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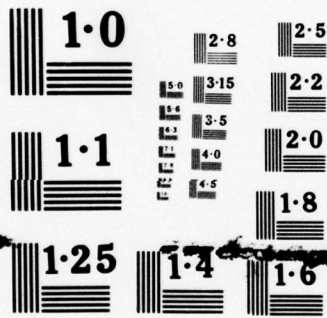
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# RECREATIONAL BOATING IN THE CONTINENTAL UNITED STATES IN 1973 AND 1976:

## THE NATIONWIDE BOATING SURVEY

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**U.S. DEPARTMENT OF TRANSPORTATION**

**UNITED STATES COAST GUARD**

**Office of Boating Safety**

**Washington, D.C. 20590**

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16. Abstract A nationwide survey of 1976 boating activity was conducted by the U.S. Coast Guard in order to expand and clarify existing information on recreational boating. Using randomly generated telephone numbers, more than 28,000 households in the continental United States were contacted and those owning and/or operating boats were interviewed. Results from these interviews were used to calculate population estimates. This report provides: 1) estimates of the numbers of pleasure boats and their characteristics; 2) information on safety and communication equipment on these boats; 3) boating household and operator characteristics and activities; and 4) feedback on the emergency assistance and boating education programs. Revised results from the previous (1973) Nationwide Boating Survey are included in this report to permit comparisons and identify trends over the 3-year interval. Pleasure boating shows substantial growth from 1973 to 1976. Boating households for 1973 are estimated at 10.6 million, total boats at 9.6 million, boat renting households 1.9 million and boat operators at 19.5 million. Boat passengers, and thus total boater figures were not determined in 1973. Boating households for 1976 are estimated at 14.9 million, total boats at 12.8 million, boat renting households 3.8 million, boat operators at 30.1 million, and boat passengers (in addition to operators) at 20.3 million. Thus the total number of boaters was 50.4 million in 1976.			
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FOREWORD

The Coast Guard is responsible for the collecting, analyzing and publishing of boating reports, information and statistics. Boating Statistics (CG-357), published annually since 1959, provides summaries of numbered boats and boating accident data.

Since we recognize that accident data alone are not sufficient to identify problem areas or to measure effectiveness of safety programs, the Coast Guard in 1974 initiated a comprehensive national boating survey to gain additional information on boats, boaters, and their activities. The information from this first survey enabled us for the first time to compute meaningful accident rates. To insure that we remain current in our rate determination, a second similar survey was initiated.

This report covers boating activities during the 1976 boating year. It also includes data for the 1973 boating year which has been revised to reflect updated Bureau of the Census population and household data. All readers should note the text accompanying each table for definitions and amplification of the data presented.

The information from the two surveys includes figures on total boats and total hours of boating exposure. Projections of accident risk will be made from the data obtained from the surveys. We intend to conduct similar periodic surveys as an important means to validate and improve our initial projections.

My personal thanks go to those whose cooperation made this survey possible. Any questions on this survey or suggestions for future similar surveys should be referred to the above address. Any comments will be appreciated.

DAVID F. LAUTH  
Rear Admiral, U. S. Coast Guard  
Chief, Office of Boating Safety

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We are greatly indebted to the thousands of boaters and boat owners who participated in this survey. The very low refusal rate and the highly positive responses of those who were interviewed stand as evidence of continuing public interest in pleasure boating and boating safety.

Chilton Research Services, of Radnor, Pennsylvania, deserves special commendation for conducting the actual interviewing and gathering of data. Project leader for Chilton, Andrew J. Brown, assisted by Cindy Udell, John Schimpf, Dale Kulp, and the Chilton interviewing staff all contributed to obtaining a good product.

Many members of the Policy Planning and Information Analysis Staff made substantial contributions to this survey. Dr. Norman Thompson was involved in all phases of the project. Kenneth Freund and Thomas Sheehan compiled tables and wrote most of the final report. Gary L. Traub developed and performed most of the computer and statistical operations. Allan L. Hakes monitored much of the typing and developed appendices. CDR James Prout coordinated the many administrative aspects connected with this extensive project. Special thanks go to Mrs. Phyllis A. Johnson for the many hours of typing tables and text.

Dr. Rolf M. Wulfsberg (USCG Reserve) is to be commended for his statistical advice at various phases of the survey, for designing the special study of "no answer/busy" calls and for calculating the weights for deriving population estimates.

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A. J. MARMO  
Chief, Policy Planning and  
Information Analysis Staff

Washington, D.C.

March, 1978

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## I. INTRODUCTION

For many years, the United States Coast Guard has been publishing a report, Boating Statistics (CG-357), in which numbered boats and boating accidents are summarized for that year. Numbered boats are counted by state, and various classifications and characteristics of these boats are presented. Summaries of the boating accidents are provided describing fatalities, injuries, property damage, vessels involved, causes and miscellaneous circumstances surrounding the accidents.

While these statistics are interesting from a purely descriptive standpoint, any attempt to analyze the statistics in terms of fatality rates or risks involved is futile without information on the total number of recreational boats in the United States and on the exposure of boats and boaters to the possibility of boating accidents. Most states supply only numbered motorboat figures. Estimates based on numbered boats alone are not valid if the ratio of all boats (including those not required to be numbered) to numbered boats is unknown. Likewise, one cannot estimate exposure based on the number of motorboats in the U.S. without knowing the total time that they are used.

In addition, although all but two of the states' numbering laws now meet the specifications of the Federal Boat Safety Act of 1971, the 16 states that require more boat types to register than the minimum required by the Act complicates any analyses using numbering data. In 1973, many states did not meet the specifications of the Act. This, too, compounded the problem. A summary of the state numbering systems as of 31 December 1973 and 31 December 1976 is shown in Appendices E and F.

In an attempt to meet this need for national boating statistics and to obtain information used in measuring the effectiveness of the boating safety program, the Coast Guard has now sponsored two comprehensive surveys of the boating public during the months of April and May, 1974 and April, May and June, 1977. Using randomly-generated telephone numbers in approximately 800 central offices in the United States, Chilton Research Services contacted over 28,000 households. Those households which contained boat owners or boat operators were interviewed. At the completion of the interviewing period, the responses from each geographical area were appropriately weighted, resulting in national estimates. The final results are printed herein.

Chapter II contains a detailed description of the methodology employed in the survey plan. While the text is technical in places, the reader is especially encouraged to review this chapter as it provides insight into the assumptions and techniques underlying the data collection. An understanding of these assumptions is vital to proper interpretation and use of the survey results.

Chapter III is a highly technical summary of the theoretical procedures employed in the data expansion. While the content of this chapter is not essential to an understanding of the results, Chapter III does offer an explanation of estimating the variances and means.

The 1973 survey estimated the approximate numbers of boaters and boats, their characteristics, boating equipment carried and boating activities in which engaged. The 1976 survey gives the same information and, in addition, enables us to develop trends in the three years since the first survey.

This survey will be used, along with other data, to formulate programs, develop standards, and initiate educational efforts. Specific examples of uses of data from the 1973 survey were in the development of standards for level flotation and fuel and electrical systems as well as in identifying a great need for safety education of boat operators.

The remaining chapters reveal the results of the Nationwide Boating Surveys. Chapter IV deals with the characteristics of the boats. The recreational boat population is estimated in terms of size and characteristics. Chapter V discusses the exposure of recreational boats and boaters to the possibility of accidents. Analyses of the 1973 and 1976 boating accidents which were reported to the U.S. Coast Guard are included. Finally, Chapter VI summarizes the results which deal with the boating households and operators.

Readers and users of this report should notice that the values in the 1973 tables differ from those in the original report (Reference 2). U.S. Census population data for 1970 was used in the original analysis of the 1973 survey. Consequently, the 1973 data was analyzed a second time using 1973 Bureau of the Census Population Estimates (Revised) for households in the various states. This second analysis also used the same computational and statistical procedures used in the analysis of the 1976 data, thus improving validity of comparisons between 1973 and 1976.

## II. 1976 NATIONWIDE BOATING SURVEY METHODOLOGY

### A. Selection of a Survey Medium.

As with the 1973 Nationwide Boating Survey, the first task to be completed was the selection of a medium through which the survey would be conducted. The three standard methods of interviewing are personal interviews, telephone interviews, and interviews by mail.

It is generally accepted that the personal interview yields the best results, both in terms of return and in terms of quality of the data; however there are several immediate drawbacks to such a technique:

(1) No frame (i.e., list of all persons in the population) exists from which to draw a probability sample. While lists do exist of owners of boats which are numbered by the states or the U.S. Coast Guard, the fact that approximately 40% of all recreational boats are not numbered makes the use of a list of numbered boat-owners untenable as a frame;

(2) This method is extremely expensive due to the travel costs involved;

(3) Unless a massive number of interviewers is employed, this method requires a long interviewing period for a reasonable sample size;

(4) Sampling procedures for this method can be very complex if they are to be valid.

For the purposes of the Nationwide Boating Survey, the cost factor alone was sufficient to eliminate personal interviewing from further consideration.

While a mail survey clearly would have been the least expensive method of interviewing, this procedure, too, had many shortcomings:

(1) No frame is available which contains all United States addresses;

(2) This method requires a long interviewing period, since returns typically continue to filter in up to a year after initial release in a mail survey;

(3) There is no way of determining if the respondent is "responsible" in the sense of being aware of the household's boating activities;

(4) Without the personal communication of personal or telephone interviews, clarification of items is impossible, quite likely leading to biased or incorrect answers.

(5) Studies of mail-out surveys have shown that readers tend to look ahead. This could possibly induce biases in survey responses.

(6) Possibly worst of all, the overall return of questionnaires on a mail survey is frequently under twenty percent, while a personal or telephone interview generally yields over ninety percent return. Poor survey return introduces problems of non-response interpretation in the survey results.

A telephone survey has few of the drawbacks just mentioned. While a general frame does not exist--not all households contain telephones--a frame can be constructed which contains all households by making the assumption that the population of telephone households is representative of all households with respect to boating characteristics. (To date, we have found no information to make us believe that this is not a reasonable assumption.) In addition, a telephone survey can be conducted in a short period of time, since no travel time is involved. Misunderstandings can be clarified while the interview is being conducted. The survey can contain sophisticated "branching" statements (i.e., instructions to answer different items depending on previous responses) which might confuse the respondent in a mail survey. Finally, by repeating the 1976 survey through the same medium as was used in the 1973 survey, comparability would be enhanced. For these reasons, telephone interviewing once again was selected as the survey medium.

#### B. Quality Assurance Measures.

At the completion of many surveys, it is frequently discovered that a sizable portion of the data is incomplete or invalid for various reasons. The fault may lie with the interviewer, the person being interviewed, persons manipulating the data into proper form for processing, or the questionnaire design. To reduce the possibility of such errors, many quality assurance measures were built into the Nationwide Boating Survey.

Quality assurance was one of the essential determinants in selecting a contractor to perform the interviewing stage of the survey. The contractor selected, Chilton Research Services of Radnor, Pennsylvania, offered a unique system to guarantee good survey results. Chilton's interviewing center is equipped with a series of interactive computer terminals and a series of Wide Area Telephone Service (WATS) Lines which in turn permitted the following quality control features:

(1) The entire questionnaire was programmed into the computer and was displayed on Cathode Ray Tube (CRT) screens for the interviewer to read. This means that all conditional "branches" were internally controlled, eliminating the possibility of incorrect skips on the part of the interviewer.

(2) All editing of the responses was done automatically and interactively by the computer program. Hence, if a response was entered which contradicted a prior response, an error message appeared on the CRT and the situation was corrected by the interviewer. In addition, response values which were not in the reasonable range were automatically rejected by the computer program.

(3) The responses were automatically recorded on magnetic tape directly from the CRT terminals. This eliminated the usual errors introduced by keypunching or extra manual data entry procedures.

(4) The programmed questionnaire employed imbedded prompting; that is, if a respondent stated that his primary boat was an outboard and was sixteen feet long, future questions referred to his "16-foot outboard" instead of his "primary boat". This eliminated possible confusion over which boat the person had stated was his primary boat in the event of multiple boat ownership.

In addition to the quality assurance measures provided by the contractor, the Coast Guard employed other techniques to guarantee quality data. An extensive pretest of the questionnaire was conducted jointly by the contractor and Coast Guard personnel prior to beginning the survey so that vague or improper wording could be corrected. The pretest also revealed certain items which needed to be added or deleted.

Secondly, the Better Business Bureaus and all Coast Guard units were informed that the survey was to be conducted and was sponsored by the U.S. Coast Guard. This proved to help reduce the refusal rate since wary respondents were able to verify the authenticity of the survey before participating.

Finally, to avoid the possible bias of present boating activity on recall of the 1976 boating year, the contractor was requested to complete all interviews before the major 1977 boating activity began. In actuality, 4,540 of the 5,507 boating interviews were completed by the Memorial Day weekend. This is over 80% of the interviews. The remainder were completed in June.

### C. Sampling Plan.

The sampling plan employed in the second Nationwide Boating Survey can best be termed stratified two-stage cluster sampling. The continental United States was first partitioned into 400 geographical strata. These strata consisted, in most cases, of single counties or groups of two or more counties. Within each stratum, two telephone central offices and two additional reserve central offices (if needed) were selected at random. A telephone central office was defined by the 3-digit area code plus the 3-digit prefix of the 7-digit telephone number. The complete telephone numbers used in the survey then were selected, within each central office, by combining the area code and 3-digit prefix with a 4-digit number which was randomly selected from the range of numbers in the working banks of that central office. The reserve central offices, used in only a few instances, provided additional working numbers where the sample from the first central office yielded insufficient contacts.

It is extremely important to note that the sampling procedure was random at each of the two stages. The expectation of this procedure was to obtain a true probability sample from which unbiased estimates of population parameters could be derived. Use of telephone books would have been untenable and invalid due to the high rate of change of residence and the significant proportion of unlisted numbers.

This sampling plan was selected over other possible techniques for several reasons:

(1) When dealing with a population that has regional homogeneity imbedded in an overall structure of heterogeneity, the use of stratification leads to a reduction in the variance of the estimates. That is, the estimates will be more precise for the same sample size than a similar plan which does not employ stratification. It is felt that the boating population has such a structure.

(2) The use of two-stage cluster sampling within each stratum is much less expensive in a telephone survey than a one-stage procedure due to the large number of non-working banks in a typical central office. The process employed required the contractor to deal with only 800 central offices instead of the national total of approximately 28,000.

(3) The use of this technique would be consistent with the strategy employed in the 1973 survey. As with the reselection of the telephone interview as the medium, the use of the same sampling plan would improve the comparability of the calculable sampling error.

Another measure to enhance the comparability of the two surveys was the selection of the same stratum boundaries used in 1973 for the 400 strata. The number of strata apportioned to a given state was proportional to the number of registered (numbered) boats in that state in 1973, subject to the restriction that no state would contain fewer than five strata. That is, all continental states (including the District of Columbia) which contained fewer than 5/400 or 1.25% of the nation's boats were partitioned into five strata each, and the remaining states received more strata depending on their 1973 population of numbered boats. Once the number of strata to be assigned to a given state was determined, the stratum boundaries were developed using the following guidelines:

- (1) No county was to be included in more than one stratum;
- (2) Counties containing major metropolitan areas or other large concentrations of population were to be isolated as much as possible;
- (3) Within the constraints of guidelines (1) and (2) above, each stratum was to be as homogeneous as possible in the context of boating densities and characteristics.

The first constraint allowed us to use household population estimates based on figures from the Bureau of the Census to estimate results. The Bureau of the Census defines a household as "all the persons who occupy a housing unit." A household can be as little as one person in a single room, or as much as a large group of related persons and/or one or more unrelated persons. Rooming houses, military barracks, institutions, etc., are not counted as households. The second and third constraints were variance-reduction measures. Since direct information on homogeneity was not available in most cases, decisions on boundaries within the third guideline were based on type of water in the area, quantity of water in the area, and the recommendations given in an earlier study funded by the U.S. Coast Guard entitled "A Recreational Boating Population Statistical Information System" (Reference 3).

The final boundaries selected are shown in Appendix C and the counties contained in each stratum are listed in Appendix D.

After the 400 strata were developed, two telephone central offices were selected at random from each stratum, resulting in a total of 800 Primary Sampling Units (PSU's). To accomplish this task, a county was first selected using a "probability proportional to size (population)" strategy. A central office was then selected at random from the county chosen in the first stage. At this point, one clarification should be made. In three cases, more than one stratum was assigned to a county or region. Two strata were assigned to Los Angeles County, California; three

strata were assigned to New Castle County, Delaware; and five strata were assigned to the District of Columbia, which does not have counties. In the calculations of estimates, these strata were collapsed, so that technically there is one stratum containing four PSU's for Los Angeles County, one stratum containing six PSU's for New Castle County, and one stratum containing ten PSU's representing Washington, D.C. Hence, overall, there were actually 393 strata containing the 800 PSU's instead of 400 strata.

