standards. Most of these substandard lot sizes came into existence prior to the adoption of statewide standards.

C. Expenditure Patterns

1. Seasonal residents, on the average, make a substantial contribution to local economies. They spend over \$175 million annually. Maintenance, remodeling, and real estate taxes account for almost half of this total.

2. The contribution of individual residents varies greatly, depending upon numerous factors such as family size, retirement status, income, length of ownership, location, and other lifestyle and demographic characteristics. For example, non-retired seasonal residents, on the average, outspend retired residents by more than 60%. This difference should be considered in light of the demographic trend toward a larger proportion of retirees.

3. Seasonal residents who live on general development lakes tend to spend more money, probably because these lakes are, by definition, the most popular and commercially developed lakes. This conclusion is suggested by differences in spending on residential maintenance, remodeling, construction, and real estate taxes.

4. Seasonal users on natural environment lakes slightly outspend their counterparts on recreational development lakes. Although recreational development lakes have greater development and recreational activity, natural environment lakes have larger lot sizes, which translate into higher real estate taxes and, to a lesser degree, higher general maintenance costs.

D. Recreational Use Patterns

1. The trend toward permanent residential use patterns has important social, economic, and environmental implications. Permanent and seasonal residents differ in their service expectations and in their recreational habits and preferences. Permanent residential use also dramatically increases the amount of sewage generated. This could have serious water quality implications.

2. About half of seasonal shoreland residents travel 100 miles or less from their primary to their shoreland residences. Predictably, the distance travelled varies by region.

-5-

3. Over 60% of seasonal residents make 1-24 trips to their shoreland homes each year with considerable variability depending upon the distance travelled. Regardless of the number of trips they take, most seasonal residents (including families and guests) spend between 121-364 user days annually at their lakeshore homes.

4. Over 90% of residents use lakes other than the ones on which they reside for recreational boating. About three-fourths of this use is through public accesses. Thus, shoreland residents, as well as non-residents and non-riparian owners of shoreland areas, increase demand for public access.

5. Seasonal residents are far more active in selected recreational activities than permanent residents.

E. Perception of Land Use Problems

1. There appear to be strong regional differences in attitudes about land use problems. This is partly attributable to differences in existing land use patterns.

2. Residents grouped problems together into categories of water quality, shoreland alteration, and crowding. Water quality problems were most often viewed as the area of greatest concern.

3. Almost one in three residents indicated that sewage treatment systems were a source of problems; only slightly fewer named agricultural activities and public accesses as well. Residents seemed to be aware of problems posed by soil erosion and agricultural chemical fertilizer run-off. The high level of awareness suggests that residents might be responsive to attempts to abate nonpoint pollution sources.

4. Activities that were identified as a source of problems on their shoreline by residents were not necessarily viewed as inappropriate uses in shoreland areas. For instance, while 28% stated that public accesses were a source of problems on their shore, only 15% considered them to be an inappropriate type of shoreland use.

-6-

5. Problems perceived by residents were more often related to features such as design, setting, and manner of use than to the type of development. This further emphasizes the need for one of the major functions of shoreland management: the careful review and design of existing and proposed development projects.

6. Residents commonly felt that nuisance by users and "crowding" were the two major aspects of shoreland development that caused the most problems.

F. Satisfaction with Shoreland Zoning

1. Almost half of the residents expressed a high degree of satisfaction with the Shoreland Program. Not quite a fourth expressed dissatisfaction.

2. It is not possible to account for the different attitudes about the Program by retirement status or residential location. Factors not measured by the questionnaire, such as background and familiarity with shoreland (or resource) management programs, may be important factors influencing shoreland resident attitudes.

G. Perception of Lake Problems

1. Shoreland residents did not seem to view most lake problems with particular alarm. The single exception was the presence or persistence of algae blooms and aquatic weeds.

2. The concern for water quality issues expressed by residents suggests that shoreland management may need to focus greater attention to related land use issues such as nonpoint source pollution, vegetation clearance, impermeable surface cover, and placement and design of on-site sewage treatment systems.

3. There was a distinct regional variation in how residents ranked shoreland problems. Water quality issues are a greater concern to residents in the north and central regions of the state; shoreland alteration activities grow in importance as one moves into the southern regions of the state.

-7-

4. The scope of regional differences suggests that the problems addressed by the Shoreland Management Program may need to vary accordingly. Counties, as they design and implement shoreland ordinances, should use state requirements as guidelines, and then should refine these for the particular demands and needs of their shoreland resources.

H. Shoreland Crowding

1. Statewide, most residents did not perceive their own shoreline as being particularly crowded. Slightly more than a fourth of all residents described their shoreline as crowded.

2. There is no apparent relationship between resident's perception of how crowded their shoreline is and the actual density of development.

3. Shoreland residents may have a much higher tolerance for shoreland development than is generally presumed. Further, density of development may not be the most appropriate indicator of shoreland development problems. Characteristics of the development and behavior of the users may be more important in influencing how residents react to the crowdedness and quality of development.

I. Conversion to Permanent Use

1. About a fourth of all seasonal residents plan to convert their shoreland residences into a permanent residence within five years. The average length of time until conversion from seasonal to permanent residential use is approximately 3.5 years.

-8-

III. SHORELAND RESIDENT CHARACTERISTICS

Shoreland residents are older, better educated, higher salaried, and more likely to be retired than the average Minnesotan (compare Tables 1 and 2). Almost a third of shoreland residents are retired, and the median age of shoreland residents is 36 as compared with a statewide average age of 29. While a third of Minnesotans have some college education, (Figure 1), 59.4 percent of shoreland residents have 1 or more years of college education.

Table 1: SHORELAND INCOME*

Income Category	Total	Retired	Non-	Primary 4	Seasonal
	households ¹	households ²	retired ³	residences	residences ⁵
\$ 0 - 9,999	7.2	16.5	2.3	15.0	4.1
\$10 - 19,999	17.8	35.7	10.8	29.9	14.1
\$20 - 29,999	21.7	25.3	23.8	27.2	22.5
\$30 - 39,999	18.5	14.4	24.9	14.1	24.4
\$40 - 49,999	10.8	3.6	17.4	8.9	13.9
\$50 - 59,999	5.8	3.5	8.0	2.8	8.7
\$60 - 69,999	2.9	0.2	4.7	0.8	4.6
\$70,000 +	5.7	2.8	8.6	3.2	8.22

Percentage of

* The 1980 U.S. Census reports that the state's per capita income was \$9,724 and the medium income was \$17,761

100,033 households (out of 110,617 or 90.4%).
31,118 households (or 33.6% of total).
61,459 households (or 66.4% of total).
36,236 households (or 36.6% of total).
62,765 households (or 63.4% of total).

Table 2

Income Category

Percent of State's Households

\$	0 -	10	,000
\$10,00	0 -	20	,000
\$20,00	0 -	25	,000
\$25,00	0 -	35	,000
\$35,00	0 -	50	,000
\$50,00	0 +		

27.6
28.9
13.3
17.7
8.5
4.6



- 1 Percentage of all adults, age 25 years or older, who have completed each category.
- 2 Percentage is calculated as the total number of residents who have reported the highest educational level achieved and then normalized. Since the questionnarie asked for the highest level of education for "adult" members among the household, these figures likely include some residents 28 years old. This would tend to depress the differences with the U.S. Census figures in the higher educational categories.

Two of every three shoreland residents have family incomes in excess of \$20,000, as compared with less than half of the state's households. This difference in income is even more apparent in the higher brackets, where 14.4% of shoreland residents report incomes of \$50,000 or more, while less than 5% of statewide residents have a comparable income. The figure is even greater for non-retired shoreland residents, of whom more than one in five fit into this higher income bracket.

Shoreland income patterns differ not only between retired and non-retired households, but also between permanent and seasonal residents; seasonal residents typically report higher incomes.

Occupationally, shoreland residents are more than two and half times more likely to be in professional or technical occupations than the average Minnesotan (Table 3). Here also, the non-retired and seasonal households are more heavily represented. The proportion of shoreland households listing homemakers remains similar to the statewide average, however. It is also interesting to note that the least represented occupations among shoreland residents are agricultural and non-farm labor.

The average shoreland resident also typically has 241 feet of water frontage. This figure varies substantially, depending upon the region in which the lake is located and the lake classification by shoreland standards (Table 4). As expected, the mean for water frontage reflects the influence of minimum standards associated with lake classifications. Thus, natural environment lakes typically have the greatest frontage lengths while general development lakes have the smallest averages. Rivers are an exception to this rule; their large frontage sizes reflect the generally lower densities of recreational development as compared with those of lakes.

-11-

Table	3:	SHORELAND OCCUPATIONS
		(percent of)

Occupational Category	Statewide labor force	Total shoreland residents	All retired households	Non-retired households	Household permanent	s seasona
Professional/ Technical	15.9	22.2	11.5	28.1	18.4	24.0
Clerical	16.7	7.8	4.3	9.5	5.1	9.2
Agricultural	5.5	2.4	2.0	2.3	3.3	2.6
Crafts	.1	3.1	1.4	4.1	3.3	2.6
Non-farm labor	11.2	2.7	.7	3.5	3.0	5.9
Sales	9.9	5.5	3.2	6.5	4.6	4.0
Machine Operators	s 15.8	3.7	1.9	4.6	2.9	4.0
Managerial/ administrative	10.6	8.7	3.6	11.5	6.2	9.9
Homemaker	25.5	17.7	17.9	17.7	17.8	17.7
Retired		17.9	48.2	1.8	26.7	13.7
Other	14.3	8.3	5.2	10.4	8.7	8.7

1 Percentage for shoreland residents is calculated from households reporting 1 or more of their members in each category (as a percentage of the total number households). These percentages were then normalized to 100 percent.

Region	Natural Environment Lakes	Recreational Development Lakes	General Development Lakes	Rivers	Average
1	507.0	203.0	155.7	-	204.9
2	755.8	288.3	240.5	509.8	299.4
3	307.8	179.2	163.0	463.4	191.0
4	944.5	528.0	136.1	245.5	409.2
5	2769.0	98.7	181.9	189.6	258.6
Statewide State	584.5	247.3	174.0	387.2	241.3
Standard	200	150	100	100	

Table 4: MEAN FRONTAGE OF SHORELAND RESIDENTS (IN FEET)

Recreational development lakes, by virtue of representing almost 55% of all shoreland development, significantly influence frontage averages in the major lake regions (Regions 1-3). In general, frontage averages also reflect the distribution and density of shoreland development. The regions with the greatest absolute number and density of shoreland development also reflect the smallest mean frontage sizes. Similarly, the regions with the high proportion of lots with substandard frontage are closely related to those areas with the highest development (Table 5).

Lake Classification

Frontage averages are also influenced by land use activities. For instance, Region 4, which is dominated by agricultural land uses with correspondingly larger landholdings, has the largest average frontage sizes. This explains why recreational development lakes in Region 4 have an average frontage width twice the statewide average for that lake class. Similarly, frontage averages for natural environment lakes in this region are fifty percent greater than state averages for that lake class.