With the exception of certain large metropolitan central offices, approximately thirty household contacts were made within each PSU (central office). A larger number of contacts were made in major urban areas as an error reduction measure. Within each central office, the final four digits for each number to be dialed in that PSU were randomly selected by computer. To avoid generating large volumes of non-working numbers, a list of the working banks was obtained for each central office prior to drawing the sample. Hence, if it were determined that only the numbers 0000-4200 contained working numbers, only four-digit numbers in that range would be generated for that PSU. The four-digit number generated in this way was combined with the central office to create the ten-digit telephone number to be dialed. Those numbers which resulted in household contacts then constituted the sample. Using this procedure, within each PSU, each telephone household had an equal chance of being selected for the sample.

#### D. Disposition of the Calls.

When a telephone number was dialed, one of six situations resulted:

- (1) A household was contacted;
- (2) A non-household number was reached;
- (3) No one answered the call;
- (4) The line was busy;
- (5) The interviewer was informed by a recording that a non-working number had been reached.
- (6) The interviewer was unable to establish whether the number was that of a household or a non-household. This could be the result of a refusal, a language barrier, or a request to call back later.

In the event that a household was contacted, the interviewer identified himself/herself as calling long distance for the U.S. Coast Guard for a boating survey, and asked two to four screening questions (see Numbers 3,73,74 and 75 of Appendix

B): "How many boats were owned by members of your household in 1976?", "How many persons in your household, including yourself, participated in any boating activities in 1976?", "How many times did you or anyone in your household rent a boat during 1976?", and "How many persons in your household, including yourself, actually operated, that is, drove, sailed, or paddled a boat in 1976?". If the answer to the second and fourth question was none, the interview was terminated, otherwise the interviewer continued and attempted to finish the interview at that time. If it became evident that the respondent was not knowledgeable about the household's boating activities, the interviewer set up a time when someone familiar with the household's boating activities might be interviewed. The four screening questions served to identify boat owners, participants, renters, operators and boating households.

In most cases, the respondent was very cooperative in answering the screening questions. Occasionally, the respondent was suspicious of the authenticity of the call. In such cases, the person was reassured and, if necessary, informed how he/she could verify that the survey was being conducted under Coast Guard sponsorship. Appointments for later interviews were made if the person wished to verify the survey or if the present time were not appropriate. In some cases, the person answering the telephone refused to be screened. These numbers were counted as neither boating nor non-boating households, since no information had been obtained. This, of course, introduces the problem of non-response. For those refusals which came before the information desired had been revealed, it was assumed that the refusal was based on general principles rather than on a particular feeling about boating. As such, it was felt that any bias induced by non-response would be negligible.

In the event that a non-household or a non-working number was reached, the fact was noted and the next number was dialed. As it was pointed out earlier, most of the non-working numbers were eliminated before generating the numbers by obtaining lists of which blocks of numbers were not in use in each central office. Calls in these categories, as well as calls for which the disposition could not be established, were not considered as part of the sample.

An interviewer encountering a busy signal attempted call-backs at 20-minute intervals until someone answered or until three calls had been attempted. In the latter situation, the operator was contacted to determine if the number in question was a working number.

Up to three call-backs were employed in the case of no answers. If the first call had been on a workday during the day, for example, the second call would have been during a weekday evening, with a third call set up for the weekend. In this way, it was felt the chances of obtaining a completion would be maximized and business phones would also be identified.

Finally, in order to adjust for a possible bias induced by the "no answer" or "busy" dispositions, a separate study was made through the follow-up of 1,500 numbers which could not be reached in the main survey after three attempts. As a result of this study, weighting factors were developed to adjust the dispositions for the number of "no answer" or "busy" calls in a given central office. This procedure is developed further in the chapter which describes the estimation procedures which were used. A record was kept of the dispositions of all calls in each PSU. A summary of the dispositions is shown in Table 1.

1976

TABLE 1: DISPOSITION OF ALL TELEPHONE CALLS

A. Households Contacted (lines 1-3)	<u>28,261</u>
1. Refused Screening Interview	2,426
2. Call Back (Live Households)	1,776
3. Screening Interviews Completed (Lines a and b)	<u>24,059</u>
a. Non-boating Households <u>1</u> /	18,041
b. Boating Households <u>2</u> / (Lines I-III)	<u>6,018</u>
I. Refused to be Interviewed	366
II. Unable to Interview	145
III. Completed Interview	<u>5,507</u>
B. Non-Households Contacted	6,274
C. Non-Working Numbers	32,623
D. No Answer or Busy Signals (3 calls)	15,234
E. Language Barrier, Ill, etc.	<u>1,340</u>
Total Numbers Dialed (Lines A - E)	83,732

1/ Did not own or operate a boat in 1976.

2/ Owned and/or operated one or more boats in 1976.

E. The 1973 Nationwide Boating Survey Methodology.

The methodology for 1976 as laid out in Sections A-D of this chapter is basically the same as that employed for 1973. However, there are some slight differences in the number of households contacted initially in each PSU. Many of the tables from that survey are included in this work for comparison purposes. Note that the 1973 figures have been revised due to the availability of updated Census population data. Table 2 is the record of the disposition of all calls in 1973.

1973

TABLE 2: DISPOSITION OF ALL TELEPHONE CALLS

Non-households Contacted		4,129
Households Contacted		
Boating Households <u>1/</u>	5,467	
Non-boating Households <u>2/</u>	18,124	
Refusals	169	
Call Back (Live H/H)	377	
Total Households	24,137	24,137
No Answer/Busy (3 Calls)		12,537
Non-working Numbers		29,126
Refusals		856
Duplicates		1,146
Call Back/Language Barrier		602
Total Numbers Dialed		72,533

1/ Owned and/or operated one or more boats in 1973.

2/ Did not own or operate a boat in 1973.

### III. COMPUTATIONAL PROCEDURES

#### A. Estimates Within Strata

In general, the types of estimates that one is interested in obtaining from a survey fall into two categories: means (which include proportions and percentages) and totals. The procedure used with the Nationwide Boating Survey was to develop estimates of the mean first for the individual stratum. Estimates of national totals then can be obtained by multiplying the estimates of the mean by the number of households in the stratum, then summing over all strata.

Before proceeding to explicit mathematical formulae for the estimates and associated mean square errors, the terms used must be defined. For ease of understanding, the terms are defined in the context of obtaining an estimate for average (mean) number of boats per household in a stratum and total number of boats in that stratum. Procedures for estimating other items follow analogously. The subscript "h" in the definitions below refers to the stratum, the subscript "i" refers to the central office (PSU) within the stratum, and the subscript "j" refers to the household within the PSU. Using this notation, the following terms are defined as shown:

- $y_{ijh}$  = Number of boats owned by the jth household in the ith central office in the hth stratum. This information is obtained directly from the survey results.
- $m^*_{ih}$  = Number of households contacted in the ith central office, obtained from counts maintained by the contractor.
- $m_{ih}$  = Number of households contacted in the ith central office for which the number of boats owned was established (i.e.,  $m^*_{ih}$  minus refusals and call backs).
- $g_{ih}$  = Number of non-households (e.g., commercial, not working) contacted in the ith central office.
- $r_{ih}$  = Number of telephone numbers dialed in the ith central office for which household status could not be established. This includes numbers for which the line was always busy or unanswered or for which a language barrier was encountered.

$\bar{y}_{ih}$  = Mean per household in the  $i$ th central office.  
Mathematically, this term is defined by

$$\bar{y}_{ih} = \frac{\sum_{j=1}^{m_{ih}} y_{ijh}}{m_{ih}} .$$

$M_{ih}$  = Number of households in the  $i$ th central office.  
Since this data is not directly available, it must be estimated. Let  $D_{ih}$  be the number of possible four-digit codes for the  $i$ th central office of the  $h$ th stratum after known non-working banks have been removed. That is,  $D_{ih}$  is the population size from which the four-digit codes were selected randomly. Then  $M_{ih}$  can be estimated by the following formula:

$$M_{ih} = \frac{(m^*_{ih} + r_{ih}P_{ih}) D_{ih}}{(m^*_{ih} + g_{ih} + r_{ih})} .$$

$P_{ih}$  is an adjustment factor to account for those households among the telephone numbers represented by  $r_{ih}$ .  $P_{ih}$  is a function of the ratio of  $m_{ih}$  to  $g_{ih}$  and of whether the  $i$ th central office had a "non-working interrupt" in operation. The functional relationship was determined empirically in a follow-up study performed by the contractor after the main survey was completed.

$f_{2ih}$  = Second stage sampling fraction, defined by

$$f_{2ih} = \frac{m_{ih}}{M_{ih}} .$$

$s_{2ih}^2$  = Sample variance within the PSU. It is calculated directly from the sample data by the formula

$$s_{2ih}^2 = \frac{1}{(m_{ih} - 1)} \sum_{j=1}^{m_{ih}} (y_{ijh} - \bar{y}_{ih})^2 .$$

$N_h$  = Number of central offices (PSU's) in the stratum.  
This information was made available by the contractor.

$n_h$  = Number of central offices selected in the  $h$ th stratum.  
In nearly all cases, this number was two.

$\bar{M}_h$  = Mean number of households per PSU in the hth stratum defined by

$$\bar{M}_h = \frac{\sum_{i=1}^{N_h} M_{ih}}{N_h} .$$

This variable can be estimated on the basis of the two sample central offices or it can be obtained by dividing the stratum household population (as estimated by data from the Census Bureau) by  $N_h$  .

$f_{1h}$  = First stage sampling fraction, defined by

$$f_{1h} = n_h / N_h .$$

The results from each PSU represent the households within that PSU or central office. Hence, when combining the PSU's to estimate the stratum mean, the PSU estimates are weighted according to the relative sizes of the central offices. That is, the estimate of the stratum mean, denoted by  $\bar{Y}_h$  , is given by

$$\bar{Y}_h = \frac{\sum_{i=1}^{n_h} M_{ih} \bar{y}_{ih}}{\sum_{i=1}^{n_h} M_{ih}} .$$

Since  $\bar{Y}_h$  is not a strictly unbiased estimate of the true population value, discussion of the associated error must be in terms of the mean square error rather than the variance. Denoted by  $v(\bar{Y}_h)$ , the estimate of the mean square error of  $\bar{Y}_h$  is

$$v(\bar{Y}_h) = \frac{1 - f_{1h}}{n_h \bar{M}_h^2 (n_h - 1)} \sum_{i=1}^{n_h} M_{ih}^2 (\bar{y}_{ih} - \bar{Y}_h)^2 + \frac{f_{1h}}{n_h \bar{M}_h^2} \sum_{i=1}^{n_h} M_{ih}^2 (1 - f_{2ih}) \frac{s_{2ih}^2}{m_{ih}} .$$

Finally, to obtain an estimate of the total number of boats in the hth stratum, one simply multiplies  $\bar{Y}_h$  by the total number of households in the stratum. The latter information can be developed from data obtained from the Census Bureau. The associated mean square error is equal to the product of  $v(\bar{Y}_h)$  and the square of the number of households in the stratum.

## B. National Estimates

The calculation of national estimates is based on the same weighting principle as is employed in deriving the stratum estimates. First, more terms must be defined. Note that although some of the same symbols are used for the nation as were used for the stratum, the definitions may be different.

$\bar{Y}_h$  = Mean number of boats per household in the hth stratum as developed in the last section.

$N_h$  = Number of households in the hth stratum. This number can be developed using data available from the Census Bureau.

$s_h^2$  =  $v(\bar{Y}_h)$  as developed in the last section.

$L$  = Number of strata in the nation.

$N$  = Total household population in the nation.

$W_h$  = Weighting factor, equal to  $N_h / N$ .

The national estimate for the mean, denoted by  $\bar{Y}$ , then is given by the weighted sum

$$\bar{Y} = \sum_{h=1}^L W_h \bar{Y}_h \quad ,$$

and the associated estimate of the mean square error is

$$v(\bar{Y}) = \sum_{h=1}^L W_h^2 s_h^2 \quad .$$

It follows that the estimate of total boats,  $Y$ , is  $Y = N\bar{Y}$ , and the estimate of the mean square error of  $Y$  is  $v(Y) = N^2 v(\bar{Y})$ .

In the event that one wishes to estimate a proportion rather than a mean, the same formulae apply with the  $y_{ijh}$  being Bernoulli random variables. That is,  $y_{ijh}$  will equal one if the  $ij$ th element has the desired characteristic and will equal zero otherwise.

In many cases, the units used in estimating the mean may be other than the household. For example, in estimating the percentage of boats which are canoes, the unit is the boat. Because some strata had such a small number of boats in the sample, it frequently was necessary to collapse strata into larger areas. In such cases, the calculations remain the same except that the new strata have more PSU's within them and there are fewer strata overall. Strata were collapsed only when fewer than ten boats or operators were in

the samples for the original strata. Also, only contiguous or adjoining strata were collapsed or combined.

Confidence intervals are discussed in Appendix G.

#### IV. RECREATIONAL BOATS IN THE CONTINENTAL UNITED STATES

##### A. Introduction.

The first section of this report presents statistics concerning recreational boats in the continental United States. In all cases the results shown are national totals. The numbers that appear in the individual tables are rounded in most cases to the nearest thousand. Table entries denoted with a zero (0) indicate that virtually no cases of that type appeared in the sample, and therefore no estimate can be derived. Counts in such cells should be interpreted as "negligible" rather than as strictly zero.

In this chapter, asterisks have been placed by some numbers to indicate that we have reservations about the accuracy of these numbers. With all the checks that have been installed in this survey, there are still the possibilities of having respondents misunderstand the questions or of having the interviewers enter the data incorrectly. Also, it should be pointed out that each response carried a weight of anywhere from 60 to 15,000. (For a discussion of weighting see Chapter III). For example, in Table 13, there are 2,000 bowrider runabouts over 65 feet. This high number could be attributed to bow cockpit cruisers. One response, however, could have been weighted to 2,000 in this category. Thus, the reader should be cautioned that, in general, the lower the figure in the table, the greater the coefficient of variation.

The reader should remember that this survey is a compilation of answers by individuals weighted to give national totals. The survey is not an exact count, for example, of all boats in the United States. Every number in this report is a mean value and has a variance associated with the estimate.

##### B. Total Boats.

Based on the sample data, the estimate for the total number of recreational boats in the continental United States in 1973 is 9,604,000 with a standard error of 219,000. If we make the assumption that the ratio of numbered boats in Alaska and Hawaii to total numbered boats is the same as the ratio of all boats in Alaska and Hawaii to all boats in the United States, we arrive at an estimate of 9,648,000 recreational boats in the United States, including Alaska and Hawaii in 1973.

In 1976, the estimate for the total number of recreational boats in the continental United States is 12,750,000 with a standard error of 326,000. If we make the same assumptions about Alaska and Hawaii, we arrive at an estimate of 12,816,000 boats in the United States, including Alaska and Hawaii. Table 3 contains a summary of the recreational boat estimates for the continental United States. Also shown are the standard errors, the coefficients of variation, and the density of estimated total U.S.

boats to total U.S. population. The size of the standard error for each year is a function of the sample size in that year, the degree of homogeneity within strata, and the distribution of the sample among strata. These factors vary heavily from state to state but the overall degree of precision in the two years is very close. Precision is frequently expressed in terms of the coefficient of variation (the ratio of the standard error to the mean estimate). For example, a coefficient of variation (c.v.) of 0.02 would be interpreted as "plus or minus 2%."

TABLE 3 : RECREATIONAL BOATS IN THE CONTINENTAL UNITED STATES

	<u>1973</u>	<u>1976</u>
Boats	9,604,000	12,750,000
Standard Error <u>1/</u>	219,000	326,000
Coefficient of Variation	.0228	.0256
Boats Per 1,000 Residents <u>2/</u>	46.0	59.7

1/ See Appendix G.

2/ Based on populations estimated as of 1 July 1973 and 1 July 1976. Source: Statistical Abstract of the United States, 1976 (Reference 4).

The standard error was used in calculating the confidence limits for our estimates. For 1973, the range for the mean is between 9,175,000 and 10,033,000 with 95% confidence. The range in 1976 goes from 12,111,000 to 13,389,000 with 95% confidence.

The number of boats has increased from 1973 to 1976 by over 3 million. When one looks at the ranges for the estimates it can be seen that it is quite possible for the total number of boats to have increased anywhere from 2.1 to 4.2 million. Thus, the total number of boats for 1976 has increased somewhere between 21% and 46% using the 95% confidence limits.

The 9,604,000 recreational boats were owned in 1973 by a total of 7,863,000 households, for an average of 1.22 boats per boating-owning household. Interestingly, 19.4% of these households owned more than one boat. In 1976, the average number of boats per boat-owning household has risen to 1.31 and 21.1% of all boat-owning households now own more than one boat. A profile of boat ownership is shown in Table 4 .