-13-

DNR REGION	Natural Environment Lakes (200 feet)	Recreational Development Lakes (150 feet)	General Development Lakes (100 feet)	
1 2 3 4 5	39.9% 38.0% 54.3% 29.9%	60.6% 46.6% 61.3% 61.5% 89.4%	30.4% 36.3% 46.3% 34.8%	
Statewide	42.1%	56.9%	28.5%	anton

Table 5:	PERCENT OF	LAKE LOTS	WITH	SUBSTANDARD	LAKE	FRONTAGE	ΒY
	DNR REGION	AND LAKE C	CLASS				

Despite the uneven distribution of shoreline throughout the state, the amount and density of development, as well as the age of the development, appear to be the most significant factors influencing the average shoreline frontage. For instance, those regions with the largest amount of development (Regions 1 and 3) have the lowest mean frontage despite their large amount of shoreline. Consistent with this observation is the high average frontage widths for the Arrowhead Region (2), which has lower densities of development and large amount of shoreline. Another factor that may be influencing frontage sizes is the distribution of desirable physical characteristics, such as sandy/loam soils, forest cover, and types of fish in the lake.

Shoreland management, through the establishment of minimum frontage standards, has certainly influenced these means. Even though these standards went into effect in 1972, the actual property frontages often fall below minimum statewide standards for the three lake classifications. On natural environment lakes, two of every five residents own lots with substandards frontage lots. On recreational development lakes, over half of the residents own substandard frontage lots. On general development lakes, however, only about a fourth of the residents' lots are below standard. Recreational development lakes have a

-14-

high incidence of substandard lots because these lakes have development totals similar to general development lakes but with minimum frontage requirements that are substantially larger (150 feet as compared to 100 feet). The large number of substandard lots is also indicative of the large number of lots subdivided prior to the adoption of shoreland standards.

IV. EXPENDITURES

One of the presumed benefits of shoreland development is the economic contribution of seasonal shoreland residents to rural economies. Thus, one of the issues addressed by the questionnaire focused on the spending habits of seasonal shoreland residents. The results indicate that we need to distinguish the spending habits of shoreland residents before the contribution of shoreland development to local economies can be properly interpreted. Seasonal residents do make a substantial contribution to local economies. However, the nature of



Unlike the traditional image of the rustic cabin on pristine lakeshore, the majority of shoreland development incorporates many of the amenities associated with an urban setting (electricity, indoor plumbing, telephone, shower or bathtub, etc.)

this contribution, the extent of its impact, and the variability of spending patterns indicates that this contribution is more complex and dynamic than may generally be assumed.

Seasonal residents spend over \$175 million annually - an amount which represents a significant contribution to the rural economy of Minnesota. But this figure provides only a cursory insight into the economic activity associated with seasonal use of shoreland development. For instance, over a third of the money spent by seasonal residents is spent on maintaining and remodeling residences, and another 14% is spent on real estate taxes. Thus, these two categories of spending account for almost half of all expenditures (see Table 6).

While the average seasonal resident spends over \$850 per year on maintaining and improving their residence, this figure alone is somewhat misleading. Seasonal resident expenditures vary greatly, from none to well over \$7,000 annually. This variation is reflected by the unusually high standard deviation, which indicates that two-thirds of the residents vary between 0 - \$4,498 per year.

Some residents appear to be spending large amounts of money building, remodeling and improving their shoreland residential property, while others have minimal, fixed costs associated with their residential property.

This pattern of high variability with respect to mean expenditures is typical of all categories of expenditure.¹ Some of the variation is partially explained by differences in family size, retirement status, length of ownership of shoreland

¹⁾ Coefficients of variation (an absolute measure of variation) ranging from a low of 145% for transportation costs to 759.3% for non-specified expenditures (other).

Table 6: STATEWIDE EXPENDITURES BY SEASONAL SHORELAND RESIDENTS (figures in dollars)

Expenditure Categories	Mean Expenditure	Mean Retired	Mean Non-retired	Standard Deviation	Total Expenditu
Residence maintenance, remodeling, construction	850.92	395.24	1094.51	3647.93	58,558,47
Real estate taxes	373.49	374.37	391.05	598.45	25,703,01
Food and Beverage (restaurants, bars, groceries)	354.69	334.51	381.49	574.71	24,408,86
Transportation (gas, oil, vehicle repairs)	230.90	185.85	265.31	334.91	15,890,33
Heating, electricity, other utilities	229.51	226.31	241.85	434.67	15,794.38
Major equipment (boat, motor, snowmobile, etc.)	185.78	66.35	253.43	825.77	12,784,93
Household supplies	91.67	65.14	109.92	325.56	6,308, 56
Minor equipment (bait, license, fishing rods, boat/motor/rental)	78.27	53.74	94.55	476.56	5,386,20
Other retail (clothing, souvenirs, etc.)	68.64	54.38	79.04	277.51	4,723,92
Recreation other than driving (golf, movies, etc.)	54.62	42.20	64.02	154.80	3,758,54
Other	34.87	56.72	28.51	265.04	2,399,86
Total seasonal sample	2553.36	1854.82	3003.69	4511.79	175,717.10

Total number of lakeshore seasonal units in state = 69,279*

*This total is taken from Philippe Cohen and Joe Stinchfield, <u>Shoreland Update Project, Rep</u><u>No. 4</u>, Shoreland Development Trends, Minnesota Department of Natural Resources, Division of Waters, Flood Plain/Shoreland Management Section, 1984. Total reflects development as of 1982.

residence, and other factors related to life style and demographic characteristics.

Retirement status is one obvious demographic factor that influences expenditure patterns. In fact, retirement status is a more important factor in expenditure patterns then geographic factors such as lake size, zoning classification and regional location. On the average, non-retired seasonal shoreland residents outspend retired residents by more than 60% (Table 6). For instance, non-retired seasonal residents outspend retired seasonal residents by over 2.5 times for residential maintenance and remodeling.

Some of these differences are partially a result of the relative differences in family size, average annual income, and stability in spending habits among retired individuals. With the demographic trend toward a proportionately larger population of retirees (aged 55 and over) this difference in spending habits between retired and non-retired seasonal residents may have long term implications. While these two groups have radically different spending patterns, they pay similar real estate taxes, (see Table 6).

As mentioned above, while retirement status influences spending habits, it is not the only factor associated with them. Residents living in different lake zones do show some differences in spending habits, although they are not as important as those caused by retirement status². Seasonal residents on general development lakes, for instance, tend to spend more money than do residents on

2) This was determined by analysis of variance and F- statistic tests.

-19-

other classes of lakes. This isn't particularly surprising given that GD lakes, by definition, are recreationally the most popular and commercially developed lakes. What is somewhat surprising, however, is that seasonal users on NE lakes tend to slightly outspend their counterparts on RD lakes. Given the greater development and recreational activity associated with RD lakes, this fact seems to run contrary to the explanation for higher spending on GD lakes. The inconsistency is partly explained by differences in lot sizes. The larger lot sizes found on NE lakes (80,000 sq. ft.) as compared with RD lakes (40,000 sq. ft.) translates into higher real estate taxes.³ Also, the larger NE lots may be subject to higher general maintenance costs.⁴

Not surprisingly, the vast majority of money spent by seasonal residents occurs on lakes larger than 150 acres, which account for 95% of seasonal shoreland development. Approximately \$165.8 million of the total (\$175.7 million) is spent on these lakes, consistent with the general distribution of seasonal shoreland development. Similarly, RD and GD lakes (which on the average are greater than 150 acres in size) account for \$167.1 million of all monies spent.

While all the factors mentioned thus far are important characteristics of how seasonal residents spend money, they are not the cause of these expenditure patterns.⁵ In fact, none of the factors could account for more than .3% of the variation in expenditure patterns.

- 3) Mean expenditures on NE lakes = \$377.02 while for RD lakes it is \$332.67.
- 4) Mean expenditures on NE lakes = \$850.00 while for RD lakes it is \$764.31.
- 5) A linear regression of each of the spending categories (including total expenditures) as a function of the variables mentioned thus far provided ETAs less than .0131 and r² results less than .0031.

-20-

One of the unanticipated findings of the questionnaire were the regional differences in how money is spent (see Table 7). For instance, considerably more money is spent on residential maintenance and remodeling in Region 1 as compared with Regions 2 and 3. Such differences are easily found for other categories, such as major and minor equipment purchases. Overall, Region 1 tends to outspend the other regions, with most of this difference attributable to the greater expenditures in residential maintenance and remodeling.

The reasons for these regional differences are not entirely clear and need further study. Still, it is possible to draw some preliminary observations about the possible causes of the regional differences. Some of the differences may reflect the greater proportion of high outliers in Region 1. In other words, there are a few individuals that spend very large sums of money and raise the mean for the region as a whole. This increased expenditure in Region 1 may be in part due to residents from North and South Dakota investing in shoreland properties in counties such as Becker, Clay and Otter Tail. Secondly, Regions 1 and 3 have more recent developments, which required large initial capital outlays that skew the expenditure patterns. For instance, Crow Wing and Cass Counties in Region 3 and Otter Tail, Douglas, and Becker Counties in Region 1 have, in recent years, been the object of significant amounts of shoreland development.

These regional differences do suggest the need for further study of expenditure patterns. Inasmuch as shoreland management may significantly influence development patterns, shoreland management policies need to consider their relationship to the economic well-being of rural Minnesota.

-21-

Table 7. TOTAL EXPENDE	Regior Total	n 1 Mean	Regior Total	n 2 Mean	Region Total	3 Mean	Region Total	4 Mean	State To Total	tal Mean
Residence maintenance, remodeling and construction	22,105,586	1056.37	12,430,748	670.45	17,664,642	735.05	2,914,263	622.36	58,558,471	850.92
Real estate ; taxes	8,309,858	397.11	7,389,415	398.56	8,768,986	364.89	1,055,367	225.38	25,703,018	373.49
Food and beverage (restaurant, bars, grocery)	8,242,451	393.89	6,593,198	355.60	7 , 853,084	326.78	1,486.534	317.46	24,408,864	354.69
Transportation (gas, oil, vehicle repairs)	5,093,401	243.40	4,427,828	238.82	5,652,064	235.23	612,891	130.89	15,890,335	230.90
Heating, electricity and other utilities	4,631,579	218.24	4,020,913	216.87	6,195,461	257.80	819,470	175.00	15,784,936	229.51
Major equipment (boat, motor, snowmobile, etc.)	4,631,579	221.33	2,084,239	112.41	4,800,761	199.77	1,237,950	264.37	12,784,936	185.78
Household supplies other than grocery	2,668,518	127.52	1,842,920	99.40	1,323,382	55.07	400,699	85.57	6,308,561	91.67
Minor equipment (bait, license, fishing rods, boats)	1,537,175	73.46	1,918,901	103.50	1,537,416	63.97	345,783	73.84	5,386,208	78.27
Other retail (clothing, souvenirs, etc.)	1,611,559	77.01	1,913,702	103.22	886,192	36.88	268,349	57.31	4,723,923	68.64
Recreation other than dining	1,610,491	76.96	1,096,038	59.12	739,785	30.78	255,395	54.54	3,758,547	54.6 2
Other	1,044,642	49.92	584,997	31.55	604,934	25.17	164,087	35.04	2,399,860	34. 87
Totals	61,422,088	2935.20	44,302,899	2389.58	56,026,708	2331.34	9,560,788	2041.59	171,312.460	2512.61

Table 7: TOTAL EXPENDITURES BY REGION¹

¹Region 5 is not included because an insufficient number of seasonal residents provided adequate information to draw statistically reliable totals for each of the individual expenditure categories.² The state total in this table does not include spending figures for Region 5, but figures suggest that expenditures by seasonal residents to be in the neighborhood of \$4.4 million.