TABLE 4 : PROFILE OF BOAT OWNERSHIP AMONG U.S. HOUSEHOLDS

<u>Number of Boats Owned</u>	<u>Year</u>	<u>Number of Households</u>	<u>Percent 1/</u>	<u>Percent Change 2/</u>
1	1973	5,893,000	80.6	
	1976	7,559,000	78.9	20.4
2	1973	991,000	13.6	
	1976	1,377,000	14.3	33.8
3	1973	260,000	3.6	
	1976	390,000	4.1	50.0
4	1973	98,000	1.3	
	1976	172,000	1.8	75.5
5	1973	19,000	0.3	
	1976	50,000	0.5	163.1
6 or more	1973	48,000	0.6	
	1976	36,000	0.4	-25.0
TOTAL	1973	7,309,000	100.0	
	1976	9,584,000	100.0	31.1

1/ Percent of Year's Total Households.

2/ Percent Change 1976 Boat Owning Households over 1973 Boat Owning Households.

### C. Classification By Type.

Each boat owner interviewed in the Nationwide Boating Surveys of 1973 and 1976 was asked about certain characteristics of his boat. Table 5 shows the estimates of boats classified by type based on boat owner's responses in 1973. In 1976, the boat types were redefined and the results are shown in Table 6. <sup>1/</sup> Many of the following tables are broken down by boat type for 1973 and 1976. Comparisons should be made only for similar boat types.

The reader will notice that the categories of boat types listed in Table 5 are not mutually exclusive, and extreme caution must be exercised when interpreting and using these results. Some of the categories are based on the general construction of the boat (e.g. johnboat, rowboat, canoe) while other categories are based on the type of propulsion (e.g. inboard, outboard). As a result, a person owning a rowboat with an outboard motor on it could have responded that he had either a rowboat or an outboard. For this reason, rowboats and johnboats have been classified in Table 8 as to the presence or absence of a motor. Unfortunately, we have no way of detecting how many of the outboards are actually rowboats or johnboats. The fact that over 60% of the single-engine outboards in the sample were under sixteen feet in length seems to indicate that the actual number of rowboats and johnboats with motors could be considerably higher than Table 8 indicates. There is another problem with Tables 5 and 6 that should be weighed when using these figures. The people answering the interview often had trouble placing their boat within these boat types, e.g. many people have always referred to their boat as a "fishing boat" and thus had problems in determining whether the boat was a johnboat or a skiff if they could not determine the hull configuration.

The 1973 survey showed the outboard single engine boat to be the dominant boat type with over 50% of the responses being in this category. Within the 1976 boat types, no single boat type dominates the list. Bowrider runabouts, rowboats, and non-bowrider runabouts all have about the same percent of the total and combined they total just a little over 40%. Having the 1976 breakdown of boat types helps in analyzing the other tables in this chapter that are broken down by boat type.

The tables disclose that kayaks and canoes in the boat population have grown substantially. There are 107.0% more kayaks in 1976 than there were in 1973. Canoes have increased by 67.8%.

<sup>1/</sup> Definitions of boat types asked in the 1976 survey are found in Appendix H.

1973

TABLE 5 : SUMMARY OF GENERAL BOAT TYPES

<u>Boat Type</u>	<u>Number 1/</u>	<u>Percent of Total</u>
Outboard Single 2/	4,939	51.4
Rowboat 2/	1,221	12.7
Canoe	587	6.1
In/Out Single 3/	552	5.7
Sailboat No Aux.	522	5.4
Inboard Gas Single	477	5.0
Johnboat 2/	198	2.1
Outboard Twin	115	1.2
Inboard Gas Twin	112	1.2
Sailboat Gas Aux.	70	0.7
Other Powerboat	62	0.6
In/Out Twin 3/	59	0.6
Inflatable	54	0.6
Houseboat	46	0.5
Kayak	43	0.4
Inboard Diesel Single	34	0.4
Inboard Diesel Twin	17	0.2
Sailboat Diesel Aux.	6	0.1
Other	490	5.1
<b>Total</b>	<b>9,604</b>	<b>100.0</b>

1/ Entries in thousands.

2/ Because the questionnaire did not define outboard to exclude rowboats and johnboats, an indeterminate number of motorized rowboats and johnboats may be included in the outboard figures.

3/ The abbreviation In/Out is a shortened form for Inboard-Outboard and is used periodically in tables following Table 5 as well.

1976

TABLE 6 : SUMMARY OF GENERAL BOAT TYPES

<u>Boat Type</u>	<u>Number</u> 1/	<u>Percent</u>
Bowrider Runabout	1,862	14.6
Rowboat	1,757	13.8
Non-Bowrider Runabout	1,701	13.3
Other Open Lightweight Boat	1,284	10.1
Johnboat	1,261	9.9
Sailboat	992	7.8
Canoe	985	7.7
Cabin Cruiser	564	4.4
Skiff	355	2.8
Thrill Craft	175	1.4
Dinghy	133	1.0
Pontoon Boat	131	1.0
Kayak	89	.7
Inflatable Raft	59	.5
Houseboat	47	.4
Inflatable Boat	38	.3
Non-Inflatable Raft	19	.1
Other	1,298	10.2
Total	12,750	100.0

1/ Entries in thousands.

#### D. Classification by Horsepower.

Table 7 gives the Classification Of Boats By Horsepower in 1973 and 1976. The only categories to substantially increase their share of the 1976 total as compared to 1973 are the boats with no motor and the boats with over 100 horsepower. By and large, though, the percentages are relatively the same.

TABLE 7 : CLASSIFICATION OF BOATS BY HORSEPOWER  
1973 and 1976

<u>Horsepower</u>	<u>1973</u>	<u>Percent of 1973 Total</u>	<u>1976</u>	<u>Percent of 1976 Total</u>
None	2,166,000	22.6	3,048,000	23.9
1-5	1,021,000	10.6	1,208,000	9.5
6-10	1,276,000	13.3	1,562,000	12.3
11-30	1,069,000	11.1	1,293,000	10.1
31-50	1,420,000	14.8	1,721,000	13.5
51-100	1,395,000	14.5	1,867,000	14.6
Over 100	1,257,000	13.1	2,051,000	16.1
Total	9,604,000	100.0	12,750,000	100.0

Tables 8 and 9 contain the horsepower profile for the different boat types in 1973 and 1976. The majority of canoes (86.9% in 1973 and 88.8% in 1976) are manually propelled. There is a slight increase in the number of canoes having motors exceeding five horsepower (from 1.2% in 1973 to 3.1% in 1976). Inflatables are similar with 72.2% manually propelled in 1973 and 93.8 percent manually propelled in 1976. Virtually none of the inflatables in either year had a motor over 5 horsepower. The majority of sailboats (87.3% in 1973 and 80.0% in 1976) are without auxiliary power. An additional 9.0% in 1973 and 14.7% in 1976 have auxiliary motors in the 1-10 horsepower range. It is of interest to note that .5% in 1973 and 1.1% in 1976 of all sailboats had motors over 30 horsepower.

In 1973, 71.1% of all rowboats were manually propelled but by 1976 only 38.3% of the rowboats were manually propelled. Almost half of the rowboats now have a motor in the 1-10 horsepower range.

For johnboats, 24.8% did not have a motor in 1973. Only 14.8% did not have a motor in 1976. The changes in rowboats and johnboats with motors may reflect a difference in the manner in which people understood the question rather than an actual change in the percentage of rowboats or johnboats without motors.

Inboards and inboard/outboards in 1973 are characterized by large engines. Only 12.3% of the inboards and 19.1% of the inboard/outboards are under 50 horsepower. Over 70% of the engines on inboards and nearly 65% of the inboard/outboard engines are over 100 horsepower.

For 1973, outboards exhibit the most uniform horsepower range. That is, 30.8% fall in the 1-10 horsepower range, 41.2% are between eleven and fifty horsepower, and 28.0% are in the over 51 horsepower category.

Skiffs, other open lightweight and other are the categories with relatively uniform distribution in Table 9. Over 90% of all dinghys had less than 10 horsepower, and almost 95% of all kayaks were manually propelled in the 1976 table.

Bowrider runabouts and non-bowrider runabouts in 1976 exhibit basically the same horsepower characteristics. For bowrider runabouts, 82.5% are over 30 horsepower with 24.0% between 31 and 50, 34.3% between 51 and 100 and 24.2% over 100 horsepower. Within non-bowrider runabouts, a slightly higher percentage, 88.5% are over 30 horsepower, 28.8% are 31-50, 29.8% are 51-100 and 29.9% are over 100 horsepower.

Over 90% of all cabin cruisers and houseboats have more than 50 horsepower as shown in Table 9. Over 70% of these types have over 100 horsepower.

Inflatable boats and inflatable rafts present the opposite picture as they all have less than 5 horsepower engines. Almost 90% of the inflatable boats had no motor, and 98.3% of the inflatable rafts were manually propelled.

Pontoon boats have a bell-shaped curve to their distribution of motors. Of all pontoon boat motors, 68.7% lie between 11 and 50 horsepower, with almost equal percents lying below and above this range. Thrill craft had large engines with over 90% being greater than 30 horsepower.

Readers should be cautioned in reviewing Tables 8 and 9 that those being interviewed were asked the horsepower of the engines they had available for their boat not necessarily the engines they had mounted on their boat.

1973  
**TABLE 8: CLASSIFICATION OF BOATS BY TYPE AND HORSEPOWER <sup>1/</sup>**  
HORSEPOWER

<u>Type</u>	<u>None</u>	<u>1-5</u>	<u>6-10</u>	<u>11-30</u>	<u>31-50</u>	<u>51-100</u>	<u>Over 100</u>	<u>Total</u>
Canoe	510	70	1	6	0	0	0	587
Houseboat	0	0	8	3	4	8	23	46
Inboard Gas Single	0	17	9	21	12	80	338	477
Inboard Gas Twin	0	0	1	19	0	7	85	112
Inboard Diesel Single	0	0	0	0	0	1	33	34
Inboard Diesel Twin	0	0	0	0	0	0	17	17
In/Out Single	0	14	40	13	34	98	353	552
In/Out Twin	0	0	0	0	16	0	43	59
Inflatable	39	15	0	0	0	0	0	54
Johnboat	49	47	74	19	3	6	0	198
Kayak	42	0	0	1	0	0	0	43
Outboard Single	0	571	949	807	1238	1122	252	4939
Outboard Twin	0	15	24	21	15	17	23	115
Rowboat	869	201	82	58	10	1	0	1221
Sailboat Gas Aux.	0	24	29	17	0	0	0	70
Sailboat Diesel Aux.	0	1	0	2	3	0	0	6
Sailboat No Aux.	522	0	0	0	0	0	0	522
Other Powerboat	0	1	20	7	5	0	29	62
Other	135	45	39	75	80	55	61	490
<b>Total</b>	<b>2166</b>	<b>1021</b>	<b>1276</b>	<b>1069</b>	<b>1420</b>	<b>1395</b>	<b>1257</b>	<b>9604</b>

<sup>1/</sup> Entries in thousands.

1976

TABLE 9: CLASSIFICATION OF BOATS BY TYPE AND HORSEPOWER 1/

Type	None	1-5	6-10	HORSEPOWER			Over 100	Total
				11-30	31-50	51-100		
Rowboat	674	405	458	136	54*	22*	8*	1,757
Skiff	63	46	59	82	63	40	2	355
Dinghy	46	34	40	6	7*	0	0	133
Johnboat	186	251	333	318	98	26*	49*	1,261
Other Open Lightweight	72	175	269	243	245	136	144*	1,284
Sailboat	794	56	90	41	4	6	1	992
Canoe	875	79	24	2	4*	1*	0	985
Kayak	84	0	0	5*	0	0	0	89
Bowrider Runabout	31*	50	75	170	447	639	450	1,862
Non-Bowrider Runabout	13*	29	61	92	490	507	509	1,701
Cabin Cruiser	0	6*	6*	4	13	121	414	564
Houseboat	0	0	0	0	4	8	35	47
Inflatable Boat	33	5	0	0	0	0	0	38
Inflatable Raft	58	1	0	0	0	0	0	59
Non-Inflatable Raft	7	0	0	11	0	0	1	19
Pontoon Boat	0	7	13	53	37	15	6	131
Thrill Craft	7	1	1	6	28	40	92	175
Other	105	63	133	124	227	306	340	1,298
<b>Total</b>	<b>3,048</b>	<b>1,208</b>	<b>1,562</b>	<b>1,293</b>	<b>1,721</b>	<b>1,867</b>	<b>2,051</b>	<b>12,750</b>

1/ Entries in thousands.  
\*See page 17.

**E. Classification By Number and Type of Engines.**

Tables 10 and 11 are summaries of questions on the number and type of engines in the 1976 survey. In 1976, 23.9% of the boats had no motors at all. Boats with one motor accounted for 70.6% of all boats, 5.1% had two motors and .4% had more than two motors. Of all boats with motors as shown in Table 11, 79.7% had outboard engines; 9.3% had inboards, 8.7% had inboard/outboards, .3% had outboard jets, .7% had inboard jets, and the remainder had other types of engines.

Of those boats with motors, cabin cruisers, thrillcraft and sailboats had the highest percentage of inboard engines, as 44.3% of all cabin cruisers, 26.8% of all thrill craft and 26.3% of all motorized sailboats, had inboards. Houseboats and cabin cruisers had the highest percentage of inboard-outboards with 34.0% of all houseboats and 24.6% of all cabin cruisers having inboard-outboards.

It should be remembered in reviewing Table 10 that the interviewees were asked how many engines they had for their boat, not how many were mounted on the boat.

1976

TABLE 10: NUMBER OF ENGINES BY BOAT TYPE 1/

Type	None	One	Two	More than Two	Total
Rowboat	674	1,045	5	33	1,757
Skiff	63	284	8	0	355
Dinghy	46	83	4	0	133
Johnboat	186	1,007	63	5	1,261
Other Open Lightweight	72	1,119	93	0	1,284
Sailboat	794	187	11	0	992
Canoe	875	105	5	0	985
Kayak	84	5*	0	0	89
Bowrider Runabout	31*	1,750	80	1	1,862
Non-Bowrider Runabout	13*	1,627	61	0	1,701
Cabin Cruiser	0	370	190	4	564
Houseboat	0	29	18	0	47
Inflatable Boat	33	5	0	0	38
Inflatable Raft	58	1	0	0	59
Non-Inflatable Raft	7	12	0	0	19
Pontoon Boat	0	126	5	0	131
Thrill Craft	7	154	14	0	175
Other	105	1,088	97	8	1,298
Total	3,048	8,997	654	51	12,750

1/ Entries in thousands. Engines not necessarily on boat simultaneously.  
\*See page 17.

The Nationwide Boating Survey reveals that in 1973 and in 1976 95.1% of all recreational boats were under 25 feet in length. Tables 11 and 12 give the breakdown of length by type for 1973 and 1976. Of these, 59.1% in 1973 and 54.3% in 1976 were under 16 feet. Also, 37.0% in 1973 and 41.2% in 1976 were between 16 feet and 25 feet in length. Thus, it can be seen that while the overall percent was less there was an increase in the proportion of boats 16 feet and longer than one percent in both years.

1976

TABLE 11: TYPE OF ENGINE BY BOAT TYPE <sup>1/</sup>

Type	Outboard	Outboard Jet	Inboard	Inboard Jet	Inboard/Outboard	Other	Total
Rowboat	1,069	2	4	0	0	8	1,083
Skiff	270	0	22	0	0	0	292
Dinghy	87	0	0	0	0	0	87
Johnboat	994	3	20	6	0	52	1,075
Other Open Lightweight	1,095	12	39	0	40	26	1,212
Sailboat	145	0	52	0	0	1	198
Canoe	109	0	1*	0	0	0	110
Kayak	5	0	0	0	0	0	5
Bowrider Runabout	1,460	1	123	14	227	6	1,831
Non-Bowrider Runabout	1,246	1	141	6	289	5	1,688
Cabin Cruiser	175	0	250		139	0	564
Houseboat	14	0	11	6	16	0	47
Inflatable Boat	5	0	0	0	0	0	5
Inflatable Raft	1	0	0	0	0	0	1
Non-Inflatable Raft	11	0	0	0	1	0	12
Pontoon Boat	126	4	0	0	0	1	131
Thrill Craft	97	3	45	3	16	4	168
Other	828	1	195	33	116	20	1,193
Total	7,737	27	903	68	844	123	9,702

<sup>1/</sup> Entries in thousands.  
\*See page 17.

#### F. Classification By Length.

The Nationwide Boating Survey reveals that in 1973 and in 1976 96.1% of all recreational boats were under 26 feet in length. Tables 12 and 13 give the breakdowns of length by type for 1973 and 1976. Of these, 59.1% in 1973 and 54.9% in 1976 were under 16 feet. Also, 37.0% in 1973 and 41.2% in 1976 were between 16 feet and 26 feet in length. Thus, it can be seen that while the overall percent was the same there was an increase in the proportion of boats between 16 and 26 feet. Less than one percent in both years were over 40 feet in length.