V. RECREATIONAL USE PATTERNS

Questionnaire results indicate that seasonal shoreland residents use their vacation homes often, travel moderate distances, and are willing to make a large number of trips to have access to shoreland recreational opportunities. Half of the seasonal shoreland residents travel 100 miles or less from their primary residence to their seasonal shoreland homes. Another third travel 101-300 miles, and just over 10% travel over 300 miles. Predictably, the distance travelled varies by region (Table 8), with cities of origin such as Duluth, The Twin Cities and Fargo-Moorhead reflected in the median distance travelled. For instance, while the average distance travelled by seasonal residents in Region 2 is greater than Region 3, the median for Region 3 is over twice that of Region 2. This is explained by the large number of seasonal residents in Region 3 coming from the Twin Cities area, while in Region 2 a significant proportion of the seasonal residents probably come from Duluth. For all the regions, the median is consistently lower than the average distance travelled, indicating that the distribution of travel distances is skewed toward longer distances.

Table 8: AVERAGE DISTANCE TRAVELLED TO SEASONAL RESIDENCE BY REGION

Region	<u>Average Distance</u> Travelled (in miles)	<u>Median Distance</u> Travelled (in miles)
1	280.3	150
2	172.3	115
3	159.8	93
4	176.5	45
5	93.8	25
Statewide	200.6	100

-23-

The questionnaire also shows that seasonal residents regularly visit their vacation homes, averaging 30 trips each year. While this average is inflated by some residents who take a large number of trips, it still reflects the regularity with which seasonal residents use their shoreland homes (Table 9).

Table 9: AVERAGE ANNUAL NUMBER OF TRIPS TO SEASONAL RESIDENCE BY DISTANCE

Distance Traveled	The Annual Average Number
to Seasonal Resi <u>dence</u>	of Trips to Residence
0-50 miles	56
51-100 miles	23
101-150 miles	24
151-300 miles	15
<u>301 +</u>	<u>15</u>
Statewide mean	31

As one might expect, the frequency of trips is inversely related to the distance travelled. Residents travelling less than 100 miles average 40 trips/year, while those travelling more than 150 miles average 15 trips/year. Almost 40% of all seasonal residents make more than 24 trips to their shoreland homes each year.

As expected, the frequency of trips is highest between June and September; alternately, 70% of seasonal residents make no trips between the months of November and March. While distance and time of year are important influences on user patterns, factors of family size and lake classification have little or no bearing on the frequency of use. Finally, regardless of the number of trips they make, 40% of residents spend between 121-364 user days⁶ annually at their lakeshore homes (Table 10).

⁶⁾ A user day refers to the use of a by a person for one day. Thus, two people using a residence for one day constitutes two user days.

	Percent of Seasonal Residents in User Day Category	Cumulative Percent
None	6.5	6.5
1-30 days/year	9.6	16.1
31-60	13.3	29.4
61-90	10.5	39.9
91-120	10.2	50.1
120-364	39.3	89.4
365-729	10.1	99.5
730-1094	0.3	99.8
1095-1459	0.2	100
1460-1824	0.0	
1825 + days	0.0	

Table 10: ANNUAL AMOUNT OF FAMILY USER DAYS (Among Seasonal Shoreland Residents)

Ninety-two percent of shoreland residents use lakes other than the one on which their residence is located for boating (Table 11). Table 12 indicates the type of lake sites that shoreland residents are likely to use to gain access to these other lakes. This table shows that over three-fourths of these residents use public accesses as compared with the few who use resorts or other sources, such as the residence of friends. Permanent residents are more than twice as likely as seasonal residents to use more than five other lakes; seasonal residents are more likely to confine their use to 1-4 additional lakes.

The tendency of residents to use lakes other than the lakes on which they reside for recreational purposes has important implications. First and foremost, it suggests that increased shoreland development increases the demand for public access, a demand originating from non-residents, non-riparian owners, and riparian owners alike. Riparian owners are as likely to use public accesses on lakes other than their own as are other users of shoreland and lake recreational resources.

Table 11: USE OF MULTIPLE LAKE RESOURCES BY CLASS AND RESIDENCE STATUS

Respondents who live on	Percentage using 1-4 alternate lakes	Percentage using 5 or more alternate lakes
rivers natural-environment lakes recreational-development lakes general development lakes	72.1 61.2 77.4 78.4	17.5 27.8 18.1 10.5
Percentages of respondents whose residences are		
permanent seasonal	69.2 81.4	24.3 10.2
Total	77.0	15.2

Table 12

SHORELAND RESIDENT BOAT LAUNCH SITE USE FOR LAKES OTHER THAN THEIR OWN LAKE

Boat Launch Site	Percent of Residents (Using Site)*	Percent of Total Response Using Site
Public Access	77.4	62.8
Resort	21.8	8.9
Other	13.1	17.7
Other Residence	11.0	10.6

*Response total is greater than 100% because more than 1 response was permitted.
Second, the tendency for residents to use additional lakes for recreational purposes underlines the fact that few lakes have superior resources for all recreational purposes. This fact is highlighted by the tendency for residents on natural environment lakes to use five or more alternate lakes. Natural environment lakes are typically smaller and shallower than are the other two lake classes, making them less desirable for boating and other recreational activities.

Seasonal residents tend to be more active in selected activities than permanent residents (Table 13). In particular, seasonal residents showed much higher activity levels for fishing, swimming/sunbathing, hiking, and waterskiing than those showed by permanent residents. Permanent residents, on the other hand, show a stronger preference for motor boating and bicycling. While fishing receives the highest participation rates among both permanent and seasonal residents, its participation rate among permanent residents is still substantially lower.

Table 13 OFTEN OR DAILY ACTIVITY LEVELS BY RESIDENCE AND RETIREMENT STATUS

Activity	Total	Permanent	Seasonal	Retired	Non-Retired
~	<u> </u>	40.0		<u> </u>	<u> </u>
Fishing	62.5	49.8	/0.3	61.4	63.1
Swimm/Sunbath.	61.5	47.5	70.1	52.5	65.9
Motor boating	42.3	49.2	30.8	33.8	46.3
Hiking	36.0	27.9	41.0	37.2	35.5
Waterskiing	27.8	17.7	33.8	17.1	32.8
Picnicking	22.9	17.4	26.4	12.5	27.9
Bicvcling	14.1	19.4	10.8	9.1	16.5

Percent of shoreline residences involved in selected activities

Retirement status also affects activity levels; consequently, non-retired residents are consistently more active than retired shoreland residents. Only for hiking did the participation rate of retired exceed that of non-retired residents.

Regardless of the differences in lake use activities, permanent and seasonal residents show nearly the same boat ownership patterns (Figure 2). This is



Figure 2: Seasonal and Permanent Residents: Percent Owning Boat Types

-28-

somewhat surprising since one might easily assume that permanent residents are more likely to own watercraft. This is clearly not the case. An open fishing boat is the only boat type which a majority of permanent residents own. Few own two open fishing boats, and not quite a third of the residents own a canoe or a runabout.



Swimming and Boating are two important family attractions for owning a shoreland residence.

VI. LAND USE PROBLEMS

The issue of land use problems was surveyed by three questions: one that asks what uses actually are a source of problems on a resident's lake; a second that asks whether certain types of development are inappropriate (regardless of whether or not they have caused problems); and a third that asks what characteristics make that type of development inappropriate. While these questions appear very similar, the responses point to important distinctions which have implications for management solutions.

First, given a list of shoreland activities, shoreland residents were asked to indicate which ones caused problems on their lake or river. Almost a third of the respondents indicated that residential sewer systems are a cause of problems; following closely, a slightly smaller proportion named agricultural activities and public accesses (Table 14).

Strong regional differences in opinions about problems caused by different land uses are evident. These are partially attributable to differences in existing land use. Thus, it is not surprising that agricultural activities are of greater concern to residents in Regions 4 and 5 than those in Region 2, where there is little or no agricultural land use. On a statewide basis, shoreland residents found campgrounds and resorts to be a minor source of problems with the exception of Region 5, where almost 40% of river residents listed campgrounds as a source of problems. A fourth of these same residents indicated that marinas and public parks are also a problem. These responses probably point to problems associated with the Mississippi and Minnesota Rivers.

-30-

Even given these regional differences in priorities, most land use activities were not identified as a major source of problems. Residential sewer systems, agricultural activities, and public accesses were the only three identified by a significant proportion of questionnaire respondents.

Development	Reg. #1	Reg. #2	Reg. #3	Reg. #4	Reg. #5	Statewide
Residential Sewer Systems	34.9	27.4	39.6	15.0	31.7	33.1
Agricultural Activities	33.9	5.8	34.2	60.4	71.3	31.3
Public Access	23.1	27.6	31.5	27.5	13.3	27.5
Other*	14.1	41.6	18.4	22.0	20.2	22.8
Fish Houses	13.1	9.2	22.6	11.2	4.5	15.5
Campground	20.0	11.6	8.7	4.3	20.6	12.3
Resorts	24.0	3.6	11.4	4.1	3.8	12.1
Public Park	5.8	5.4	5.9	6.2	6.3	5.8
Motor Vehicle Park	6.9	2.4	3.6	4.4	11.4	4.5
Bar/Restaurants	3.0	1.1	5.7	2.0	10.2	3.8
Marinas	4.3	3.5	3.0	.7	3.8	3.3
Boathouse	4.9	3.5	2.0	1.7	2.1	3.1
Swimming Beach	1.5	1.4	4.9	3.7	4.5	3.1

Table 14: PERCENT OF RESPONDENTS WHO INDICATED SPECIFIC DEVELOPMENTS TO HAVE CAUSED A PROBLEM ON THEIR LAKE OR RIVER.

*This category was used by questionnaire respondents for a broad range of categories such as excessive vegetation clearance, weeds, summer's itch, inadeqaute fish stocking, construction activity, boat speeds, etc.

Shoreland residents who perceive their shoreline to be crowded tended to more frequently respond that particular shoreland uses are a cause of problems. This tendency is made visible by comparing the last two columns in Table 15. In the first of these two columns, the figures show the percent of those residents that perceive their shoreline to be crowded and that also responded that a particular shoreland use (i.e., residential sewer, agricultural activity, etc.) causes problems. The last column represents the percent of all responses indicating a particular shoreland use is a problem. A comparison of these two columns

-31-

shows that for residents perceiving their shoreline to be crowded, the figures are consistently greater than those expressed by shoreland residents in general. For example, only 33.1% of all shoreland residents viewed residential sewers as a cause of problems, while 41.0% of those who perceive their shoreline is crowded also responded that residential sewers are a cause of problems.

While most of the shoreland uses listed are viewed by shoreland residents as relatively inconsequential sources of problems (i.e., marinas, bar/restaurant, boathouses, public parks, etc.), it is interesting to note, once again, that a disproportionate number of those indicating these as problems also view their shoreline as crowded (Table 16). For instance, in Table 16, of all those who responded that marinas are a cause of problems, 43.6% perceive their shore to be

Table 15:	OF THOSE	RESIDENTS F	RESPONDING T	HAT THEIR	SHORELINE	IS VACANT OR
	CROWDED,	THE PERCENT	<pre>「 INDICATING </pre>	SPECIFIC	SHORELAND	USES CAUSE
	PROBLEMS*	*				

Shoreland uses causing problems	Residents responding their shore is vacant	Residents responding their shore is crowded	Total % indicating shoreland use causes problems
Posidontial Source	20.2	41 0	22 1
Agnicultural activity	20.J 20 E	41.0	21.2
Agricultural activity	20.5	32.0	31.3
PUDIIC access	20.4	31.2	27.5
Other	28.9	15.5	22.9
Fish Houses	13.2	17.0	15.5
Campgrounds	12.5	17.0	12.3
Resorts	12.5	15.8	12.1
Public Parks	5.1	5.8	5.8
Motor Vehicle Park	3.4	5.4	4.5
Bar/Restaurant	4.7	5.3	3.8
Marinas	3.6	5.2	3.3
Boathouse	2.4	4.8	3.1
Swimming Beach	3.0	3.4	3.1
Percent of total sample	31.1	27.6	

*Figures will not sum to 100% because respondents could provide more than one answer.

crowded, a percentage (27.6%) much higher than their proportion in the total sample. Table 16 also reveals that those shoreland uses generally perceived by residents to be unimportant causes of problems acquire greater importance among those residents perceiving their shoreline as crowded. One possible explanation is that as the perception of shoreland crowding increases, residents express their concern by focusing on less dominant land use problems.



Few shoreland residents indicated that marinas were a cause of problems or were an inappropriate type of development.

Table 16:	OF THOSE RESIDENTS RESPONDING THAT A PARTICULAR	
	SHORELAND USE CAUSES PROBLEMS. THE PERCENT THAT PERCEIVE	
	THEIR SHORELINE TO BE VACANT OR CROWDED*	

			Total % indicating
Shoreland uses	Shore is	Shore is	shoreland use
causing problems	vacant	crowded	causes problems
Residential Sewer	26.6	34.2	33.1
Agricultural activity	28.3	28.2	31.3
Public access	23.0	31.3	27.5
Other	39.2	18.7	22.9
Fish Houses	26.5	30.2	15.5
Campgrounds	31.7	38.3	12.3
Resorts	32.2	36.1	12.1
Public Parks	27.2	27.4	5.8
Motor Vehicle Park	23.7	33.0	4.5
Bar/Restaurant	39.0	38.8	3.8
Marinas	33.8	43.6	3.3
Boathouse	24.3	43.0	3.1
Swimming Beach	29.8	29.9	3.1
Percent of total sample	31.1	27.6	

*Figures will not sum to 100% because respondents could provide more than one answer.

Residents made a clear distinction between shoreland uses they view as a cause of problems and whether those same uses are inappropriate for shoreland areas (Figure 3). Generally speaking, while particular shoreland uses may cause problems, that does not mean that they are also considered inappropriate uses. For instance, while 27.5% of shoreland residents found public accesses to be a problem on their lake, only 14.5% considered them as an inappropriate type of development. This corresponds with the earlier finding that shoreland residents are very likely to use public accesses on lakes other than the one on which they live. Therefore, while an access point may cause a problem on "their" lake, it is still generally perceived as a worthwhile shoreland development.

-34-



Figure 3: Percent of Sample Indicating Specific Shoreland Uses as Inappropriate on their Lake or River*

*Questionnaire respondents could provide multiple responses, therefore the sum is greater than 100%.

In another example, almost a third of shoreland residents found agricultural land use in shoreland areas to be a problem on their lake, but only slightly more than one in ten felt it is an inappropriate type of activity. In fact, few shoreland developments were considered by residents to be inappropriate; the three most common responses - commercial development, bar/restaurant and resorts - scored only 15-21% among questionnaire respondents. Neither lake sizes nor lake zoning classification substantially changed the residents' responses as they related to the inappropriateness of shoreland use. This was unexpected, given the differences in suitability and the incompatibility of some uses for various lakes. Smaller lakes (less than 150 acres), for instance, are often unsuitable for certain types of commercial and resort developments.

-35-

Similarly, lakes classified as natural environment are often restricted to residential use because of incompatibilities with other uses. The limited concern on the part of shoreland residents regarding the appropriateness of various shoreland uses may reflect a lack of awareness about potential suitability and compatibility conflicts.





The low responses concerning inappropriate uses are further clarified by a survey question designed to identify those characteristics of shoreland development that residents find inappropriate. The shoreland development characteristics that may be a source of problems appear less related to development type than to other features such as design, context, and the behavior of users. This conclusion supports one of the important functions of shoreland management - the careful review and design of existing and proposed development projects.

The most common characteristic that residents viewed as inappropriate was "nuisance by users", followed by crowding (Figure 4). Neither of these characteristics are inherent attributes of shoreland development, but, rather, reflect the behavior and number of users. Feelings of crowdedness may be strongly influenced by the level of nuisance behavior and vice versa.

Although shoreland zoning addresses such issues as inappropriate development and some of their characteristics, there is little relationship between what people identified as inappropriate development characteristics and the level of satisfaction with shoreland zoning. Perhaps, as noted above, shoreland residents recognize that the major sources of their dissatisfaction relate to human behavior, which is only indirectly influenced by shoreland zoning controls.

-37-



Development characteristics, such as crowding, contrast to environment, closeness to shore and lack of landscaping, often overlap in their effects on people's perceptions of shoreland development.



Responses varied little according to retirement status, lake classification, or region. The lack of variation by region (Table 17) is somewhat surprising since one might expect that those in regions and on lakes with the highest development densities would show greater concern for crowding and density characteristics. This surprising result further highlights another finding of the shoreland questionnaire to be discussed later; there is very little correlation between the perception of crowding and the amount of actual development on a given lake.

	Reg. #1	Reg. #2	Reg. #3	Reg. #4	Reg. #5	Statewide
llser Nuisance	56.2	75.0	54.9	50.6	64.2	60.2
Crowding	57.2	51.0	48.0	33.5	38.8	50.1
Contrast to						
Environment	42.7	36.4	33.0	29.0	43.6	37.6
Closeness to						
Shore	32.4	25.0	29.3	25.2	14.5	29.8
Density	45.0	27.1	19.9	24.9	15.4	29.8
Upkeep	26.0	24.2	21.1	30.0	30.7	24.1
No Landscaping	15.4	6.3	11.4	13.3	17.4	12.2
Design	12.0	7.9	11.5	6.1	26.0	10.8
Other	11.2	9.6	13.1	10.9	11.6	11.5
Color	7.7	4.3	2.5	0	2.1	4.3

Table 17: PERCENT OF RESIDENTS IN EACH REGION WHO INDICATED CERTAIN DEVELOPMENT CHARACTERISTICS TO BE INAPPROPRIATE

It should also be noted that some categories of inappropriate characteristics, such as contrast to environment, closeness to shore, crowding, density and upkeep, may be measuring similar perceptual attributes. For instance, a structure that is very near the shore and has poor screening will also contrast sharply with its surrounding environment. Similarly, a series of boathouses that are close to the shore may also elicit feelings of crowdedness or high density from other shoreland residents. Therefore, one must be careful in drawing conclusions from shoreland resident responses to individual attribute categories.

-39-

THE SHORELAND MANAGEMENT PROGRAM AND RESIDENT PERCEPTIONS

I. Satisfaction with shoreland zoning

One of the important goals of the shoreland resident questionnaire was to determine how satisfied shoreland residents are with the Program. Almost half (48.2%) of the residents sampled expressed a high degree of satisfaction (5-7 on a scale of 0-7) with the Program. About a fourth (22.1%) expressed considerable dissatisfaction (0-1). Although the Program appears to have a high degree of acceptance and satisfaction, this report will focus primarily on expressions of dissatisfaction in an effort to identify potential shortcomings in the Program.

The attitudes of shoreland residents toward shoreland zoning did not appear to vary regionally. Residents, however, do tend to be more polarized in their attitudes about the Program if they reside on NE lakes (Figure 5). This was particularly evident in Regions 2-4, where the greatest proportion of respondents expressing satisfaction and dissatisfaction came from residents on NE lakes. The larger lot sizes and more restrictive zoning standards on NE lakes may be the causes. Residents on these lakes may be polarized between satisfaction with more stringent standards and frustration with restrictions on structure placement and setbacks.

-40-



Figure 5: Satisfaction with Shoreland Zoning by Lake Classification

Retirement and residential status (seasonal or permanent) do not have a bearing on levels of satisfaction with the Program. Level of satisfaction appeared to be equally unrelated to lake characteristics (size and zoning classification) or to perceptions of crowdedness of shoreland development. For instance, of those perceiving the shoreland to be very crowded ("packed"), only 10.6% expressed little or no satisfaction with the Program, while over half expressed a high degree of satisfaction (Table 18).

Shoreline Crowding	Satisfaction None (0-1)	Some (2-4)	High (5-7)	Total	
Vacant (0-1)	3.7	4.7	11.8	20.3	
Moderately Crowded (2-4)	3.4	22.9	29.1	55.2	
Packed (5-7)	3.5	11.4	9.6	24.6	
Total	10.6	39.0	50.4	100.0	

Table 18: SHORELAND CROWDING AND SATISFACTION WITH SHORELAND ZONING

Contingency coefficient = .36677

ETA with shoreline crowding dependent = .22463ETA with zoning satisfaction dependent = .16236Pearson's R = .13185 significance = .0000

Even though residents responded strongly to several shoreland problems (Table 19), their concern did not have a significant bearing on their attitudes about shoreland zoning.⁸ It is not yet clear what is the set of conditions and facts responsible for resident attitudes. Without further analysis, we may conclude that factors not measured by the questionnaire, such as background and familiarity with shoreland (or resource) management programs, may be more important influences on shoreland resident attitudes.

⁸⁾ The highest measured correlation coefficient concerned well water contamination, with a score of only .28084. It also had the strongest Pearson's R score of -.28043. This might reflect the increased nationwide media attention given to groundwater pollution at about the time this questionnaire was being distributed. Other tests included the use of ETA scores to measure non-linear correlations.