The results in Tables 12 and 13 show that there were 46,000 boats 65 feet and over in 1973 but only 8,000 in 1976. This helps point out that for comparison purposes the smaller numbers can be unreliable.

As regard canoes, 38.5% in 1973 and 42.2% in 1976 were under sixteen feet in length. The remainder of the canoes in each year were between sixteen and twenty-five feet in length. The large percentage in this category is due mainly to the large number of 16 foot canoes.

Rowboats and johnboats were predominantly under sixteen feet in length. The results show 91.6% of the rowboats and 89.4% of the johnboats in this category in 1973 but the 1976 figures show 91.3% of rowboats under 16 feet and only 83.7% of johnboats under 16 feet.

Sailboats display wide variation in length. In 1973 over 60% were under sixteen feet. The results in 1976 show that only 54% of all sailboats were now under 16 feet. Interestingly, two percent of the sailboats were at least twenty six feet long.

Inboards and outboards fall in all the length classes in the 1973 table. Nearly 58% of the inboards were 16-25 feet long and over 80% were 16-39 feet in length. The majority of the outboards (60.9%), on the other hand, were under 16 feet long. Barely over 1% were at least twenty six feet in length. It should be pointed out that the relatively large (19,000) number of outboards over 65 feet is suspect. Most boats of this length employ an inboard propulsion system. The results in this category could be due to respondent error or to simple sampling error. In either case, the number is clearly unrealistic. The majority of the inboard/outboards (74.5%) fall in the 16-25 feet range, with most of the remainder under 16 feet in length.

From the 1976 results, virtually all bowrider runabouts and non-bowrider runabouts were under 26 feet in length. For the bowriders, 38.1% were under 16 feet and 61.7% were 16-25 feet. Non-bowriders had a slightly higher percent in the 16-25 foot category (66.6%), 33.4% were less than 16 feet.

Most of the cabin cruisers were 16-25 feet (62.1%). The bulk of the remainder (32.8%) were 26-39 feet. Conversely, skiffs (68.7%) and dinghys (97.0%) were predominantly under 16 feet, all the rest were less than 26 feet.

All thrill craft were under 26 feet with almost 2/3 being between 16 and 25 feet. Pontoon boats (81.7%) were also mostly in the 16-25 foot bracket.

Inflatable rafts and inflatable boats were all under 16 feet in length. Most kayaks were also less than 16 feet, 74.2% of them.

All houseboats were 16 feet or greater, with over one-half being 16-25 feet. Most of the non-inflatable rafts were also 16-25 feet but those that were not, were all under 16 feet.

Boat Type	Under 16 feet	16-25 feet	26-39 feet	40-49 feet	50-59 feet	60-69 feet	70-79 feet	80-89 feet	90-99 feet	100+ feet
Bowriders	38.1%	61.7%								
Non-bowriders	33.4%	66.6%								
Cabin Cruisers		62.1%	32.8%							
Skiffs	68.7%									
Dinghys	97.0%									
Thrill Craft		~66.7%								
Pontoon Boats		81.7%								
Inflatable Rafts	100%									
Inflatable Boats	100%									
Kayaks	74.2%									
Houseboats		>50%								
Non-inflatable Rafts		>50%								
Other										
Total										

Figures in thousands.  
See page 17.

1973

TABLE 12: CLASSIFICATION OF BOATS BY LENGTH AND TYPE <sup>1/</sup>

Type	LENGTH					TOTAL
	Under 16'	16-25'	26-39'	40-65'	Over 65'	
Canoe	226	361	0	0	0	587
Houseboat	0	17	20	9	0	46
Inboard Gas Single	87	316	73	0	1	477
Inboard Gas Twin	6	33	69	2	2	112
Inboard Diesel Single	0	22	7	5	0	34
Inboard Diesel Twin	0	0	7	10	0	17
In/Out Single	138	402	12	0	0	552
In/Out Twin	0	53	6	0	0	59
Inflatable	54	0	0	0	0	54
Johnboat	177	21	0	0	0	198
Kayak	40	3	0	0	0	43
Outboard Single	3012	1873	35	0	19*	4939
Outboard Twin	66	49	0	0	0	115
Rowboat	1119	99	0	3	0	1221
Sailboat Gas Aux.	7	24	39	0	0	70
Sailboat Diesel Aux.	0	0	2	4	0	6
Sailboat No Aux.	366	139	4	0	13*	522
Other powerboat	21	30	0	0	11	62
Other	361	108	19	2	0	490
Total	5680	3550	293	35	46*	9604

<sup>1/</sup> Entries in thousands.

\*See page 17.

1976

TABLE 13: CLASSIFICATION OF BOATS BY LENGTH AND TYPE <sup>1/</sup>

Type	Under 16'	16-25'	LENGTH 26-39'	40-65'	Over 65'	TOTAL
Rowboat	1,604	153	0	0	0	1,757
Skiff	244	111	0	0	0	355
Dinghy	129	4	0	0	0	133
Johnboat	1,056	205	0	0	0	1,261
Other Open Lightweight Boat	920	364	0	0	0	1,284
Sailboat	537	337	98	19	1	992
Canoe	416	569	0	0	0	985
Kayak	66	23	0	0	0	89
Bowrider Runabout	710	1,148	2	0	2*	1,862
Non-Bowrider Runabout	569	1,132	0	0	0	1,701
Cabin Cruiser	10*	350	185	19	0	564
Houseboat	0	26	14	7	0	47
Inflatable Boat	38	0	0	0	0	38
Inflatable Raft	59	0	0	0	0	59
Non-Inflatable Raft	7	12	0	0	0	19
Pontoon Boat	12	107	12	0	0	131
Thrill Craft	63	112	0	0	0	175
Other	557	604	107	25	5	1,298
Total	6,997	5,257	418	70	8	12,750

<sup>1/</sup> Entries in thousands.  
\*See page 17.

### G. Classification By Hull Material.

Fiberglass and aluminum were clearly the predominant materials used in hull construction. The results show that 39.7% and 43.9% of all recreational boat hulls in 1973 and 1976, respectively, were made of fiberglass. Aluminum hulls accounted for 33.5% and 33.1% of all boats in 1973 and 1976, respectively. There has been a decrease in the number and percentage of wooden boats from 1973 to 1976. (This is consistent with published numbering data. In 1973, 15.3% of all boats had wooden hulls while in 1976 this decreased to 9.9% of all boats. The responses for a combination of materials remained steady with 7.0% (1973) and 8.6% (1976).

Tables 14 and 15 give the breakdown of hull material by boat type. Canoes were dominated by aluminum construction as were rowboats and johnboats. Canoes made out of aluminum slipped from 57.2% (1973) to 53.0% (1976). Fiberglass canoe construction has more than taken up this difference; 22.7% of all canoes in 1973 were fiberglass; by 1976, 32.2% were fiberglass. Rowboats made out of aluminum have increased their share of the population from 59.5% to 69.6% over the 3-year period. This is due to the drastic decrease in the population share of wood rowboats. The drop was from 22.5% (1973) to 9.0% (1976). The percentage of aluminum johnboats is very high with 76.3% aluminum in 1973 and 71.9% in 1976. The johnboat figure is not surprising since some groups maintain that aluminum hull construction is part of the definition of a johnboat. Again, fiberglass construction has taken up the slack in the drop in aluminum constructed johnboats.

Sailboats were predominantly of fiberglass hull construction. For 1973, 62.4% were fiberglass, this increased to 66.3% in 1976.

For 1973, inboard hulls were characterized by wood (40.0%) and fiberglass (39.8%), while inboard/outboards are predominantly of fiberglass hull construction. Outboards were also primarily fiberglass (44.9%) with aluminum (34.9%) picking up a large share.

In Table 15, fiberglass was the number one construction material for kayaks (41.6%), bowrider runabouts (69.1%), non-bowrider runabouts (70.1%), cabin cruisers (47.2%), thrill craft (84.0%) and other (55.5%). Skiffs (46.8%), dinghys (44.4%), other open lightweights (44.3%), non-inflatable rafts (47.4%) and pontoon boats (38.2%), all have aluminum as their primary construction material; in none of these categories was the proportion over 50%. Houseboats, inflatable boats and inflatable rafts, all had combination or other materials as their dominant hull material.

1973

TABLE 14: HULL MATERIAL BY BOAT TYPE 1/

HULL MATERIAL

Type	Aluminum	Canvas	Ferro- Cement	Fiber Glass	Steel	Wood	Other	Combination	Total
Canoe	336	14	0	133	9	35	8	52	587
Houseboat	9	0	0	6	18	2	1	10	46
Inboard Gas Single	25	0	0	203	0	176	17	56	477
Inboard Gas Twin	4	0	0	22	1	63	9	13	112
Inboard Diesel Single	0	0	0	24	0	10	0	0	34
Inboard Diesel Twin	3	0	0	6	1	7	0	0	17
In/Out Single	51	0	2	435	0	19	1	44	552
In/Out Twin	0	0	0	43	0	14	0	2	59
Inflatable	0	5	1*	0	0	0	48	0	54
Johnboat	151	0	0	14	1	20	5	7	198
Kayak	0	2	0	14	0	0	12	15	43
Outboard Single	1716	1	11*	2219	36	660	63	233	4939
Outboard Twin	47	0	0	52	2	6	0	8	115
Rowboat	726	0	0	86	18	275	44	72	1221
Sailboat Gas Aux.	0	0	0	42	0	12	0	16	70
Sailboat Diesel Aux.	0	0	0	3	0	0	0	3	6
Sailboat No Aux.	0	0	0	328	0	89	33	72	522
Other Powerboat	7	0	0	18	1	9	10	17	62
Other	147	0	0	164	25	68	32	54	490
Total	3,222	22	14	3,812	112	1,465	283	674	9,604

1/ Entries in thousands.

\*See page 17.

1976

TABLE 15: HULL MATERIAL BY BOAT TYPE  
HULL MATERIAL

Type 1/	Aluminum	Canvas	Ferrocement	Fiberglass	Rigid Plastic	Rubber	Steel	Wood	Other	Combination	Total
Rowboat	1,223	3	0	192	21	2	52	158	26	80	1,757
Skiff	166	5	0	74	3	0	0	90	0	17	355
Dinghy	59	0	0	32	1	8	0	29	2	2	133
Johnboat	907	1	0	173	0	0	38	24	1	117	1,261
Other Open Lightweight	569	0	0	475	22	0	25	88	5	100	1,284
Sailboat	2	0	6	658	40	1	6	135	13	131	992
Canoe	522	2	4*	317	18	6	0	23	7	86	985
Kayak	0	11	0	37	5	2	0	0	2	32	89
Rowider Sunabout	234	0	0	1,287	8	0	10	137	5	181	1,862
Non-Rowider Sunabout	199	0	0	1,192	20	0	1	193	0	96	1,701
Cabin Cruiser	30	0	0	266	0	0	7	190	3	68	564
Houseboat	0*	0	0	15	0	0	11	0	0	21	47
Inflatable Boat	0	2	0	0	12*	5	0	0	13	6	38
Inflatable Raft	0	0	0	0	5*	42	0	0	11	1	59
Non-Inflatable Raft	9	0	0	0	0	4	0	6	0	0	19
Pontoon Boat	50	0	0	7	1	0	17	14	4	38	131
Thrill Craft	5	0	0	147	0	0	2	0	0	21	175
Other	243	7	0	721	17	3	10	178	15	104	1,298
Total	4,218	31	10	5,593	173	73	179	1,265	107	1,101	12,750

1/ Entries in thousands.  
\*See page 17

Table 16 gives Hull Material By Length for all boats owned in 1973 and 1976. For boats less than 16 feet, aluminum increased its proportionate share by 3.3 percentage points to 46.7% of the total; fiberglass increased also but only by 1.5 points to 32.3% of the market. These increases were made at the expense of the wood boats.

Fiberglass boats in 1976 were almost 60% of the 16-25 foot boats. There was a big jump by combination boats in this bracket from a 6.5% share to 10.2%.

For 26-39 foot boats, wood is the prime material (46.6%) but fiberglass has gained rapidly and has 36.6% of this length. For 40-65 foot boats, fiberglass (50.0%) and wood (42.9%) comprise almost all of the boats.

TABLE 16: HULL MATERIAL BY LENGTH <sup>1/</sup>

Hull Material	LENGTH											
	Under 16'		16-25'		26-39'		40-65'		Over 65'		Total	
	1973	1976	1973	1976	1973	1976	1973	1976	1973	1976	1973	1976
Aluminum	2,460	3,266	733	937	12	13	2	0	15	2	3,222	4,218
Canvas	20	24	2	7	0	0	0	0	0	0	22	31
Ferrocement	7	10	7	0	0	0	0	0	0	0	14	10
Fiberglass	1,750	2,259	1,961	3,143	75	153	8	35	18	3	3,812	5,593
Rigid Plastic <sup>2/</sup>	-	138	-	35	-	0	-	0	-	0	-	173
Rubber <sup>2/</sup>	-	71	-	2	-	0	-	0	-	0	-	73
Steel	54	111	37	54	13	13	8	1	0	0	112	179
Wood	788	521	525	516	141	195	10	30	1	3	1,465	1,265
Other	216	67	53	25	10	15	4	0	0	0	283	107
Combination	385	530	232	538	42	29	3	4	12	0	674	1,101
Total	5,680	6,997	3,550	5,257	293	418	35	70	46*	8	9,604	12,750

<sup>1/</sup> Entries in thousands.

<sup>2/</sup> In 1973: 'Rigid Plastic' and 'Rubber' were included in 'Other'.

\*See page 17.

## H. How Owners Obtained Boats.

Table 17 gives the results of question No. 11 on the 1976 Survey by boat type. Included in the homemade boats are boats built from a kit. The results show a very even division between used boats and first owner boats. A small percent of boats (3.9%) are homemade. This percent may be low as people who bought a used homemade boat could only respond to one category. Thus, the used boat category includes manufactured boats and homemade boats. In 1973, boat owners were only asked if their boat was homemade.

This table shows that the less expensive boats, inflatable boats (100.0%), inflatable rafts (76.3%), canoes (68.8%), johnboats (50.9%) and other open lightweights (50.5%) tended to be in the hands of people who bought them brand new. For the most part, used boat types with the highest percentages were the more expensive motorized boats such as: cabin cruisers (65.8%), non-bowrider runabouts (56.7%), thrill craft (55.4%) and bowrider runabouts (52.6%). Houseboats and kayaks were the types of boats, if owned, to most likely have been made at home with 44.7% and 43.8%, respectively. In absolute numbers, sailboats are the most common homemade boats.

As shown in Table 18, results based on the 1973 Nationwide Boating Survey indicate that 10.1% of all recreational boats are homemade. Kayaks (46.5%) and houseboats (39.1%) have the highest incidence of home construction. Judging from the size of the houseboat figure, it is surmised that pontoon boats converted to an enclosed or semi-enclosed state are included in this total. Canoes and outboards were least frequently homemade. Only 6.3% of the canoes and 8.2% of the outboards were built at home. Kit-built boats are included in the figures in Table 18.

The homemade part of Table 19 has already been discussed in connection with Table 17. This table also shows kit-built boats. For kayaks, 14.6% of them were built from a kit. This far outranks any other boat type percentage, but there are slightly more kit-built sailboats and canoes in existence, the 1976 Nationwide Survey shows.

1976

TABLE 17: HOW OWNERS OBTAINED BOATS BY BOAT TYPE <sup>1/</sup>

Type of Boat	HOW OBTAINED			Total			
	Bought New	Percent <sup>2/</sup>	Bought Used		Percent <sup>2/</sup>	Homemade	Percent <sup>2/</sup>
Rowboat	873	49.7	858	48.8	26	1.5	1,757
Skiff	177	49.9	127	35.7	51	14.4	355
Dinghy	66	49.6	54	40.6	13	9.8	133
Johnboat	642	50.9	577	45.8	42	3.3	1,261
Other Open Lightweight	648	50.5	596	46.4	40	3.1	1,284
Sailboat	463	46.7	458	46.1	71	7.2	992
Canoe	678	68.8	271	27.5	36	3.7	985
Kayak	23	25.8	27	30.4	39	43.8	89
Bowrider Runabout	829	44.5	979	52.6	54	2.9	1,862
Non-Bowrider Runabout	711	41.8	964	56.7	26	1.5	1,701
Cabin Cruiser	176	31.2	371	65.8	17	3.0	564
Houseboat	4	8.5	22	46.8	21	44.7	47
Inflatable Boat	38	100.0	0	0.0	0	0.0	38
Inflatable Raft	45	76.3	12	20.3	2	3.4	59
Non-Inflatable Raft	5	26.3	14	73.7	0	0.0	19
Pontoon Boat	53	40.5	61	46.5	17	13.0	131
Thrill Craft	78	44.6	97	55.4	0	0.0	175
Other	604	46.5	650	50.1	44	3.4	1,298
Total	6,113	47.9	6,138	48.2	499	3.9	12,750

<sup>1/</sup> Entries in thousands.  
<sup>2/</sup> Percent of boat type.

1973

TABLE 18: SUMMARY OF HOMEMADE BOATS

<u>Type of Boat</u>	<u>Total Homemade 1/ Number 2/</u>	<u>Percent 3/</u>
Canoe	37	6.3
Houseboat	18	39.1
Inboard Gas Single	50	10.5
Inboard Gas Twin	1	0.9
Inboard Diesel Single	7	20.6
Inboard Diesel Twin	0	0.0
In/Out Single	44	8.0
In/Out Twin	9	15.3
Inflatable	8	14.8
Johnboat	19	9.6
Kayak	20	46.5
Outboard Single	406	8.2
Outboard Twin	9	7.8
Rowboat	193	15.8
Sailboat Gas Aux.	0	0.0
Sailboat Diesel Aux.	0	0.0
Sailboat No Aux.	52	10.0
Other Powerboat	9	14.5
Other	92	18.8
Total	974	10.1

1/ Includes those boats built from a kit.

2/ Entries in thousands.

3/ Percent of all boats of this type in the continental United States.

1976

TABLE 19: SUMMARY OF HOMEMADE BOATS

Type of Boat	Total Homemade 1/		Homemades Built from a Kit	
	Number 2/	Percent 3/	Number 2/	Percent 3/
Rowboat	26	1.5	6	0.3
Skiff	51	14.4	9	2.5
Dinghy	13	9.8	5	3.8
Johnboat	42	3.3	6	0.5
Other Open Lightweight	40	3.1	2	0.2
Sailboat	71	7.2	17	1.7
Canoe	36	3.6	14	1.4
Kayak	39	43.8	13	14.6
Bowrider Runabout	54	2.9	9	0.5
Non-Bowrider Runabout	26	1.5	7	0.4
Cabin Cruiser	17	3.0	0	0
Houseboat	21	44.7	0	0
Inflatable Boat	0	0	0	0
Inflatable Raft	2	3.4	0	0
Non-Inflatable Raft	0	0	0	0
Pontoon Boat	17	13.0	0	0
Thrill Craft	0	0	0	0
Other	44	3.4	2	0.2
Total	499	3.9	90	0.7

1/ Includes those built from a kit.

2/ Entries in thousands.

3/ Percent of all boats of this type in the continental United States.

## I. Age of Recreational Boats.

While marketing research teams might be interested in boat age in order to estimate replacement trends, the Coast Guard is interested in numbers of boats in different age groups to determine whether accidents are more predominant in older boats and to assist in the process of recalling defective boats. The accident analysis in this area has not been completed, but the survey results on age of boat are presented by type of boat in Tables 20 and 21. These tables give Boat Age By Boat Type and average ages of the boat types for 1973 and 1976. Tables 22 and 23 give Hull Material by Boat Age and average ages of the hull types for 1973 and 1976.

For 1973, inflatables, with an average age of 15.3 years, and inboards, average age - 9.8 years, were the oldest boats. Kayaks (2.8 years) and canoes (4.7 years) were the newest boats.

In 1976, on a nationwide basis, rowboats and cabin cruisers were the oldest boats with average ages of 10.0 and 9.7 years, respectively. The newest boats in the boat age profile were inflatable rafts and inflatable boats with average ages of 3.5 and 2.9 years, respectively.

In reviewing Tables 20 and 21 it is clear that there are some distortions. This is due primarily to two factors. People giving the age of their boat tended to pick round numbers such as 5, 10, 15, etc. Second, there is a phenomenon detected in "Optimum Recall Period for Reporting Persons Injured in Motor Vehicle Accidents" (Reference 7). People remember incorrectly how long ago an event occurred.

Tables 22 and 23 show that in both years wood and steel hulled boats were the oldest boats on the average. In 1976, steel-hulled boats had a mean age of 17.7 years; wood-hulled boats - 13.3 years. In 1973, Canvas (4.5 years) and Fiberglass (6.4 years) were the hull materials having the lowest average age. The two new categories included in 1976, rigid plastic and rubber, had the lowest age averages in 1976, 4.0 and 3.1, respectively.

1973

TABLE 20: BOAT AGE BY BOAT TYPE <sup>1/</sup>  
Age (Years)

Type	1	2	3	4	5	6	7-8	9-10	11-15	16-20	21 or more	Total	Average Age (in years) By Boat Type
Canoe	99	72	97	52	77	12	41	40	34	22	41	587	4.7
Houseboat	0	11	5	3	4	2	3	1	16	1	0	46	7.4
Inboard Gas Single	46	16	63	25	32	32	48	50	51	70	44	477	10.5
Inboard Gas Twin	12	10	10	3	4	18	12	16	11	15	1	112	8.0
Inboard Diesel Single	7	1	2	0	14	0	2	0	7	1	0	34	6.1
Inboard Diesel Twin	0	0	3	0	0	1	6	5	1	1	0	17	8.1
In/Out Single	60	67	76	47	64	40	82	41	36	19	20	552	6.7
In/out Twin	10	4	9	3	10	4	5	4	10	0	0	59	5.7
Inflatable	6	12	8	4	0	2	0	1	0	0	21	54	15.3
Johnboat	20	11	9	16	36	34	20	28	0	3	21	198	8.7
Kayak	19	12	5	1	2	0	0	1	3	0	0	43	2.8
Outboard Single	428	488	534	465	545	330	537	498	606	259	249	4939	8.0
Outboard Twin	16	15	5	13	11	4	11	10	16	13	1	115	7.4
Rowboat	99	114	133	120	137	52	117	172	159	33	85	1221	8.5
Sailboat Gas Aux.	4	1	9	1	22	7	5	1	7	13	0	70	8.0
Sailboat Diesel Aux.	2	0	2	0	0	0	0	1	1	0	0	6	5.1
Sailboat No Aux.	79	63	83	50	59	24	44	30	58	26	6	522	6.0
Other Powerboat	0	12	12	5	4	3	7	2	15	1	1	62	7.1
Other	63	42	49	36	51	32	62	36	36	41	42	490	8.9
TOTAL	970	951	1114	844	1072	597	1002	937	1067	518	532	9604	8.0

<sup>1/</sup> Entries in thousands.

1976

TABLE 21: BOAT AGE BY BOAT TYPE 1/

Type	Age (Years)											Total	Average Age (in years) By Boat Type
	1	2	3	4	5	6	7-8	9-10	11-15	16-20	21 or More		
Rowboat	77	112	190	142	160	111	242	268	187	93	175	1,757	10.0
Skiff	14	28	48	44	39	25	52	40	15	23	27	355	8.6
Dinghy	9	3	37	16	8	10	10	16	5	16	3	133	7.3
Johnboat	92	100	166	111	232	103	113	177	88	21	58	1,261	7.2
Other Open Lightweight	121	65	144	96	116	101	227	134	172	73	35	1,284	7.8
Sailboat	98	45	128	113	114	58	162	97	82	5	90	992	8.5
Canoe	109	100	189	104	118	107	82	45	71	4	56	985	6.6
Kayak	15	15	16	16	6	2	14	0	0	0	5	89	5.4
Bowrider Runabout	152	132	239	190	190	141	165	221	203	107	122	1,862	8.5
Non-Bowrider Runabout	98	105	134	118	150	130	218	301	258	131	58	1,701	8.8
Cabin Cruiser	26	51	64	56	39	30	28	75	107	48	40	564	9.7
Houseboat	0	0	4	5	11	0	15	9	3	0	0	47	6.9
Inflatable Boat	5	11	13	0	9	0	0	0	0	0	0	38	2.9
Inflatable Raft	9	22	5	14	1	4	0	3	0	0	1	59	3.5
Non-Inflatable Raft	0	0	4	11	0	0	0	3	0	0	1	19	6.3
Pontoon Boat	10	26	16	8	10	23	12	10	9	1	6	131	6.6
Thrill Craft	22	22	45	19	7	9	20	13	13	5	0	175	5.1
Other	142	92	123	175	159	73	109	134	138	39	116	1,298	8.7
Total	999	929	1,565	1,238	1,369	927	1,469	1,546	1,351	564	793	12,750	8.3

1/ Entries in thousands.

1973

TABLE 22: HULL MATERIAL BY BOAT AGE <sup>1/</sup>

Hull Material

<u>Age (Years)</u>	<u>Aluminum</u>	<u>Canvas</u>	<u>Ferro- Cement</u>	<u>Fiber- glass</u>	<u>Steel</u>	<u>Wood</u>	<u>Other</u>	<u>Combination</u>	<u>Total</u>
1	321	5	0	490	2	59	40	53	970
2	347	0	0	447	5	54	42	56	951
3	354	13	0	568	8	80	23	68	1114
4	348	0	2	406	15	36	4	33	844
5	437	0	5	409	8	94	50	69	1072
6	193	1	0	236	7	91	31	38	597
7-8	342	0	4	383	13	159	19	82	1002
9-10	290	0	1	350	10	198	19	69	937
11-15	280	1	2	331	26	327	11	89	1067
16-20	120	2	0	65	8	229	14	80	518
Over 20	190	0	0	127	10	138	30	37	532
<b>Total</b>	<b>3,222</b>	<b>22</b>	<b>14</b>	<b>3,812</b>	<b>112</b>	<b>1465</b>	<b>283</b>	<b>674</b>	<b>9604</b>
<b>Average Age (In Years) By Hull Material</b>	<b>7.6</b>	<b>4.5</b>	<b>7.0</b>	<b>6.4</b>	<b>10.7</b>	<b>11.6</b>	<b>7.6</b>	<b>9.0</b>	<b>8.0</b>

<sup>1/</sup> Entries in thousands.

1976

TABLE 23: HULL MATERIAL BY BOAT AGE 1/

HULL MATERIAL

Age (Years)	Aluminum	Canvas	Ferrocement	Fiberglass	Rigid Plastic	Rubber	Steel	Wood	Other	Combination	Total
1	266	3	0	557	25	6	13	39	11	79	999
2	336	8	0	408	32	22	0	27	12	84	929
3	525	5	6	741	26	20	13	111	14	104	1,565
4	377	8	0	650	33	20	2	48	12	88	1,238
5	391	1	0	677	10	2	9	91	15	173	1,369
6	357	0	0	380	34	0	8	67	14	67	927
7-8	529	0	4	650	6	0	30	109	0	141	1,469
9-10	545	0	0	626	5	3	40	197	12	118	1,546
11-15	429	0	0	494	1	0	26	251	12	138	1,351
16-20	216	0	0	173	0	0	9	118	1	47	564
Over 20	247	6	0	237	1	0	29	207	4	62	793
Total	4,218	31	10	5,593	173	73	179	1,265	107	1,101	12,750
Average Age (in years) by Hull Material	8.4	9.1	4.8	7.2	4.0	3.1	17.7	13.3	6.7	8.3	8.3

1/ Entries in thousands.

## J. Recreational Boats and Insurance

One of the main problems facing the U. S. Coast Guard in its efforts to analyze boating accident data is the lack of complete information. Twenty-five respondents to the Nationwide Boating Survey indicated that members of their households had been in boating accidents in 1973 which involved death, bodily injury incapacitating the victim over 24 hours, or property damage over one hundred dollars. All of these accidents were required by law to have been reported to the Coast Guard, but only fifteen were reported. Furthermore, in the 1971 Fifth Coast Guard District study, (Reference 8), an investigation of insurance records compared to survey results indicated that the actual percentage of reportable accidents may be as low as five percent for non-fatal incidents.

The approach of checking insurance records may well be the best way to arrive at a reasonable estimate of the true number of annual boating accidents. To make such an investigation meaningful, however, information on the extent of boating insurance is necessary. Such information was gathered in the Nationwide Boating Surveys and is presented in Tables 24 and 25.

Overall, the Nationwide Surveys reveal that 62.8% and 61.8% of boats were insured in 1973 and 1976, respectively. Of the boats that were insured in 1976, 41.3% had special boat insurance, 48.4% were covered under a Homeowner's Policy and 10.3% had some other insurance. In 1973, 68.6% of the insured boats were covered under a Homeowner's Policy while 31.4% of the insured boats had other coverage. The less expensive boats characteristically are covered under a Homeowner's Policy.

In 1973, inboards and inboard/outboards had the highest percent insured, 83.6% and 85.6% respectively. For 1976, houseboats (10%) and pontoon boats (87.8%) are the percentage leaders. Inflatables (90.7%), kayaks (72.1%), rowboats (57.9%) and johnboats (50.5%) were the least frequently insured boats, the 1973 survey shows. Inflatable rafts (69.5%), kayaks (61.8%) and rowboats (58.2%) were on top in 1976 followed by canoes (54.8%). Canoes had a 55% coverage rate in 1973, but this slipped to just a little over 45% with insurance in 1976.

1973

TABLE 24: INSURANCE BY BOAT TYPE 1/

Type	Homeowner's Policy	Other Insurance	No Insurance	Percent 2/	Total
Canoe	289	34	264	45.0	587
Houseboat	25	6	15	32.6	46
Inboard Gas Single	189	200	88	18.4	477
Inboard Gas Twin	56	54	2	1.8	112
Inboard Diesel Single	16	4	14	41.2	34
Inboard Diesel Twin	5	11	1	5.9	17
In/Out Single	227	237	88	15.9	552
In/Out Twin	20	39	0	0.0	59
Inflatable	5	0	49	90.7	54
Johnboat	81	17	100	50.5	198
Kayak	11	1	31	72.1	43
Outboard Single	2248	933	1758	35.6	4939
Outboard Twin	38	32	45	39.1	115
Rowboat	460	54	707	57.9	1221
Sailboat Gas Aux.	25	41	4	5.7	70
Sailboat Diesel	4	2	0	0.0	6
Sailboat No. Aux.	235	115	172	32.9	522
Other Powerboat	18	21	23	37.1	62
Other	188	94	208	42.4	490
Total	4140	1895	3569	37.2	9604
Percent	43.1	19.7	37.2		100.0

1/ Entries in thousands.

2/ Percent of that boat type having "No Insurance."

1976

TABLE 25: INSURANCE BY BOAT TYPE <sup>1/</sup>

Type	Special Boat Insurance	Homeowner's Policy	Other Insurance	No Insurance	Percent <sup>2/</sup>	Total
Rowboat	160	454	120	1,023	58.2	1,757
Skiff	78	109	18	150	42.2	355
Dinghy	16	39	19	59	44.4	133
Johnboat	159	421	79	602	47.7	1,261
Other Open Lightweight	264	427	71	522	40.6	1,284
Sailboat	221	279	55	437	44.0	992
Canoe	36	382	27	540	54.8	985
Kayak	0	26	8	55	61.8	89
Bowrider Runabout	789	586	99	388	20.8	1,862
Non-Bowrider Runabout	706	494	74	427	25.1	1,701
Cabin Cruiser	267	154	70	73	12.9	564
Houseboat	24	22	1	0	0.0	47
Inflatable Boat	5	19	0	14	36.8	38
Inflatable Raft	1	17	0	41	69.5	59
Non-Inflatable Raft	9	0	0	10	52.6	19
Pontoon Boat	38	65	12	16	12.2	131
Thrill Craft	82	45	21	27	15.4	175
Other	399	275	142	482	37.1	1,298
Total	3,254	3,814	816	4,866	38.2	12,750
Percent	25.5	29.9	6.4	38.2		100.0

<sup>1/</sup> Entries in thousands.

<sup>2/</sup> Percent of that boat type having 'No Insurance.'

K. Safety Equipment Items.

In order to better understand the extent to which recreational boaters are prepared for emergency situations, boat owners were asked if they carry various safety equipment items. A summary of safety equipment items carried in 1973 and 1976 is contained in Tables 26 and 27. The percentage of each boat type carrying that equipment item is also given.

Tools were carried on the boat a little over 70% of the time surveys indicate. This figure is more impressive when one consider that only 76% of the boats in 1976 were motorized.

The number of boats equipped with anchor and line has remained at about 84%. This was the most frequently carried safety equipment item in 1973 and was second in 1976.

There has been a decrease in the percent of boats carrying spare engine parts from 40.1% of all boats in 1973 to only 33.5% (1976).

Carriage of distress signals (35.1% positive response), charts (20.0%) and compasses (32.9%) were only questioned in 1973. The percent of people carrying these items was lower than the other 1973 categories. In 1976, four new categories were added. It was determined that paddles and oars led all categories, old and new, with 92.8% of all boats so equipped. A high percent (78.5%) of the boats owned had bailing devices or bilge pumps. The other two new categories, fire extinguishers and sound amplifiers, were on board 53.3% and 37.0% of the time, respectively.