II. Resident attitudes about particular problem areas.

One of the most important issues addressed by the questionnaire concerned how shoreland residents perceived shoreland problems. One of the questions listed thirteen problems (henceforth referred to as shoreland problem categories) that residents were asked to rate on a scale of 0-7, in which seven indicates an immediate problem and zero indicates there is no problem. Responses highlight those problems of particular concern for shoreland residents.



Algae blooms, aquatic weeds, was most often listed as the most serious problem by shoreland residents.

As a rule, few problems were found to be of significant concern to shoreland residents. The single exception to this was "algae blooms, aquatic weeds." The possible reasons for this exception will be discussed shortly. Even with this exception, shoreland residents do not seem to view most of the listed problems with particular alarm.

Despite this positive general conclusion, certain observations may be important to future shoreland management policy and administration of the Program. First, residents' responses were generally grouped into three broad factors related to shoreland problems. These three factors are: problems associated with water quality, activities that directly alter the shoreland environment, and problems related to crowding. Secondly, there are some significant regional differences in how residents identified serious shoreland problems. Next, certain problems tend to be better indicators of shoreland resident attitudes about conditions and problems. Finally, and perhaps most importantly, there is no apparent relationship between the perceived crowdedness of shoreland development and the actual amount and density of shoreland development.

Before addressing these points, it should be noted that residential status is, for the most part, an unimportant factor in evaluating shoreland resident attitudes toward particular shoreland problems (Table 19). The only real deviation from this generalization is the somewhat greater concern permanent residents have for particular problem categories, such as surface water contamination, environmental degradation, and well contamination.

-44-

Problem area	Mean Score	% Scoring greater than or = 5	Seasonal (% greater than or = 5)	Permanent (% greater than or = 5)	Retired (% greater than or = 5)	Non-retired (% greater than or = 5)
Algae blooms, aquatic weeds	3.73	44.2	41.3	49.5	45.0	43.9
Surface water contamination	2,28	20.3	18.0	24.4	17.1	21.8
Environmental degradation	2.13	17.6	14.4	23.0	13.3	21.6
Drainage	1.70	15.6	9.6	15.2	10.2	12.4
Unsightly development	1.70	11.3	10.2	12.5	N/A	N/A
Acid rain	1.48	10.4	9.8	11.7	11.5	10.0
Shoreland crowding	1.65	9.4	8.8	10.3	N/A	N/A
Well contamination	1.29	8.4	5.8	12.8	8.7	8.2
Dredging	1.12	8.4	4.8	8.5	5.9	6.4
Water surface crowding	1.62	7.9	6.9	8.5	N/A	N/A
Tree cutting	1.11	6.7	5.1	5.0	6.7	4.7
Filling	1.03	5.9	3.8	5.3	2.8	5.2
Sand blanketing	.83	5.5	3.4	5.2	5.5	3.9

Table 19: SCALE RESPONSES TO SHORELAND MANAGEMENT PROBLEM CATEGORIES

A closer examination of the responses to the shoreland problem categories provided some unexpected results. Almost 60% of the variance in questionnaire responses to shoreland problem categories could be accounted for by three factors⁹. Figure 6 graphically depicts how residents associated various problems, graphed along three axes, with each axes representing a factor. Figures 6A-6C represent each of the three graphed relationships depicted in

9) Factor	analysis res	ults are shown be	low.
Factor	Eigenvalue	% of Variance	<u>Cumualtive %</u>
1	4.83073	37.2	37.2
2	1.41753	10.9	48.1
3	1.05265	8.1	56.2
4	.94559	7.3	63.4
5	.72264	5.6	69.0
6	.66820	5.1	74.1
7	.65310	5.0	79.2
8	.60088	4.6	83.8
9	.56619	4.4	88.1
10	.45737	3.5	91.7
11	.41187	3.2	94.8
12	.37474	2.9	97.7
13	.29849	2.3	100.0

Rotated Factor Loadings (Used in Figures 6-6C)

	p.		
Shoreland problem categories	Factor 1 Water Quality	Factor 2 Shoreland Alteration Activity	Factor 3 Crowding
surface water contamination	.78992	.17531	.19159
environmental degradation	.68805	.24226	.27298
well contamination	.57529	.21901	.26617
drainage	.44994	.36852	.14699
algae blooms, aquatic weeds	.41664	.12585	.08180
acid rain	.38931	.20908	.15595
unsightly development	.37969	.31886	.33211
Cronbach's alpha for water quali	ty = .80549		
filling	.19000	.73768	.13900
dredging	.21522	.60977	.04603
sand blanketing	.19555	.59591	.07035
tree cutting	.15985	.50688	.17294
Cronbach's alpha for shoreland a	lteration = .7469	8	
shoreland crowding	.24533	.11329	.86556
water surface crowding	.26106	.14313	.56897
Cronbach's alpha for crowding =	.73760		

Figure 6, showing how the different problem categories tend to be grouped. Factor one problems are those related to water quality issues. Questions of surface water contamination, well contamination, environmental degradation, algae blooms/aquatic weeds can all be associated with the real and perceived condition of a lake and, in particular, the quality of the water. The second factor includes those problems related to shoreland alteration activities, such as dredging, filling, tree-cutting, and sand blanketing. Initially it was assumed that drainage would be viewed as a shoreland alteration activity, but questionnaire responses indicate drainage was associated with the water quality factor. Shoreland residents apparently interpreted drainage as referring to waterflow over shoreland property rather than to ditching activity, as was intended. The third factor includes the two problems concerned with crowding; water surface and shoreland crowding.





The water quality factor is a primary concern to shoreland residents. Algae blooms and aquatic weeds, in addition to being a nuisance, are usually the most visible indicator of potential water quality problems and lake eutropication. In response to this concern, shoreland management may need to further address issues related to water quality - such as nonpoint source pollution associated with agricultural activities, development, vegetation clearance and impermeable surface cover, as well as the placement and design of on-site sewage treatment systems. Regional differences in shoreland resident attitudes point to a second observation about the visibility and seriousness of the various shoreland problem categories used in the questionnaire. This is especially evident in the relative rankings of these problems (Table 20). For instance, Region 3 views algal blooms/aquatic weeds and surface water contamination with concern, while Region 5 shows significantly greater concern for dredging and filling activities. Regional differences are also revealed by which of the three shoreland factors seemed to be of primary concern. For instance, shoreland residents in Region 5 perceive shoreland alteration activities (Factor 2) such



While on some popular lakes water surface crowding may be a problem during peak use periods, most shoreland residents indicated that this was not a serious problem.



According to shoreland residents, unsightly development and shoreland crowding were not among the most serious problems.



Table 20: REGIONAL RESPONSES TO SHORELAND MANAGEMENT PROBLEM CATEGORIES

.1	% Score greater than					
Problem area	or = 5	Region 1	Region 2	Region 3	Region 4	Region 5
1) Algae blooms/aquatic	44.2	25.9 (1)	49.6 (1)	56.0 (1)	39.6 (1)	45.7 (1)
2) Surface water contam.	20.3	15.2 (2)	10.9 (4)	28.5 (2)	20.3 (4)	39.4 (3)
3) Environmental degradati	on 17.6	14.0 (3)	11.5 (3)	22.1 (3)	22.9 (3)	27.8 (4)
4) Drainage	15.6	12.8 (4)	10.4 (5)	18.8 (4)	24.0 (2)	22.6 (6)
5) Unsightly development	11.3	12.1 (6)	10.3 (6)	11.4 (7)	6.0 (11)	15.0 (8)
6) Acid rain	10.4	4.8 (12)	12.7 (2)	13.4 (6)	10.4 (7)	15.2 (7)
7) Shoreland crowding	9.4	12.6 (5)	3.3 (13)	10.8 (8)	5.2 (12)	6.9 (12)
8) Well contamination	8.4	3.4 (13)	6.2 (7)	13.9 (5)	5.2 (12)	14.7 (9)
9) Dredging	8.4	4.9 (11)	6.2 (7)	8.7 (10)	14.2 (6)	40.9 (2)
10) Water surface crowding	7.9	7.5 (7)	5.2 (10)	9.3 (9)	9.2 (9)	12.2 (10)
11) Tree cutting	6.7	6.1 (9)	5.3 (9)	6.8 (11)	14.9 (5)	6.0 (13)
12) Filling	5.9	6.8 (8)	3.6 (12)	4.3 (13)	10.2 (8)	24.8 (5)
13) Sand blanketing	5.5	5.7 (10)	5.0 (11)	4.7 (12)	8.3 (10)	8.3 (11)

as dredging and filling with considerably more concern than those in other regions. This is probably due to activity along the Mississippi River. On the other hand, those in the Arrowhead region (2) perceive acid rain to be a more significant threat than residents in the central lakes region (1 and 3), where water quality issues (Factor 1) seem to be the focus of greatest concern. In general, water quality issues seem to be of greater concern to residents in the north and central regions of the state while shoreland alteration activities grow in importance as one moves into the southern regions of the state. The magnitude of regional differences suggests that the problems addressed by the Shoreland Management Program need to vary accordingly; individual counties, as they design and implement shoreland ordinances, should use state regulations as guidelines, to be refined to the particular needs and demands of their shoreland resources.

VIII. SHORELAND CROWDING

Certainly, one of the major problems facing shoreland management is determining to what extent the resource is overdeveloped or crowded. The questionnaire partially addresses this issue in two ways: to what degree do residents see shoreland crowding as a problem (Figure 7A); and how crowded residents perceive their own shoreland area to be (Figure 7B). Statewide, shoreland residents perceive the shoreline of their lake or river to be generally uncrowded or moderately crowded, 31.9% perceive it to be vacant (rating of 0-1, 42.1% moderately crowded (2-4), and only 26.0% think conditions are packed (5-7).

There appears to be surprisingly little or no direct relationship between the amount of actual development (as measured in units/shoremile) and the perceptions of crowded conditions¹⁰. Figure 8 expresses this fact quite dramatically. This scattergram plots the perception of shoreland crowding as a problem against the actual density of developments in units/shore mile. While low density development (less than per 20 units/shoremile) typically correlates with the perception that shoreland crowding is not a problem, the converse does not hold true. At high levels of shoreland development density, there is no discernible pattern or trend suggesting that increasing development density is in and of itself perceived as a serious problem. Even the relationship between

-53-

¹⁰⁾ The measure of contingency coefficient was only .22575, with Pearson's R = .18222, and ETAs measuring .18290 and .21663 for development density and perception of crowdedness as the dependent variables, respectively.

Figure 7B: Perception of Crowdedness

Crowding as a Problem 22.1% 26.0% Moderate Crowded 42.1% (2-4)(5-7) 68.4% Moderately Crowded No Problem 9.4% (0-1)(2-4)Immediate Problem 31.9% (5-7) Vacant (0-1)

Figure 7A: Perception of Shoreland

the perception of crowding and the indication that shoreland crowding is a problem is not a simple and straightforward one¹¹, with a direct and immediately obvious correlation between the two.