Surprisingly, first-aid kits were carried on only 56.8% and 57.0% of the boats in 1973 and 1976, respectively. With the high incidence of fishing and waterskiing among boating households, one would expect more boaters to be prepared for minor injuries.

1973

TABLE 26: SAFETY EQUIPMENT ITEMS ON RECREATIONAL BOATS 1/

Boat Type	Tools		Anchor and Line		Engine Parts		Distress Signals		Charts		Compass		First Aid Kit	
	No.	Percent 2/	No.	Percent 2/	No.	Percent 2/	No.	Percent 2/	No.	Percent 2/	No.	Percent 2/	No.	Percent 2/
Canoe	126	21.5	324	55.2	35	6.0	76	12.9	65	11.1	148	25.2	274	46.7
Houseboat	46	100.0	46	100.0	30	65.2	31	67.4	25	54.3	38	82.6	40	87.0
Inboard Gas Single	396	83.0	400	83.9	226	47.4	256	53.7	197	41.3	262	54.9	395	82.8
Inboard Gas Twin	111	99.1	111	99.1	80	71.4	106	94.6	94	83.9	102	91.1	111	99.1
Inboard Diesel Single	34	100.0	34	100.0	11	32.4	24	70.6	27	79.4	27	79.4	27	79.4
Inboard Diesel Twin	17	100.0	17	100.0	17	100.0	17	100.0	17	100.0	16	94.1	17	100.0
In/Out Single	522	94.6	516	93.5	294	53.3	337	61.1	233	42.2	319	57.8	396	71.7
In/Out Twin	55	93.2	59	100.0	39	66.1	57	96.6	47	79.7	39	66.1	46	78.0
Inflatable	10	18.5	22	40.7	1	1.9	5	9.3	4	7.4	4	7.4	15	27.8
Johnboat	142	71.7	168	84.8	77	38.9	47	23.7	11	5.6	34	17.2	85	42.9
Kayak	7	16.3	21	48.8	0	0.0	4	9.3	0	0.0	4	9.3	5	11.6
Outboard Single	4,195	84.9	4,514	91.4	2,583	52.3	1,925	39.0	891	18.0	1,686	34.1	3,026	61.3
Outboard Twin	95	82.6	110	95.7	78	67.8	46	40.0	29	25.2	49	42.6	62	53.9
Rowboat	383	31.4	970	79.4	90	7.4	145	11.9	27	2.2	117	9.6	431	35.3
Sailboat Gas Aux.	67	95.7	69	98.6	46	65.7	51	72.9	64	91.4	58	82.9	65	92.9
Sailboat Diesel Aux.	6	100.0	288	55.2	6	100.0	6	100.0	6	100.0	6	100.0	6	100.0
Sailboat No. Aux.	196	37.5	6	100.0	12	2.3	71	13.6	96	18.4	113	21.6	133	25.5
Other Powerboat	54	87.1	61	98.4	29	46.8	29	46.8	20	32.3	32	51.6	46	14.2
Other	339	69.2	367	74.9	200	40.8	137	28.0	66	13.5	106	21.6	277	56.5
Total	6,801	70.8	8,103	84.4	3,854	40.1	3,370	35.1	1,919	20.0	3,160	32.9	5,457	56.8

1/ Entries in thousands.  
2/ Percent of each boat type carrying that item.

1976

TABLE 27: SAFETY EQUIPMENT ITEMS ON RECREATIONAL BOATS 1/

Boat Type	Tools	Percent 2/	Anchor and Line	Percent 2/	Engine Parts	Percent 2/	Sound Amplifier	Percent 2/	Fire Extinguisher	Percent 2/	Bailing Device Bilge Pump	Percent 2/	Paddle or Oar	Percent 2/	First Aid Kit	Percent 2/
Rowboat	957	54.5	1,517	86.3	353	20.1	154	8.8	407	23.2	1,252	71.3	1,691	96.2	791	45.0
Skiff	289	81.4	340	95.8	135	38.0	89	25.1	175	49.3	280	78.9	345	97.2	203	57.2
Dinghy	74	55.6	104	78.2	28	21.0	24	18.0	33	24.8	104	78.2	124	93.2	43	32.3
Johnboat	894	70.9	1,110	88.0	376	29.8	240	19.0	475	37.7	980	77.8	1,221	96.8	624	49.5
Other Open Lightweight	1,032	80.4	1,192	92.0	531	41.4	458	35.7	585	45.6	1,083	84.3	1,243	96.8	717	55.9
Sailboat	373	37.6	576	58.1	99	10.0	252	25.4	209	21.1	590	59.5	784	79.0	360	36.3
Canoe	188	19.1	470	47.7	31	3.1	43	4.4	40	4.1	507	51.5	980	99.5	347	35.2
Kayak	19	21.3	23	25.8	0	0.0	0	0.0	0	0.0	32	36.0	82	92.1	27	30.3
Bowrider Runabout	1,645	88.3	1,716	92.2	766	41.1	1,118	60.0	1,552	83.4	1,667	89.5	1,763	94.7	1,317	70.7
Non-Bowrider Runabout	1,494	87.8	1,515	89.1	828	48.7	1,054	62.0	1,473	86.6	1,520	89.4	1,616	95.0	1,137	66.9
Cabin Cruiser	557	98.8	557	98.8	405	71.8	457	81.0	557	98.8	555	98.4	385	68.3	545	96.7
Houseboat	47	100.0	47	100.0	39	83.0	41	87.2	47	100.0	39	83.0	42	89.4	47	100.0
Inflatable Boat	7	18.4	13	34.2	0	0.0	0	0.0	0	0.0	9	23.7	38	100.0	6	15.8
Inflatable Raft	7	11.9	20	33.9	0	0.0	4	6.8	0	0.0	34	57.6	58	98.3	21	35.6
Non-Inflatable Raft	15	79.0	16	84.2	1	5.3	1	5.3	4	21.1	15	78.9	19	100.0	5	26.3
Pontoon Boat	103	78.6	130	99.2	44	33.6	75	57.3	79	60.3	66	50.4	105	80.2	72	55.0
Thrill Craft	165	94.3	168	96.0	68	38.9	82	46.9	155	88.6	158	90.3	162	92.6	137	78.3
Other	1,124	86.6	1,190	91.7	568	43.8	629	48.5	1,004	77.3	1,124	86.6	1,169	90.0	870	67.0
Total	8,990	70.5	10,704	84.0	4,272	33.5	4,721	37.0	6,795	53.3	10,015	78.5	11,827	92.8	7,269	57.0

1/ Entries in thousands.  
2/ Percent of each boat type carrying that item.

L. Fuel Consumed By Motorboats.

Tables 28 and 29 tabulate the number of boats with motors, gallons of fuel consumed, and average number of gallons used per motorboat by boat type for respondents who used their boat.

In 1973 there were 6,435,000 boats that met the above criteria. Total fuel consumed was 2,125,459,000 gallons and the average number of gallons used per motorboat was 330.

Overall, in 1976, there were 8,740,000 boats that met the above criteria. The fuel consumed by these boats was 3,071,290,000 gallons and the average number of gallons of fuel used per boat was 351. The increase from 1973 to 1976 in fuel used per motorized boat was 6.4%, this is a 1.9% increase in fuel usage per boat per year over the three year period.

Cabin cruisers (1,098) and houseboats (734) used the most gallons of fuel per boat for 1976. In 1973, inboards and inboard/outboards used the greatest average amount of fuel per boat.

Table 30 shows that almost all motorboats use gasoline or gasoline-oil fuel (95.1%). This is true for every boat type. The 'other' category would include propane fuel, kerosene fuel and those with electric motors.

1973

TABLE 28: FUEL USAGE BY BOAT TYPE

<u>Type</u>	<u>Number of Boats With Motors 1/</u>	<u>Total Gallons of Fuel Consumed 1/</u>	<u>Average Number of Gallons Used Per Boat</u>
Canoe	73	2,901	40
Houseboat	45	12,912	287
Inboard Gas Single	413	466,112	1,129
Inboard Gas Twin	107	95,849	896
Inboard Diesel Single	32	16,828	526
Inboard Diesel Twin	16	19,344	1,209
In/Out Single	479	250,900	524
In/Out Twin	54	10,602	196
Inflatable	15	165	11
Johnboat	142	11,773	83
Kayak	1	30	30
Outboard Single	4,245	1,055,075	249
Outboard Twin	101	34,610	343
Rowboat	299	13,435	45
Sailboat Gas Aux.	66	2,684	41
Sailboat Diesel Aux.	6	125	21
Sailboat No. Aux.	0	0	0
Other Powerboat	39	4,821	124
Other	302	127,293	422
Total	6,435	2,125,459	330

1/ Entries in thousands.

1976

TABLE 29: FUEL USAGE BY BOAT TYPE

<u>Type</u>	<u>Number of Boats With Motors 1/</u>	<u>Total Gallons of Fuel Consumed 1/</u>	<u>Average Number of Gallons Used Per Boat</u>
Rowboat	922	76,043	82
Skiff	260	53,881	207
Dinghy	77	6,709	87
Johnboat	994	173,794	175
Other Open Lightweight	1,069	294,343	275
Sailboat	189	15,238	81
Canoe	105	3,644	35
Kayak	5	27	5
Bowrider Runabout	1,689	571,059	338
Non-Bowrider Runabout	1,486	468,840	316
Cabin Cruiser	529	581,076	1,098
Houseboat	47	34,517	734
Inflatable Boat	5	43	9
Inflatable Raft	1	20	20
Non-Inflatable Raft	12	3,312	276
Pontoon Boat	126	22,345	177
Thrill Craft	157	78,057	497
Other	1,067	688,342	645
Total	8,740	3,071,290	351

1/ Entries in thousands.

1976

TABLE 30: TYPE OF FUEL USED BY BOAT TYPE 1/

<u>Type</u>	<u>Type of Fuel Used</u>			<u>Total</u>
	<u>Gasoline-Oil</u>	<u>Diesel Fuel</u>	<u>Other</u>	
Rowboat	1,050	2	31	1,083
Skiff	286	0	6	292
Dinghy	87	0	0	87
Johnboat	982	5	88	1,075
Other Open Lightweight	1,175	10	27	1,212
Sailboat	177	20	1	198
Canoe	105	0	5	110
Kayak	5	0	0	5
Bowrider Runabout	1,766	26	39	1,831
Non-Bowrider Runabout	1,640	13	35	1,688
Cabin Cruiser	489	39	36	564
Houseboat	47	0	0	47
Inflatable Boat	0	0	5	5
Inflatable Raft	1	0	0	1
Non-Inflatable Raft	12	0	0	12
Pontoon Boat	123	0	8	131
Thrill Craft	168	0	0	168
Other	1,113	42	38	1,193
Total	9,226	157	319	9,702

1/ Entries in thousands.

M. Communication Equipment.

Tables 31 and 32 give the breakdown of which items of communication equipment were carried on boats in 1973 and 1976. Table 31 shows that in 1973 only 6.3% of the recreational boats carried two way radios. By 1976, 11.5% of all boats owned carried Citizens Band radios, almost double the 1973 figure for all two way radios.

The categories of responses in 1973 were mutually exclusive, but respondents in 1976 indicated multiple pieces of equipment per boat. There were 6,801,000 electronic communication devices on 3,965,000 boats according to the 1976 survey. Thus, 31.1% of all boats carried at least one piece of communication equipment.

Standard radio receivers were the most frequent items carried. They comprise 37.7% of all electronic communication equipment on board. By including CB radios (21.6%) and VHF-FM (12.4%) with the standard radios over 70% of all communication pieces are included.

1973

TABLE 31: TWO-WAY RADIOS ON RECREATIONAL BOATS

<u>Type of Two-Way Radio</u>	<u>Number Carrying</u>	<u>Percent 1/</u>
CB Radio	185,000	1.9
MF/HF	121,000	1.3
VHF-FM	184,000	1.9
MF/HF and VHF-FM	111,000	1.2
Total	601,000	6.3

1/ Percent of 1973 boats (9,604,000 total).

1976

TABLE 32: CARRIAGE OF COMMUNICATION EQUIPMENT <sup>1/</sup>

<u>Type of Communication Equipment 2/</u>	<u>Do Carry</u>	<u>Percent</u>	<u>Do Not Carry</u>	<u>Percent</u>	<u>Total</u>
CB Radio	1,468	11.5	11,282	88.5	12,750
VHF-FM Two Way Radio	842	6.6	11,908	93.4	12,750
Single Side Band Radio (SSB)	296	2.3	12,454	97.7	12,750
Commercial Broadcast Receiver (Standard Radio)	2,566	20.1	10,184	79.9	12,750
Weather Monitor	695	5.5	12,055	94.5	12,750
Scanner	251	2.0	12,499	98.0	12,750
Emergency Position Indicating Radio Beacon (EPIRB)	141	1.1	12,609	98.9	12,750
Emergency Locator Transmitter (ELT)	163	1.3	12,587	98.7	12,750
Other Types of Communication Equipment	379	3.0	12,371	97.0	12,750

<sup>1/</sup> Entries in thousands.

<sup>2/</sup> Multiple responses possible.

N. Electronic Navigation Equipment.

Table 33 shows the navigation equipment carried in the respective survey years. The results show that almost every type has increased substantially not just in total number but also in percentage of all boats carrying each item. Due to slightly different questionnaire wording, it can be determined that 307,000 boats (3.2% of the boat population) carried some type of navigation equipment in 1973. In 1976, 421,000 boats (3.3% of the boat population) carried the types of equipment listed in Table 33. Thus, in 1976 more boats had navigation equipment, although in many cases they didn't have the specific equipment items listed in Table 33.

For the types listed in Table 33, 287,000 pieces of navigation equipment were in use in 1973. This figure has grown to 638,000 in 1976, over a 200% increase.

Radio direction finders made up 56.8% of the total items owned in 1973 but only 46.1% in 1976. This shows that the other types have picked up in usage appreciably. In fact, in every category except radio direction finders and Omega, the number in operation has more than doubled. It should be pointed out that in 1973 people were only asked if they had "direction finders" and some of the respondents may not have understood the question, and thought that compasses, for example, were "direction finders".

TABLE 33: ELECTRONIC NAVIGATION EQUIPMENT 1/

Type of Navigation Equipment	Do Carry 1973	Percent <u>2/</u>	Do Carry 1976	Percent <u>2/</u>
Radio Direction Finder	163	1.7	294	2.3
Loran A Automatic	20	.2	48	.4
Loran A Manual	39	.4	97	.8
Loran C	3	.03	25	.2
Loran A-C	1	.01	25	.2
Omega	26	.3	35	.3
Radar	35	.4	114	.9

1/ Entries in thousands.

2/ Percent of that year's total boats.

The following sections discuss tables that were done for 1976 only.

O. Height of Boat By Boat Type.

Table 34 gives the results of a question asked only about dinghys, sailboats, cabin cruisers, houseboats, and pontoon boats. It is of interest because of determinations which must be made in bridge construction. In 1976, 30.8% of all boats in the noted categories were 8 feet or less above the water level. Of all boats in the forementioned categories, 40.8% were between 9 and 19 feet in height. Thus, 28.4% of all boats in the above categories stretched 20 feet or higher above the water level. Height was measured from the water line to the top of the mast or highest point of the boat.

Over 90% of the boats over 26' tall were sailboats. This is over 25% of all sailboats.

TABLE 34: HEIGHT OF BOAT BY BOAT TYPE 1/

Type	Height of Boat								Total
	1-3'	4-6'	7-8'	9-10'	11-14'	15-19'	20-25'	26' or more	
Dinghy	125	0	0	1	4	3	0	0	133
Sailboat	11*	22	36	79	217	150	218	259	992
Cabin Cruiser	13*	143	89	157	67	42	28	25	564
Houseboat	0	0	22	3	9	12	0	1	47
Pontoon Boat	4	44	65	9	9	0	0	0	131
Total	153	209	212	249	306	207	246	285	1,867

1/ Only asked of those who owned dinghys, sailboats, cabin cruisers, houseboats, pontoon boats. Entries in thousands.

\*See page 17.

P. Planned Length of Ownership.

In the 1976 Nationwide Boating Survey owners of new boats were asked how long they intended to keep their boats. Table 35 gives the result of this question by boat type.

Owners who held 64.5% of the new boats claimed they would not sell their boats, 5.5% of the boats had already been sold, 2.5% of the boats were going to be kept less than one year, 9.6% of the boats were to be kept between one year but less than two and a half years, 11.2% were to be kept between two and a half but less than five and a half years, and 6.7% were to be kept more than five and a half years. The results show that new inflatable boats, dinghies, non-inflatable rafts, canoes and rowboats are least likely to be sold by their present owner. New sailboats were most likely to have been sold in 1976 or 1977. (Some 20.1% indicated they had sold or would be selling shortly.)

1976

TABLE 35: TIME PLANNED TO KEEP BOAT BY BOAT TYPE <sup>1/</sup>

Type of Boat	Won't Sell	Sold Already	Months Planned To Keep							121 or More	Total
			<sup>2/</sup> 1-11	12-18	19-29	30-54	55-66	67-120			
Rowboat	675	29	7	27	11	19	51	30	24	873	
Skiff	123	0	2	3	4	0	14	24	7	177	
Dinghy	54	0	0	0	2	2	6	2	0	66	
Johnboat	469	30	13	13	24	13	34	28	18	642	
Other Open Lightweight	460	27	6	24	44	34	6	37	10	648	
Sailboat	288	58	5	30	29	6	19	23	5	463	
Canoe	540	7	0	20	9	38	17	38	9	678	
Kayak	10	0	0	0	13	0	0	0	0	23	
Bowrider Runabout	462	45	50	46	52	65	76	29	4	829	
Non-Bowrider Runabout	363	44	29	43	52	75	70	30	5	711	
Cabin Cruiser	68	17	10	7	7	36	9	15	7	176	
Houseboat	3	0	0	0	0	1	0	0	0	4	
Inflatable Boat	32	0	0	0	0	0	6	0	0	38	
Inflatable Raft	33	4	5	1	0	0	1	0	1	45	
Non-Inflatable Raft	4	0	0	0	1	0	0	0	0	5	
Pontoon Boat	34	1	4	2	5	4	2	0	1	53	
Thrill Craft	30	7	1	27	2	7	4	0	0	78	
Other	299	66	19	50	41	36	32	31	30	604	
Total	3,947	335	151	293	296	336	347	287	121	6,113	

<sup>1/</sup> Entries are in thousands.

<sup>2/</sup> Boats owned in 1976 and sold in 1976 or in 1977 before the interview.

Q. Months Used By Boat Type.

Table 36 gives the breakdown of Months Used by Boat Type. On the average, the boats in operation over the greatest span of time in 1976 were houseboats (7.2 months used), thrill craft (6.1), sailboats (5.5), cabin cruisers (5.3), johnboats (5.0), and skiffs (4.9). In the middle averages, the boat types were other (4.8), pontoon boats (4.7), canoes (4.5), bowrider runabouts (4.5), non-bowrider runabouts (4.5), dinghys (4.4), other open lightweights (4.4) and inflatable boats (4.3). Kayaks (3.8 average usage months), non-inflatable rafts (3.8), rowboats (3.6) and inflatable rafts (2.4) made up the low end of the spectrum.

There were 1,428,000 boats that were not used at all in 1976. This is 11.2% of the total recreational boat population. This leaves 11,322,000 boats that were in operation. Over 20% of the boats used were on the water for over 6 months of the year. Almost two-thirds (63.6%) of the boats operated in 1976 were utilized between 3 and 6 months of the year. Few (15.6%) were active only one or two months of calendar year 1976.

R. Times Used Per Month.

Of the 12,750,000 boats that the 1976 Nationwide Survey estimated, 1,428,000 were not used (see Table 36). The remaining 11,322,000 were used sometime in 1976. There was a question asked about these 11,322,000 boats concerning how many times per month they were used.

Table 37 shows that pontoon boats (9.9 average times out per month of use), non-inflatable rafts (8.8), other (7.2), inflatable boats (7.1) and sailboats (7.0) had the highest rates. Those out between six and seven times per month of use were bowrider runabouts (6.7 times), cabin cruisers (6.7), other open lightweights (6.5), rowboats (6.4), non-bowrider runabouts (6.4), thrill craft (6.2), dinghys (6.1), johnboats (6.1) and skiffs (6.0). Those having the fewest outings per month of use comprised houseboats (5.8 outings), canoes (5.3), kayaks (4.9) and inflatable rafts (4.5).

A significant percent (13.1) of the boats used were out more than 12 times per month of use. Almost 70% of all boats are only used from one to six times per month in their boating season. Boats used seven to twelve times per month of use number 1,988,000 or 17.6% of the total operated.

1976

TABLE 36: MONTHS USED BY BOAT TYPE 1/

<u>Type</u>	<u>Months Used</u>									
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7-11</u>	<u>12</u>	<u>Totals</u>
Rowboat	275	144	215	271	214	254	230	113	41	1,757
Skiff	53	16	20	60	38	37	42	48	41	355
Dinghy	14	12	22	22	9	1	32	8	13	133
Johnboat	112	72	111	212	157	149	157	142	149	1,261
Other Open Lightweight	176	75	89	233	158	166	174	140	73	1,284
Sailboat	115	28	40	183	133	97	102	117	177	992
Canoe	80	74	83	171	150	150	128	89	60	985
Kayak	6	7	32	2	9	14	7	10	2	89
Bowrider Runabout	173	101	159	322	309	290	199	194	115	1,862
Non-Bowrider Runabout	215	67	117	276	301	293	148	173	111	1,701
Cabin Cruiser	35	16	59	82	68	84	79	84	57	564
Houseboat	0	3	0	11	0	4	9	4	16	47
Inflatable Boat	0	5	0	18	6	0	0	9	0	38
Inflatable Raft	12	11	7	15	4	7	3	0	0	59
Non-Inflatable Raft	0	0	0	7	9	3	0	0	0	19
Pontoon Boat	5	3	5	24	26	30	23	13	2	131
Thrill Craft	10	3	11	22	14	14	45	30	26	175
Other	147	87	73	230	173	154	133	168	133	1,298
Total	1,428	724	1,043	2,161	1,778	1,747	1,511	1,342	1,016	12,750

1/ Entries in thousands.

1976

TABLE 37: BOAT TYPE BY TIMES USED PER MONTH <sup>1/</sup>

Type	Times Used Per Month											Total
	1	2	3	4	5-6	7-8	9-10	11-12	13-15	16-20	21 or More	
Rowboat	185	257	183	241	173	88	119	67	46	45	78	1,482
Skiff	29	64	20	46	44	40	26	7	14	2	10	302
Dinghy	14	28	35	7	4	2	10	4	5	4	6	119
Johnboat	137	210	213	190	90	83	64	10	35	62	55	1,149
Other Open Lightweight	122	202	166	188	105	48	78	42	40	65	52	1,108
Sailboat	68	150	133	157	84	46	40	50	22	90	37	877
Canoe	155	211	120	106	120	39	35	46	14	29	30	905
Kayak	8	28	9	5	4	13	6	8	2	0	0	83
Bowrider Runabout	199	263	187	271	206	162	104	71	48	95	83	1,689
Non-Bowrider Runabout	216	241	180	195	213	80	79	81	70	77	54	1,486
Cabin Cruiser	44	87	81	73	77	38	26	14	32	40	17	529
Houseboat	0	4	14	10	2	0	11	4	1	1	0	47
Inflatable Boat	22	4	0	3	0	0	0	3	0	0	6	38
Inflatable Raft	9	23	2	0	3	1	2	3	0	4	0	47
Non-Inflatable Raft	0	0	4	3	0	8	0	0	0	3	1	19
Pontoon Boat	3	5	8	21	22	5	6	25	11	11	9	126
Thrill Craft	2	17	34	39	8	35	18	2	0	6	4	165
Other	90	166	121	230	140	87	99	53	38	64	63	1,151
<b>Total</b>	<b>1,303</b>	<b>1,960</b>	<b>1,510</b>	<b>1,785</b>	<b>1,295</b>	<b>775</b>	<b>723</b>	<b>490</b>	<b>378</b>	<b>598</b>	<b>505</b>	<b>11,322</b>

<sup>1/</sup> Entries in thousands.

S. Hours Per Outing.

Table 38 breaks down average hours per outing for the 11,322,000 boats that were used in 1976. The typical outing for 38.8% of the boats was 3 hours or less. For 38.8% of the boats, the typical outing was between 4 and 6 hours. For 22.4% of the boats, the typical outing was seven hours or more.

The overall average number of hours per outing was 5.3. The highest averages were for houseboats (average of 12.0 hours per outing), cabin cruisers (7.2), inflatable rafts (6.3), thrill craft (6.1) and other open lightweights (6.0). Those grouped in the middle were other (average of 5.8 hours per outing), bowrider runabouts (5.7), non-bowrider runabouts (5.6), skiffs (4.8), sailboats (4.7), johnboats (4.5) and canoes (4.5). Rowboats (4.3), pontoon boats (4.3), kayaks (3.8), inflatable boats (3.6), non-inflatable rafts (3.3) and dinghys (3.3) spent the lowest mean number of hours on the water per outing.

T. Operation in Darkness.

Of those 11,322,000 boats that were used in 1976, 27.1% were operated in darkness. Table 39 gives operation in darkness by boat type and average percent of time operated in darkness. Houseboats, cabin cruisers, and non-inflatable rafts are the types most likely to be operated in darkness.

Overall, 27.1% of all boats operated were operated in darkness. These 3,069,000 boats operated 13.7% of their total time at night.

1976

TABLE 38: HOURS PER OUTING BY BOAT TYPE <sup>1/</sup>

Type of Boat	Hours Per Outing								Total
	1	2	3	4	5	6	7-8	9 or more	
Rowboat	245	300	221	205	118	152	138	103	1,482
Skiff	10	34	86	59	30	34	29	20	302
Dinghy	23	21	23	22	7	5	11	7	119
Johnboat	86	184	156	172	103	219	114	115	1,149
Other Open Lightweight	95	156	148	158	101	138	156	156	1,108
Sailboat	82	146	186	144	103	80	58	78	877
Canoe	76	139	173	206	90	86	73	62	905
Kayak	9	19	6	22	11	13	2	1	83
Bowrider Runabout	119	163	224	271	234	235	250	193	1,689
Non-Bowrider Runabout	94	205	240	282	148	171	196	150	1,486
Cabin Cruiser	18	77	58	86	42	66	59	123	529
Houseboat	0	5	14	0	10	0	1	17	47
Inflatable Boat	5	13	4	3	0	13	0	0	38
Inflatable Raft	5	0	6	4	17	4	3	8	47
Non-Inflatable Raft	0	12	0	0	3	4	0	0	19
Pontoon Boat	17	32	19	15	7	13	17	6	126
Thrill Craft	14	23	20	18	18	9	29	34	165
Other	117	130	140	165	109	164	155	171	1,151
Total	1,015	1,659	1,724	1,832	1,151	1,406	1,291	1,244	11,322

<sup>1/</sup> Entries in thousands.

1976

TABLE 39: OPERATION IN DARKNESS BY BOAT TYPE <sup>1/</sup>

Type of Boat	Operated in Darkness		Avg Percent of	Not Operated	
	Number	Percent	Time Operated in Darkness <sup>2/</sup>	Number	Percent
Rowboat	256	17.3	13.2	1,226	82.7
Skiff	57	18.7	13.7	245	81.3
Dinghy	20	16.5	15.4	99	83.5
Johnboat	329	28.7	20.4	820	71.3
Other Open Lightweight	282	25.5	11.2	826	74.5
Sailboat	149	17.0	11.0	728	83.0
Canoe	121	13.3	17.0	784	86.7
Kayak	4	4.8	5.2	79	95.2
Bowrider Runabout	588	34.8	12.8	1,101	65.2
Non-Bowrider Runabout	535	36.0	11.7	951	64.0
Cabin Cruiser	261	49.4	14.0	268	50.6
Houseboat	35	73.9	14.4	12	26.1
Inflatable Boat	0	0.0	0.0	38	100.0
Inflatable Raft	0	0.0	0.0	47	100.0
Non-Inflatable Raft	9	47.4	19.1	10	52.6
Pontoon Boat	25	19.8	9.7	101	80.2
Thrill Craft	54	32.7	7.8	111	67.3
Other	344	29.9	15.4	807	70.1
Total	3,069	27.1	13.7	8,253	72.9

<sup>1/</sup> Entries in thousands.<sup>2/</sup> This is the average percent of time operated in darkness for only those boats of that type that were operated in darkness.

U. Trailing of Boats.

Tables 40 and 42 give the number of boats trailered by boat type and by boat length with percent trailered by type and by length. Tables 41 and 43 give miles boat was trailered by boat type and boat length. Understandably enough, 62.7% of all boats were trailered in 1976. Of the trailered boats, 29.3% were trailered less than 10 miles, 24.6% were trailered between 11 and 30 miles, 28.4% were trailered between 31 and 100 miles, 17.7% were trailered over 100 miles round trip.

Inflatable rafts (79.7%), inflatable boats (71.1%), kayaks (70.8%) and canoes (70.3%) were the types of boats most commonly transported. Houseboats (6.4%), pontoon boats (16.0%) and cabin cruisers (34.0%) were the least likely to be trailered.

The average distance a boat was trailered in 1976 was 72 miles (this is round trip mileage). Those trailered further on the average are houseboats (200 miles round trip), cabin cruisers (144), inflatable boats (125), kayaks (118), thrill craft (92), bowrider runabouts (82), canoes (81), non-bowrider runabouts (76), other (74), and other open lightweights (74). Generally, these boats with high distances trailered are either the more expensive motorboats or car-top boats. The boats at or below the average of 72 miles include dinghys (72), skiffs (68), johnboats (60), rowboats (58), inflatable rafts (51), non-inflatable rafts (35), sailboats (27) and pontoon boats (26). These figures are averages for only those boats that were trailered in 1976.

The average distances trailered by length for those boats trailered are more uniform. Boats under 16 feet were trailered 66.0 miles average round trip. Sixteen to twenty-five foot boats had the highest mean, 81.2 miles. For 26-39 foot boats, the average was 30.3. There were no survey boats trailered in the 40-65 foot category.

1976

TABLE 40: BOATS TRAIERED BY BOAT TYPE

<u>Type</u>	<u>Trailerred</u>	
	<u>Number</u>	<u>Percent</u>
Rowboat	1,065,000	60.6
Skiff	227,000	63.9
Dinghy	77,000	57.9
Johnboat	920,000	63.0
Other Open Lightweight	872,000	67.9
Sailboat	460,000	46.4
Canoe	692,000	70.3
Kayak	63,000	70.8
Bowrider Runabout	1,289,000	69.2
Non-Bowrider Runabout	1,087,000	63.9
Cabin Cruiser	192,000	34.0
Houseboat	3,000	6.4
Inflatable Boat	27,000	71.1
Inflatable Raft	47,000	79.7
Non-Inflatable Raft	8,000	42.1
Pontoon Boat	21,000	16.0
Thrill Craft	113,000	64.6
Other	827,000	63.7
<b>Total</b>	<b>7,990,000</b>	<b>62.7</b>

1976

TABLE 41: MILES TRAIERED BY BOAT TYPE <sup>1/</sup>Miles Trailered (Round Trip)

Type	1-2	3-5	6-10	11-20	21-30	31-50	51-100	101-200	201 or more	Total
Rowboat	89	67	147	157	168	172	108	122	35	1,065
Skiff	25	30	52	24	19	8	40	15	14	227
Dinghy	3	5	26	15	4	0	8	6	10	77
Johnboat	87	73	113	192	87	92	178	59	39	920
Other Open Lightweight	66	87	92	131	86	93	173	71	73	872
Sailboat	92	63	111	65	9	58	44	14	4	460
Canoe	56	34	115	90	74	94	106	59	64	692
Kayak	3	2	7	12	4	7	7	17	4	63
Bowrider Runabout	125	79	112	147	127	137	277	189	96	1,289
Non-Bowrider Runabout	100	56	115	176	87	126	212	123	92	1,087
Cabin Cruiser	15	12	24	12	20	5	32	43	29	192
Houseboat	0	0	0	0	0	0	0	3	0	3
Inflatable Boat	0	5	0	0	0	2	7	4	9	27
Inflatable Raft	1	9	9	10	0	5	1	3	3	47
Non-Inflatable Raft	0	0	0	4	6	3	1	0	0	8
Pontoon Boat	4	0	5	4	4	0	4	0	0	21
Thrill Craft	3	6	10	18	13	9	20	20	14	113
Other	57	46	105	74	126	90	149	121	59	827
<b>Total</b>	<b>726</b>	<b>574</b>	<b>1,043</b>	<b>1,131</b>	<b>834</b>	<b>901</b>	<b>1,367</b>	<b>869</b>	<b>545</b>	<b>7,990 <sup>2/</sup></b>

<sup>1/</sup> Entries in thousands.<sup>2/</sup> Total number of boats trailered in 1976.

1976

TABLE 42: BOATS TRAIERED BY BOAT LENGTH 1/

<u>Length</u>	<u>Trailerred In 1976</u>	<u>Percent of Boats of This Length Trailerred In 1976</u>
Under 16'	4,702	67.2
16-25'	3,241	61.7
26-39'	46	11.0
40-65'	0	0.0
Over 65'	1*	12.5
Total	7,990	62.7

1/ Entries in thousands.  
\*See page 17.