These findings have important policy implications for shoreland management. Shoreland residents have a much higher tolerance for shoreland development than is generally presumed, and density of development may not be the most appropriate indicator of shoreland development problems. In fact, responses to questions about those characteristics that make shoreland development inappropriate (or undesirable) indicate that aesthetic, design, local community relations, and nuisance factors may be more critical in influencing the crowding and quality of development and management in shoreland areas than the actual amount of development. The responses by shoreland residents to crowding may be further influenced by the kinds of amenities and settings being sought. A person seeking remote settings is likely to have a much lower tolerance for development than one seeking a social setting.

11) Contingency coefficient = .46185ETA with perception of crowdedness the dependent variable = .49715ETA with perception of shoreland crowding as a problem the dependent variable = .50040Pearson's R = .48885





IX. CONVERSION FROM SEASONAL TO PERMANENT USE

One of the most significant trends identified in the Shoreland Update Project was the growing number of permanent units in shoreland areas. While seasonal development increased by almost two-thirds between 1967-1987, permanent development more than doubled. A significant but undetermined percentage of the change was a result of conversion of existing seasonal units into year-round residential use.

Questionnaire respondents reflect this trend, almost one of every four seasonal residents plan to eventually convert their lakeshore home into a permanent residence (Table 21). Of those planning to convert to year-round use, about one in three intend to do so within 4.5 years. The average length of time from conversion to year round use was approximately 3.5 years. These figures changed very little with respect to regional location.

Certainly the improvement in the road network has dramatically extended commuting ranges and has traditionally been an important factor in non-urban population growth in Minnesota.

PLANS	TO CONVERT	TO YEAR-RO	UND RESIDE	NTIAL USE	TIAL USE			
	Region 1	Region 2	Region 3	Region 4	Region 5	Statewide		
Plan to Convert	28.7	17.1	25.6	26.7	29.3	24.4		
Do not plan to convert	71.3	82.9	74.4	73.3	70.7	75.6		

Table 21: PERCENT OF SEASONAL SHORELAND RESIDENTS INDICATING PLANS TO CONVERT TO YEAR-ROUND RESIDENTIAL USE

-56-

The trend toward permanent residential use of shoreland areas has important political, social, economic, and environmental implications. As this survey has demonstrated, one can expect that with conversion will come changes in the pattern and intensity of resource use. Permanent users often use shoreland areas other than the one which they reside on for recreational purposes. At the same time, permanent and seasonal residents not only differ in recreational habits and preferences, but also have different service demands and expectations. Another important consideration is the political implications at the local level. Conversion rates may substantially change the voting characteristics of some shoreland areas. These changes, in turn, may alter representation at the local (and perhaps statewide) level, shaping policies and making them more responsive to the interests of these new shoreland residents. In turn, land use issues associated with shoreland areas are likely to move up in importance on local political agendas.

Many of the conclusions and observations made in this report need to be carefully considered in terms of how they might be influenced by the trend to conversion. Certainly expenditure patterns, along with service demands, are likely to change. The nature of these changes and the likely path they will take are beyond the scope of this report, but deserve careful and detailed consideration.

-57-

APPENDIX I

Please circle the number of the appropriate response.

Q-Ol Does your shoreland residence have shoreline frontage on a lake or a river? (Please circle the appropriate number below.)

1. yes, lake frontage

2. yes, river frontage

- 3. no, but our shoreland residence is closest to a lake. (skip to Q-3)
- 4. no, but our shoreland residence is closest to a river. (skip to Q-3)

Q-02 How many feet of shoreline frontage do you have?

feet (skip to Q-4)

Q-O3 How far is your property line from the nearest lake or river?

- 1. 100 feet or less
- 2. 101-300 feet
- 3. 301-1,000 feet
- 4. 1,001 feet or more
- Q-04 Is your shoreland residence your "primary" residence, (the residence in which your family spends the most amount of time per year)?

1. yes, it's our primary residence (skip to Q-09)

- 2. no, we use it as a seasonal/vacation residence
- Q-05 If your shoreland residence is currently used as a seasonal/vacation residence, do you plan to convert it to your primary residence?
 - 1. yes
 2. no (skip to Q-07)
- Q-O6 <u>How many years from now</u> do you expect to convert your shoreland residence from a seasonal one to your primary residence?

years

Q-07 How far does your family travel from your primary residence to your shoreland residence?

····miles

Q-08 We are interested in how often your family travels from your primary residence to your shoreland residence. Please estimate the number of trips your family made each month to your shoreland residence, between September 1, 1981 and August 31, 1982, in the spaces provided below.

1981	1	982		1982
Sept. 0	ct. Nov. Dec. J	lan: Feb. Mar. A	pr: May June	July Aug.
# TRIPS:	[[] .			

Q-09 What is the primary source of water for your shoreland residence? (Please circle one number only.)

municipal
 surface water
 deep (drilled) well
 shallow (sand point) well
 other (Please explan)

Q-10 Which of the following items do you have in your shoreland residence? (Please circle the number of each that applies.)

- 1. clothes washer
- 2. dishwasher
- 3. electricity
- 4. garbage disposal
- 5. indoor plumbing
- 6. shower or bathtub
- 7. telephone

Q-11 Please estimate the amount of time your shoreland residence was in use by each of your immediate family members, between September 1, 1981 and August 31, 1982. In the table below, please list the <u>initials</u> of each of your family members, their <u>ages</u>, and the number of <u>nights</u> <u>spent</u> by each, for each month in the spaces provided below. ("Nights spent" is used because it has been found to be an easy way to accurately estimate "user-days".)

	-	1981 NUMBER OF NIGHTS 1982											
INITIALS	AGE	Sept:	Oct.	Nov.	Dec .	Jan.	Feb.	Mar:	Apr.	May	June	July	Aug:
		ļ											
	· · ·							<u> </u>	· · · · ·				
		1 · •											
				 · · · ·	 • •			 • •,• •	 ,- ,-				
	Construction of							¦					
	• • •												
6/900*000	WITCH DESCRIPTION									1			l
	• • •								i	<u> </u>			<u> </u>
					1								
			 - · - •	 									- • • •
	and the second second		i			İ	i	1					i — i
• •		İ <i></i> .	.					· · <i>·</i> ·				İ	
Terran Hiller and a finite and a first spectrum													[]
	- • •		1		1	· ·			1			1	

Q-12 Please estimate the amount of time your shoreland residence was in use by your guests between September 1, 1981 and August 31, 1982. In the table below, please list: the initials of one individual to represent each family or group of guests at your shoreland residence, the number of guests from each group, and the number of nights spent by each group, for each month in the spaces provided below. (Please include any persons or groups which may have rented your shoreland residence as "guests".)

		1981				NUMBE	ER OF	NIGH	rs				1982
INITIALS	# GUESTS	Sept.	Oct:	Nov:	Dec.	Jan:	Feb.	Mar:	Apr.	May	June	July	Aug.
		· · · · ·								· · · · ·	· · · -		
					1								
													
								 			 '		
	****												'
	· · · · · · · · ·												
₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩ ₩₩₩₩												i	i
• • • • • • • • •							••••						
Aurophysical Contraction and Contraction and Contraction and	termenerikateninterna untugu augusta taratat			Construction of the local distance of the lo									1
	, ··											1	
Same of the other states of the states of th													
D. W. D. Control of Co	ang damag ta ang ang ang ang ang ang ang ang ang an		-		Reference concerns	0							

Q-13 Do you rent your shoreland residence to other persons?

1. yes

2. no (Skip to Q-15)

Q-14 About how many days between September 1, 1981 and August 31, 1982 was your shoreland residence rented?

days
Q-15 Please indicate the number of watercraft of each type and their respective motor sizes, that were operated by your family members or guests from your shoreland residence, between September 1, 1981 and August 31, 1982.

Number of Each Type	Watercraft Type	Horsepower of Each Motor (1st) (2nd) (3rd)
	Open (Fishing) Boats	· · · · · · · · · · · · · · · · · · ·
	Runabouts	
	Cruisers	· · · · · · · · · · · · · · · · · · ·
	Pontoon Boats	
	Houseboats	····· ······
• • • • • • • • • • • • •	Canoes	·····
	Sailboats	م م م م م م م م م م م م م م م م م م م مربع میں میں میں میں میں میں میں میں میں م
	Jet-powered water bikes	
	Padd leboats	NA NA NA.
	Windsurfers	<u>-N-A- N-AN-A-</u>

- Q-16 Between September 1, 1981 and August 31, 1982, did you or your guests use these watercraft on any lakes or rivers other than the one on which your shoreland residence is located?
 - 1. yes 2. no (skip to Q-21)
- Q-17 During this period, <u>on how many other lakes or rivers</u> did you or your guests use your watercraft?

lakes rivers

Q-18 <u>How many days</u> during this period did you or your guests use your watercraft on these other lakes or rivers?

days

Q-19 What is the <u>average distance</u> of these lakes or rivers from your shoreland residence?

·····miles

- Q-20 Where do you launch your watercraft when they are used on lakes or rivers other than that which your shoreland residence is located? (Please circle the number of each that applies.)
 - public access
 residence of a friend or relative
 resort
 - 4. other (Please explain)
- Q-21 On the days you are at your shoreland residence, how frequently do your <u>family members or guests</u> participate in each of the following <u>land-oriented</u> activities.

(On the scale below, O represents never, and 7 represents daily participation. Please circle the appropriate number for each activity below.)

	·	never	seldom	<u>often</u>	<u>daily</u>
a)	Bicycling	.01	.2	456.	7
b)	Camping	.01	.23	456.	7
c)	Golf	.01	.2	46.	7
d)	Hiking	.01	.23	456.	7
e}	Horseback Riding	.01	.23	46.	7
f)	Hunting/Trapping	.0	.2	456.	7
g)	Photography	.01	.23	456.	7
h)	Picnicking	.01	.23	46.	7
i)	Tennis	.01	.23	456.	7
j)	Trail Biking	.01	.2	46.	7
k)	All-Terrain 3-Wheeling.	.01	.23	456.	7
1)	4-Wheeling	.01	.23	46.	7
m)	Cross-Country Skiing	.01	.23	456.	7
.n)	Downhill Skiing	.01	.23	46.	7
o)	Snowmobiling	.01	.23	46.	7
p)	Snowshoeing	.01	.23	46.	7

Q-22 On the days you are at your shoreland residence, how frequently do your family members or guests participate in each of the following water-oriented activities.

(Please circle the appropriate number for each activity below.)

		never		<u>seldo</u>	m	ofte	n	<u>dai</u>	<u> 1y</u>
a)	Fishing	.0	.1	.2	.3	.4	.5	6	.7
b)	Canoeing	.0	.1	.2	.3	.4	.5	6	.7
c)	Duck Hunting	.0	.1	.2	.3	.4	.5	6	.7
d)	Motor Boating	.0	.1	.2	.3	.4	.5	6	.7
e)	Row Boating	.0	.1	.2	.3	.4	.5	6	.7
f)	Sailing	.0	.1	.2	.3	.4	.5	6	.7
g)	Swimming/Sunbathing	.0	.1	.2	.3	.4	.5	6	.7
h)	Waterskiing	.0	.1	.2	.3	.4	.5	6	.7
i)	Ice-boating	.0	.1	.2	.3	.4	.5	6	.7
j)	Ice-fishing	.0	.1	.2	.3	.4	.5	6	.7

Fisheries Questions:

The following seven questions regard your family's fishing activities and attitudes. Answer only if you or your family members participate in fishing activities:

- Check here if neither you nor your family members fish and skip to Q-30.
- Q-23 On the scale below, please indicate how important fishing quality was in choosing the location of your shoreland residence.

low	high
importance	importance
01234	567

Q-24 On the scale below, please rank the fishing quality of your lake.

low	high
quality	quality
012345	.67

Q-25 On the days you go fishing, what is your average catch per outing?(number of fish)

Q-26 On the scale below, please rate the importance (desirability) which you place on the following items.

		low importance	high importance
a)	Catching and releasing fish	012345.	67
b)	The size of the fish that you catch	012345.	67
c)	The number of fish that you catch	012345.	67
d)	Catching more than one different kind of fish	012345.	67
e)	Catching a particular kind of fish	012345	67
	What kind of fish?	•••••••••••••••••••••••••••••••••••••••	

- Q-27 Do you feel that the present daily limits on fish are adequate, too liberal, or too restricitve?
 - 1. adequate
 - 2. too liberal
 - 3. too restrictive
- Q-28 Would you favor the banning of live bait on some of our walleye waters if this would increase the survival of fish stocks?
 - 1. yes
 - 2. no
 - · 3. no opinion
- Q-29 Would you be in favor of setting aside several bodies of water just for "trophy" fishing?
 - 1. yes
 - 2. no
 - 3. no opinion
- Q-30 Do your <u>family members or guests</u> use a winter fishhouse from your shoreland residence?

1. yes

2. no

Q-31 For the water-oriented activities in which your family participates, please indicate on the scale below how crowded you feel the water surface of your lake or river is, during peak use periods.

vacant

packed

0.....1.....2.....3.....4.....5.....6.....7

- Q-32 What time of day is the water surface of your lake or river the most crowded? (In the space below, please indicate the one-hour of the day, either a.m. or p.m., that the water surface of your lake or river is the most crowded.)
- Q-33 During the time period you indicated above (Q-32), how often between September 1, 1981 and August 31, 1982 did surface crowding cause your family not to use your lake or river?
 - l. never
 - 2. once a month or less
 - 3. more than once a month

Q-34 We are interested in your perceptions of the effectiveness of different methods of minimizing water surface conflicts. On the scale below, please rate the effectiveness of each of the following methods.

		least effecti	ve					most effective
a)	Limits on motor size	.0	1	.2	.3	.4	.5	.67
b)	Limits on public access use	.0	1	.2	.3	.4	.5	.67
c)	Speed limits	.0	1	.2	.3	.4	.5	.67
d)	Banning certain activities during peak use periods	.0	1	.2	.3	.4	.5	.67
e)	Zoning areas of the lake or river for certain activities	.0	1	.2	.3	.4	.5	
f)	Enforcement	.0	1	.2	.3	.4	.5	67

Q-35. On the scale below, please rate the need for each of the following methods of minimizing water surface conflicts, on your lake or river.

		least needed			most needed
	a) Limits on motor size	0			.67
	<pre>b) Limits on public access use</pre>	0			.67
	c) Speed limits	01			.67
	d) Banning certain activities during peak use periods	01	2		.67
	e) Zoning areas of the lake or river for certain activities	01	2		.6 7
	f) Enforcement	01	2		.67
	g)Check here if	you feel none	are necessary	for your lake on	r river.
36	Please indicate on th	e scale below,	how crowded y	rou feel the sho	reline of

Q-

vacant

packed

- Q-37 Shoreland zoning regulations control or limit each of the following:
 - 1. lot area
 - 2. water frontage and lot width at building line
 - 3. building setback from ordinary high water mark
 - 4. building setback from roads and highways
 - 5. building elevation above highest known water level
 - 6. sewage system setback from ordinary high water mark
 - 7. sewage system elevation above highest groundwater level or bedrock

Please-indicate on the scale below, the extent to which you are satisfied with the way in which the shoreland zoning regulations have maintained your lake or river.

no	complete
satisfaction	satisfaction
0	

- Q-38 If you are not satisfied with the way in which your shoreland zoning regulations have maintained your lake or river, what changes or recommendations would you offer to address these problems?
- Q-39 On the scale below, please indicate the degree to which you consider each of the following to be problems on your lake or river.

	no problem	immediate problem
Conditions		
a) water surface crowding	0123	
b) shoreland crowding	0123	4567
c) well contamination	0123	4567
d) surface water contamination.	0123	4567
e) environmental degradation	0123	4567
f) unsightly development	0123	4567
g) algae blooms, aquatic weeds.	0123	4567
h) acid rain	0123	4567

Shoreland Alterations

h)	drainage	.0]	2	.3	.4	.5	.6	.7
i)	dredging	.0				4	.5	6	•7
j)	filling	.0				4	.5	6	.7
k)	tree cutting	.0				4		6	.7
1)	sand blanketing	.0		2			.5	6	.7

Q-40 If acid rain caused the contamination or elimination of fish at your shoreland residence, how would it affect your use of the residence? (Please circle the appropriate number below)

our use would not be affected
 we would use our shoreland residence less
 we would use our shoreland residence more
 we would sell our shoreland residence

5. other (Please list)

Q-41 Among the items listed below, please indicate those that have caused problems on your lake or river. (Please circle the number of each that applies.)

01. agricultural activities 02. bar/restaurant 03. boathouses 04. campground 05. marinas 06. motor vehicle park 07. public park 08. public access 09. residential sewer system 10. resort 11. swimming beach 12. winter fishhouse 13. other (Please explain)

Q-42 From the list below, circle the number of each type of development on your lake or river which you feel is <u>inappropriate</u>. (Please circle the number of each that applies.)

- 01. residences
 02. resorts
 03. boathouses
 04. bar/restaurant
 05. commercial
 06. bridges
 07. farm
- 08. public access
- 09. public parks 10. other (Please list)
- 11. None (skip to Q-44)
- Q-43 For the types of development you circled above (Q-42), what characteristics make them inappropriate? (Please circle the number of each that applies.)
 - 01. color 02. upkeep 03. design 04. closeness to shore
 - 05. density
 - 06. lack of landscaping
 - 07. contrast to environment
 - 08. nuisance by users
 - 09. crowding
 - 10. other (Please explain)

- Q-44 Keeping in mind the cost to shoreland residents in terms of taxes, which of the following public services or facilities would you like to see extended or improved on your lake or river? (Please circle the number of each that applies.)
 - 10. schools 01. municipal sewer 11. library 02. municipal water 12. public parks 03. electricity 13. public access 04. natural gas 14. rubbish collection 05. telephone 15. public fishing dock 06. fire protection 16. None 07. police protection 17. other (Please list) 08. ambulance/hospital 09. road maintenance
- Q-45 (Answer only if your shoreland residence is used on a seasonal basis: If your shoreland residence is your primary residence; skip to Q-46:)

Please provide your best estimate of how much money your household spent between September 1, 1981 and August 31,1982, in the immediate vicinity of your shoreland residence. Do not include expenditures in more than one category. Do not include amounts spent at your permanent residence in preparation for your trip to your seasonal residence.

LOCAL - PURCHASES	AMOUNT - SPENT
transportation (gas, oil, vehicle repairs)	· · · · · · · · · · · · · · · · · · ·
food and beverage (restaurant, bars, grocery)	····
minor equipment (bait, license, fishing rods, boat/motor/rental)	
major equipment (boat, motor, snowmobile, etc.)	
real estate taxes	
household supplies other than grocery	· · · · · · · · · · · · · · · · · · ·
residence maintenance, remodeling, construction	
recreation other than dining (golf, movies, etc.)	· · · · · · · · · · · · · · · · · · ·
heating, electricity, other utility	·····
other retail (clothing, souvenirs, etc.)	
other (please specify)	

Q-46 How many years from now do you plan on retiring? (Enter 0 if you are already retired.)

years

Q-47 How many years of education do the adult members of your household have? (Please indicate the number of adult members in each category.)

a) 1-6 years

b) 7-8 years

c) ----- 9-12 years

d) ----- 1-4 years of college

e) college degree

f) post graduate work

- Q-48 What is the yearly income of your household? Please include all income of spouses, relatives, and children living at home. Also, consider income to be the total from employment and investments prior to taxes in 1981. Please note: Although the survey so far has required information for the period between September 1, 1981 and August 31, 1982; to make this question easier to answer, use the calender year 1981: (Please circle the appropriate letter below:)
 - a) 0-9,999 b) 10,000-19,999 c) 20,000-29,999 d) 30,000-39,999 e) 40,000-49,999 f) 50,000-59,999 g) 60,000-69,999
 - h) 70,000+
- Q-49 What are the occupations of the adult members of your household? (Please indicate the number of adult members in each category.)

a) professional/technical

b) clerical

c) agricultural

d) ····· crafts

e) ---- non-farm labor

f) sales

g) machines and other operatives

h) manager/administrative

i) homemaker

j) retired

k) other

Q-50 Are there any additional comments you would like to make regarding trends, concerns, management problems, etc. relative to your shoreland residence?

Q-51 If you would like to receive any of the following materials, check the appropriate boxes and fill in your name and address below. In the open space provided, please indicate the specific lake, park or county per request.

····· list of lake depth maps

public access maps

state park maps

snowmobile trail maps state ski trails maps

boating guides

NAME	-	-	-			-	-			-		-		-	-	-		_	-	-	-	-			-	-	-		-	-	_	-	-	-
ADDRESS		_				•				-	-		_		-			-	-	-	_		-		-		_	-	-	-	-	-	-	-
	•	-				•	-		-				-			-	-	-	-	-	-	-			-		•		-	-	-	-	-	
				 • •	• •	•	-	-	-	•							-		-			-		-	•		•	-		-		-		-

Thank you very much for your time and cooperation in completing this survey! The information you have provided will enable us to better understand the needs of shoreland residents, so that DNR management practices can be responsive to both the public and to our priceless natural resources.



APPENDIX II



Sample Index.

DNR	Resource			Relative
Region	Туре	Code	N	Frequency
1	NFIK	11	39	2.9%
ì	RDIK	12	154	11 6%
'n	GDIK	13	63	4 8%
2	Divor	20	37	2.8%
2	NEIV	21	17	1 3%
2		22	274	20.7%
2		23	217	1 8%
2	Divor	20	27 41	3 12
2	NEIL	21	22	1 79
2		22	196	31.09
3		32	100	17.00
3	GU LK	33 40	180	13.0% 1 10
ч я	NE IL	40	10	0.09
4	NE LK	41	12	0.36
4	KD LK	42	39	2.9%
4	GD LK	43	107	8.1%
5	River	50	43	3.2%
5	NE Lk	51	3	0.2%
5	RD Lk	52	34	2.6%
5	GD Lk	53	29	2.2%
(No 1	Match)	9 9	5	0.4%
		Total	T325	100.0%

Sample by Region.

DNR Region	N	% of Total Sample
		(2.2. 64)
1	256	(19.3%)
2	352	(26.6%)
3	430	(32.5%)
4	173	(13.1%)
5	109	(8.2%)
(no match)	5	(0.4%)

Sample by Zoning-Class/Resource Type.

Zoning Class	N	% of Total Sample
Natural Environment Lakes	94	(7.1%)
Recreational Development Lakes	687	(51.8%)
General Nevelonment Lakes	403	(30.4%)
Rivers	136	(10.3%)
(no match)	5	(0.4%)

Sample by Size.

Lake Size or River	<u> </u>	% of Total Sample
Large Lake (150+ acres)	1069	(80.7%)
Small Lake (0-149 acres)	120	(9.1%)
Rivers	136	(10.3%)

County I.D. #	County	<u> </u>	% of Total Sample
01	Aitkin	47	(3.5%)
03	Becker	10	(0.8%)
04	Beltrami	23	(1.7%)
07	Blue Earth	וו	(0.8%)
09	Carlton	39	(2.9%)
11	Cass	83	(6.3%)
13	Chisago	50	(3.8%)
16	Cook	36	(2.7%)
18	Crow Wing	88	(6.6%)
21	Douglas	75	(5.7%)
29	Hubbard	49	(3.7%)
31	Itasca	92	(6.9%)
32	Jackson	ונ	(0.8%)
33	Kanabec	19	(1.4%)
34	Kandiyoh i	75	(5.7%)
40	Le Sueur	1	(0.1%)
43	McLeod	18	(1.4%)
44	Mahnome n	14	(1.1%)
47	Meeker	12	(1.1%)
48	Mille Lacs	6	(0.5%)
49	Morrison	29	(2.2%)
51	Murray	17	(1.3%)
52	Nicollet	4	(0.3%)
55	01msted	32	(2.4%)
56	Ottertail	61	(4.6%)
61	Pope	24	(1.8%)
66	Rice	32	(2.4%)
69	St. Louis	138	(10.4%)
71	Sherb urne	18	(1.4%)
73	Stearns	61	(4.6%)
77	Todd	11	(0.8%)
79	Wabasha	45	(3.4%)
80	Wadena	12	(0.9%)
83	Watonwan	22	(1.7%)
86	Wright	53	(4.0%)

-74-

Response Rate (Please note: these figures are not adjusted; i.e., the innapropriately sampled respondents are not deleted. The actual response rates may therefore be greater than that which is indicated below.)

Sample return by Lake.

Resident <u>Q ID #</u>	DOW Lake Number	Lake Name	Zoning Class	Sample Size	N of <u>Returns</u>	Response Rate	% of all <u>Returns</u>
Region 1							·.
Becker Coun	ity						
031 032	03334 03258	Net Acorn*	RD RD	04 22	0 10	0.0% 45.5%	0.0% 0.8%
Beltrami Co	unty						
041 042 043 044	04110 04134 04196 04265	Little Bass 3 Island Campbell Island	RD NE NE RD	15 17 13 04	6 9 7 1	40.0% 52.9% 53.8% 25.0%	0.8% 0.7% 0.5% 0.1%
Douglas							4
211 212 213 214 215	21016 21057 21199 21094 21123	Smith Carlos Crooked Louise Ida	RD GD RD GD GD	23 60 06 34 53	10 26 2 12 25	43.5% 43.3% 30.3% 35.3% 47.2%	0.8% 2.0% 0.2% 0.9% 1.9%
Hubbard						*	
291 292 293	29059 29243 29072	Mirage Potato 8th Crow Wing	NE RD RD	21 51 58	4 18 27	19.0% 35.3% 46.6%	0.3% 1.4% 2.0%
Mahnomen			_ *				
44]	44014	S. Twin	RD	57	14	24.6%	1.1%
Ottertail	· · ·	•		•••		4. S. S.	
561 562 563 564	56238 56293 56306 56604	Clitheral Crane Elbow N. Ten Mile	RD RD NE NE	60 44 13 29	24 18 7 12	40.0% 40.9% 53.8% 41.4%	1.8% 1.4% 0.5% 0.9%
Pope							
611	61064	Amelia	RD	60	24	40.0%	1.8%

-75-

Resident Q ID #	DOW Lake Number	Lake Name	Zoning Class	Sample Size	N of Returns	Response Rate	% of all Returns
Region 2						•	
Aitkin							
011 012 013	01089 01104 01179	Long French Hickory	RD NE RD	60 24 29	29 8 10	48.3% 33.3% 34.5%	2.2% 0.6% 0.8%
Carlton	· ·						
091 092	09008 09035	Chubb L.Hang'g Horn	RD * RD	41 37	19 20	46.3% 54.1%	1.4% 1.5%
Cook							
161 162	16356 16365	Gunflint Clara	RD RD	60 30	24 12	40.0% 40.0%	1.8% 0.9%
Itasca							
311 312 313 314 315	31259 31271 31334 31585 31432	Balsam Marble Deer McAvity Lost Moose*	RD-2 NE RD-2 RD-2 RD-1	51 04 42 21 14	21 1 24 11 10	41.2% 25.0% 57.1% 52.4% 71.4%	1.6% 0.1% 1.8% 0.8% 0.8%
St. Louis		· · ·					• •
691 692 693 694 695 696	69412 69624 69627 69515 695128 69565	Comstock Schelins Nichols Bergen* Briar* Esquagama	RD NE RD RD GD	56 12 60 45 60 52	25 8 29 15 25 24	44.6% 66.7% 48.3% 33.3% 41.7% 46.2%	1.9% 0.6% 2.2% 1.1% 1.9% 1.8%
Region 3							
Cass				•			• .
111 112 113 114 115	11086 11092 11200 11258 11415	Grave Little Sand Mule Long Pike Bay	NE RD RD GD	19 13 51 60 01	6 5 28 33 0	31.6% 38.5% 54.9% 55.0% 0.0%	0.5% 0.4% 2.1% 2.5% 0.0%
<u>Chisago</u>							
131 132	13068 13054	Fish 1. Comfort*	GD GD	56 36	25 11	44.6% 30.6%	1.9% 0.8%

(

-76-

Region 3 continued.

Resident Q ID #	DOW Lake Number	Lake Name	Zoning Class	Sample Size	N of Returns	Response Rate	% of all Returns
Crow Wing							
181 182 183 184 185 186	18020 18180 18239 18386 18043 4800201	Borden Lows Silver Red Sand Roosevelt* Mille Lacs	GD NE RD NE GD	60 11 35 30 26 53	23 2 12 9 10 16	38.3% 18.2% 34.3% 30.0% 38.5% 30.2%	1.7% 0.2% 0.9% 0.7% 0.8% 1.2%
Kanabec							
331	33015	Mud	RD	56	19	33.9%	1.4%
Mille Lacs							
481	4800254	Mille Lacs	GD	14	6	42.9%	0.5%
Morrison		• •					
491	49016	Sullivan	GD	60	29	48.3%	2.2%
Sherburne		÷ .					
711	71055	Elk	GD	60	18	30.0%	1.4%
Stearns							
731 732 733	731 18 731 57 73200	Pelican Horseshoe Koronis	RD RD GD	58 60 58	16 21 24	27.6% 35.0% 41.4%	1.2% 1.6% 1.8%
Todd			•				
771	77034	Little Swan	RD	46	רר	23.9%	0.8%
Wadena							•
801	80034	Blueberry	RD	39	12	30.8%	0.9%
Wright							
861 862	86217 86234	Granite Bass	RD GD	60 52	25 28	41.7% 53.8%	1.9% 2.1%

Resident Q ID #	DOW Lake Number	Lake Name	Zoning Class	Sample Size	N of Returns	Response Rate	% of all Returns
Region 4							
Jackson							
321	32020	Loon	RD	22	11	50.0%	0.8%
Kandiyohi							
341 342 343 344	34044 34072 34171 34116	Diamond Lillian Eagle Henderson*	GD RD GD GD	60 13 58 27	20 2 39 14	33.3% 15.4% 67.2% 51.9%	1.5% 0.2% 2.9% 1.1%
LeSueur							
401	40014	Sabre	NE	04	1	25.0%	0.1%
McLeod		:					
431 432	43115 43085	Cedar Otter	NE GD	08 53	1 17	12.5% 32.1%	0.1% 1.3%
Meeker	•						
471 472 473	47016 47177 47183	Wolf Long Hope	RD NE NE	12 23 02	4 9 1	33.3% 39.1% 50.0%	0.3% 0.7% 0.1%
Murray		·					
511	51063	Sarah	GD	-50	17	34.0%	1.3%
Watonwan							
831	83040	Long	RD	60	22	36.7%	1.7%
Region 5				· . · ·			
Olmsted							
551	55004	Zumbro	RD	60	29	48.3%	2.2%
Rice							
661 662 663	66008 66010 66061	Cannon Wells Cody	GD GD NE	60 14 13	23 6 3	38.3% 42.9% 23.1%	1.7% 0.5% 0.2%
Wabasha 791	79003	Prichard*	RD -78-	12	5	41.7%	0.4%

Resident Q ID #	River Name	Sample Size	N of Returns	Response Rate	% of all Returns
Region 2					
Itasca Count	<u>y</u>				
3191	Big Fork	36	12	33.3%	0.9%
3192 3193	Prairie Mississippi	25	6 7	24.0% 23.3%	0.5% 0.5%
<u>St. Louis</u> 6991	Lester	07	3	42.9%	0.2%
6992	French	15	4	26.7%	0.3%
0993	Lloquet	13	5	38.5%	0.4%
Region 3					
Cass 1191	Crow Wing	25	8	32.0%	0.6%
Chisago	Pine	08	3	37.5%	0.2%
1391 1392	Sunrise St. Croix	07 41	0 14	0.0% 34.1%	0.0% 1.1%
Crow Wing	Micciccinni	36	11	30 6%	0.8%
1892	Gul 1	15	5	33.3%	0.4%
Region 4					
Blue Earth		07			0.0%
9071 0792	Minnesota Maple	07 06	3 2	42.9% 33.3%	0.2% 0.2%
0793	Blue Earth	22	6	27.3%	0.5%
Nicollet					
5291	Minnesota	19	4	21.1%	0.3%
Region 5			1. · ·	· · ·	
Dimsted					
5591	Plum	06	0	0.0%	0.0%
5592 5593	S.Fork Zumbro W.Fork Zumbro	05 03	2 1	40.0% 33.3%	0.2% 0.1%
labasha					
7991 7002	Mississippi Zumbro Piver	34 31	19 7	55.9% 22.6%	1.4%
7993	Zumbro (Lake)	21	6	28.6%	0.5%

-79-