1976

TABLE 43: MILES TRAIERED BY BOAT LENGTH 1/

<u>Length</u>	<u>Miles Trailerred</u>									<u>Total</u>
	<u>1-2</u>	<u>3-5</u>	<u>6-10</u>	<u>11-20</u>	<u>21-30</u>	<u>31-50</u>	<u>51-100</u>	<u>101-200</u>	<u>201 or more</u>	
Under 16'	405	375	639	692	571	559	711	476	274	4,702
16-25'	315	189	399	437	249	334	656	392	270	3,241
26-39'	6	10	5	2	14	7	0	1	1	46
Over 65'	0	0	0	0	0	1*	0	0	0	1
Total	726	574	1,043	1,131	834	901	1,367	869	545	7,990

1/ Entries in thousands.  
\*See page 17.

V. Safety Related Defects.

Table 44 reveals that most people would contact either their marine dealer (seller), the boat manufacturer, the Coast Guard or someone else if they found their boat had a safety-related defect. Only 15.3% would not contact anyone. Many of these respondents indicated they would handle the situation themselves. Most responses were for contacting their marine dealer (33.7%) or the manufacturer (31.3%). More people would contact no one than would contact the Coast Guard, 15.3% to 14.7%.

1976

TABLE 44: WHOM WOULD YOU CONTACT IF YOU FOUND YOUR BOAT HAD A SAFETY-RELATED DEFECT? 1/

<u>Contact</u>	<u>Would Contact</u>	
	<u>Number</u>	<u>Percent</u> <u>2/</u>
Your Marine Dealer (Seller)	3,284	33.7
The Manufacturer	3,058	31.3
The Coast Guard	1,430	14.7
Someone Else	1,340	13.7
No One	1,491	15.3

1/ This question was asked only of boat-owning households and only for the primary boat. Entries are in thousands.

2/ Percent of the 9,754,000 primary boat-owning households. The percent column totals to 108.7% because people could give more than one answer.

W. Marine Waste Disposal.

Table 45 describes the results of a question asked to determine the availability of pumpout facilities at boating locales. In 1973, 33.4% of the recreational boats had pumpout facilities at their location. In 1976, 35.1% of all boats had pumpout facilities at their boating locale. There was no appreciable increase in the number of locales with pumpout facilities.

In evaluating Table 46, only those numbers larger than 10 to 20 thousand have much statistical validity. The results do show that 8.4% or 1,072,000 boats have marine toilets. Cabin cruisers make up 395,000 (36.8%) of the total having marine toilets. Houseboats and cabin cruisers are the two boat types most likely to have marine toilets with 89.4% of all houseboats and 70.0% of all cabin cruisers having them.

TABLE 45: MARINE WASTE PUMPOUT FACILITY AT BOATING LOCATION?

	1973		1976	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Yes	3,212,000	33.4	4,469,000	35.1
No	6,391,000	66.6	8,281,000	64.9
Total	9,604,000	100.0	12,750,000	100.0

1976

TABLE 46: MARINE TOILETS BY BOAT TYPE <sup>1/</sup>

Type	Yes <sup>2/</sup>	Percent of Type	No	Percent of Type	Total
Rowboat	26	1.5	1,731	98.5	1,757
Skiff	9*	2.5	346	97.5	355
Dinghy	1*	0.8	132	99.2	133
Johnboat	12*	1.0	1,249	99.0	1,261
Other Open Lightweight	48	3.7	1,236	96.3	1,284
Sailboat	174	17.5	818	82.5	992
Canoe	15*	1.5	970	98.5	985
Kayak	0	0.0	89	100.0	89
Bowrider Runabout	63	3.4	1,799	96.6	1,862
Non-Bowrider Runabout	95	5.6	1,606	94.4	1,701
Cabin Cruiser	395	70.0	169	30.0	564
Houseboat	42	89.4	5	10.6	47
Inflatable Boat	0	0.0	38	100.0	38
Inflatable Raft	3*	5.1	56	94.9	59
Non-Inflatable Raft	1*	5.3	18	94.7	19
Pontoon Boat	0	0.0	131	100.0	131
Thrill Craft	12*	6.9	163	93.1	175
Other	176	13.6	1,122	86.4	1,298
Total	1,072	8.4	11,678	91.6	12,750

<sup>1/</sup> Entries in thousands.

<sup>2/</sup> For all boat types asterisked above, the responses to the question may have indicated ownership of portable toilets rather than installation of marine toilets on the boats.

\*See page 17.

## V. EXPOSURE RATES AND ACCIDENT ANALYSIS

### A. Boating Accidents in 1973 and 1976.

The Coast Guard is charged, under the Federal Boat Safety Act of 1971, with gathering and compiling statistics on reportable boating accidents. A reportable accident is one which involves a fatality; an injury in which an individual loses consciousness, requires medical treatment and/or is incapacitated for at least 24 hours; or property damage of at least \$100 is suffered. In 1973, a reported 1,754 persons lost their lives in reported boating accidents. In 1976, 1,264 persons lost their lives in boating accidents. Coupling this information with the increases seen in total number of boats, total number of boat hours and total number of passenger hours means that the fatality rate has taken a dramatic drop since 1973. A total of 6,738 vessels were involved in serious mishaps in 1973; 8,954 vessels were involved in 1976. The increase in exposure per boat more than offsets the increase in boats involved in accidents. This leads to a reduced 1976 rate for vessels involved per million passenger hours. It should be noted that the total vessels involved in accidents is greater than the total number of accidents. Often more than one vessel is involved in each accident.

This chapter compares exposure and accident rates and explains the limitations of the accidents being analyzed. The Coast Guard annually publishes a statistical summary of boating accidents based on reports received by the Office of Boating Safety. One problem in analyzing these data, however, is that much of the information is incomplete. For example, of the 1973 accidents, there are twenty-seven cases where the vessel involved is known to have been a canoe, but it is not known if the canoe had a motor. In order to give statements of accident risks by boat type, this unknown information must be estimated.

The procedure which was used to estimate the unknown data is the well-known principle of maximum likelihood. This principle distributes the unknown elements over the various cells in the same proportion that the known information is distributed. For example, it is known that three motorized canoes and 115 manually-propelled canoes were involved in mishaps in 1973. Hence, under the maximum likelihood principle, one of the twenty-seven unknown canoes would be assigned to the motorized cell and twenty-six would be assigned to the manual cell. The vessels about which neither type nor propulsion are known are distributed over all cells using the same principle. A summary of the fatalities and vessels involved in accidents, after the unknown data were distributed, is shown in Table 47 for 1973 and Table 48 for 1976.

From Table 47, the reader might conclude that outboards are the most dangerous boat type, since 53.5% of the fatalities occurred on outboards. However, when one considers that 53.0% of the boats are outboards, this changes the picture. For this reason, a discussion of exposure must precede a meaningful analysis of boating accidents.

1973

TABLE 47: SUMMARY OF ACCIDENTS REPORTED (ADJUSTED)

<u>Boat Types</u>	<u>Fatalities</u>	<u>Vessels Involved</u> 1/	<u>Total Boats</u>
Canoe (No Motor)	170	158	510,000
Canoe (Motor)	4	4	77,000
Houseboat	3	46	46,000
Inboard	123	1,564	640,000
Inboard/Outboard	44	751	611,000
Outboard	939	2,943	5,054,000
Rowboat/Johnboat (No Motor)	178	156	918,000
Rowboat/Johnboat (Motor)	56	98	501,000
Sailboat (No. Aux.)	53	181	522,000
Sailboat (Aux.)	25	475	76,000
Other	159	362	649,000
<b>Total</b>	<b>1,754</b>	<b>6,738</b>	<b>9,604,000</b>

1/ Vessels involved in accidents which were required by law to be reported to the Coast Guard.

1976

TABLE 48: SUMMARY OF ACCIDENTS REPORTED (ADJUSTED)

<u>Boat Types</u>	<u>Fatalities</u>	<u>Vessels Involved 1/</u>	<u>Total Boats</u>
Rowboat			
With Motor	104	769	1,083,000
Without Motor	93	124	674,000
Skiff			
With Motor	28	206	292,000
Without Motor	9	12	63,000
Dinghy			
With Motor	8	62	87,000
Without Motor	6	9	46,000
Johnboat			
With Motor	103	764	1,075,000
Without Motor	26	34	186,000
Other Open Lightweight			
With Motor	116	862	1,212,000
Without Motor	10	13	72,000
Sailboat			
With Motor	22	835	198,000
Without Motor	56	314	794,000
Canoe	134	155	985,000
Kayak	12	14	89,000
Bowrider Runabout	179	1,307	1,862,000
Non-Bowrider Runabout	163	1,200	1,701,000
Cabin Cruiser	100	1,808	564,000
Houseboat	8	106	47,000
Inflatable Boat	12	13	38,000
Inflatable Raft	19	21	59,000
Non-Inflatable Raft	1	4	19,000
Pontoon Boat	4	26	131,000
Thrill Craft	6	35	175,000
Other	45	261	1,298,000
<b>Total</b>	<b>1,264</b>	<b>8,954</b>	<b>12,750,000</b>

1/ Vessels involved in accidents which were required by law to be reported to the Coast Guard.

**B. Boating Exposure.**

In order to estimate the amount of time each boat was exposed to the possibility of a boating accident, each boat owner was asked the number of months the boat was used in the survey year, the average number of outings per month, and the length in hours of an average outing. The average number of passengers on board was also obtained. The passenger data allow us to convert boat exposure data to passenger exposure information.

The various parts of Table 49 and Table 50 summarize boat exposure and passenger exposure.

The inappropriateness of using total boats as a denominator can be seen using Table 49. The average auxiliary sailboat was on the water four times as much as the average motored rowboat. Furthermore, the problem is compounded even more when one sees that auxiliary sailboats carry two times more passengers than motored rowboats on the average.

Tables 49 and 50 show that while exposure per boat in 1973 was at 190 hours, by 1976, it has only risen to 199. A much bigger increase was registered in the number of passenger hours per boat hour. In 1973, the data showed an average of 3.0 passengers for every hour of operation. This figure has increased to 3.4 for 1976. Several factors could have caused this, people could own a higher percentage of the larger types of boats, e.g., cabin cruisers and auxiliary sailboats. These same types of boats could be underway a greater proportion of the time than they were in 1973. Finally, people could be taking more passengers out per outing.

The boats carrying the most passengers in 1973 were the inboard-gas twins and the houseboats, in that order. This is roughly comparable to the figures for 1976 where houseboats carried an average of 6.6 passengers per hour of operation and cabin cruisers carried 6.1. These are the two boat types carrying the greatest number of passengers per hour of operation in 1976.

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1973

TABLE 49: SUMMARY OF BOATING EXPOSURE

Type	Number of Boats (in 000s) 1/	Total Boat Hours (in 000s)	Percent of Total Boat Exposure	Exposure Per Boat (Hours)	Total Passenger Hours (in 000s)	Percent of Total Passenger Exposure	Ratio of Passenger Hours Per Boat Hour 2/
Canoe							
Without Motor	456	68,293	4.4	150	140,651	3.0	2.1
With Motor	73	15,300	1.0	210	43,095	0.9	2.8
Houseboat	45	12,876	0.8	286	62,456	1.4	4.9
Inboard Gas Single	413	171,540	11.0	415	522,608	11.4	3.0
Inboard Gas Twin	107	23,743	1.5	222	129,584	2.8	5.5
Inboard Diesel Single	32	13,891	0.9	434	56,116	1.2	4.0
Inboard Diesel Twin	16	8,592	0.6	537	36,364	0.8	4.2
Inboard/Outboard Single	479	91,180	5.9	190	342,723	7.5	3.8
Inboard/Outboard Twin	54	10,854	0.7	201	37,094	0.8	3.4
Inflatable							
Without Motor	22	482	0.0	22	950	0.0	2.0
With Motor	15	735	0.0	49	1,470	0.0	2.0
Johnboat							
Without Motor	40	2,700	0.2	68	3,575	0.1	1.3
With Motor	142	24,566	1.6	173	60,931	1.3	2.5
Kayak	35	1,289	0.1		2,799	0.1	2.2
Outboard Single	4,245	788,197	50.9	186	2,285,357	49.6	2.9
Outboard Twin	101	17,040	1.1	169	58,686	1.3	3.4
Rowboat							
Without Motor	635	59,948	3.9	94	147,468	3.2	2.5
With Motor	299	26,127	1.7	87	68,496	1.5	2.6
Sailboat Gas Aux.	66	18,318	1.2	278	66,309	1.4	3.6
Sailboat Diesel Aux.	6	2,085	0.1	348	10,012	0.2	4.8
Sailboat No Aux.	464	62,925	4.1	136	153,081	3.3	2.4
Other Powerboat	39	35,334	2.3	906	84,802	1.9	2.4
Other							
Without Motor	79	5,046	0.3	64	13,667	0.3	2.7
With Motor	302	88,076	5.7	292	276,042	6.0	3.1
Total							
Without Motor	1,730	200,646	13.0	116	462,111	10.0	2.3
With Motor	6,435	1,348,491	87.0	210	4,142,225	90.0	3.1
Grand Total	8,165	1,549,137	100.0	190	4,604,336	100.0	3.0

1/ Includes only boats operated in 1973.

2/ These are figures for the average number of passengers per hour of operation. Care should be taken here as this is not necessarily the average number of passengers per outing.

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1976

TABLE 50: SUMMARY OF BOATING EXPOSURE

Type	Number of Boats (in 000s) 1/	Total Boat Hours (in 000s)	Percent of Total Boat Exposure	Exposure Per Boat (Hours)	Total Passenger Hours (in 000s)	Percent of Total Passenger Exposure	Ratio of Passenger Hours Per Boat Hour 2/
Rowboat							
Without Motor	560	47,376	2.1	85	102,332	1.3	2.2
With Motor	922	125,023	5.5	136	287,554	3.8	2.3
Skiff							
Without Motor	42	2,789	0.1	66	4,769	0.1	1.7
With Motor	260	47,580	2.1	183	122,757	1.6	2.6
Dinghy							
Without Motor	42	2,280	0.1	54	4,629	0.1	2.0
With Motor	77	12,197	0.5	158	31,468	0.4	2.6
Johnboat							
Without Motor	155	20,631	0.9	133	34,659	0.5	1.7
With Motor	994	215,300	9.5	217	488,732	6.4	2.3
Other Open Lightweight							
Without Motor	39	2,063	0.1	53	5,549	0.1	2.7
With Motor	1,069	277,512	12.3	260	666,030	8.7	2.4
Sailboat							
Without Motor	688	159,822	7.1	232	434,717	5.7	2.7
With Motor	189	75,467	3.3	399	314,701	4.1	4.8
Canoe							
Without Motor	800	101,280	4.6	127	222,816	2.9	2.2
With Motor	105	9,082	0.4	87	17,529	0.2	1.9
Kayak							
Without Motor	78	6,560	0.3	84	7,347	0.1	1.1
With Motor	5	21	0.0	4	43	0.0	2.0
Bowrider Runabout	1,689	329,099	14.6	195	1,213,654	15.9	3.7
Non-Bowrider Runabout	1,486	273,424	12.1	184	885,894	11.6	3.2
Cabin Cruiser	529	173,142	7.7	327	1,052,702	13.8	6.1
Houseboat	47	19,049	0.8	405	125,915	1.7	6.6
Inflatable Boat							
Without Motor	33	5,283	0.2	160	11,570	0.1	2.2
With Motor	5	258	0.0	52	515	0.0	2.0
Inflatable Raft							
Without Motor	46	4,705	0.2	102	15,859	0.2	3.4
With Motor	1	118	0.0	118	470	0.0	4.0
Non-Inflatable Raft							
Without Motor	7	518	0.0	74	1,037	0.0	2.0
With Motor	12	1,351	0.1	113	4,608	0.1	3.4
Pontoon Boat	126	25,981	1.1	206	143,416	1.9	5.5
Thrill Craft							
Without Motor	8	133	0.0	17	265	0.0	2.0
With Motor	157	45,451	2.0	289	177,715	2.3	3.9
Other							
Without Motor	84	9,652	0.4	115	17,179	0.2	1.8
With Motor	1,067	262,482	11.6	246	1,238,915	16.2	4.7
Total							
Without Motor	2,582	363,092	15.1	141	862,628	11.3	2.4
With Motor	8,740	1,892,532	83.9	216	6,772,618	88.7	3.6
Total	11,322	2,255,624	100.0	199	7,635,246	100.0	3.4

1/ Includes only boats operated in 1976.

2/ These are figures for the average number of passengers per hour of operation. Care should be taken here as this is not necessarily the average number of passengers per outing.

### C. Analysis of the 1973 and 1976 Boating Accidents.

Once the exposure data has been computed for each boat type, an analysis of the boating accidents can be performed. Rates of fatalities and vessels involved can now be expressed in terms of rates of fatalities per million passenger hours and vessels involved per million passenger-hours, respectively.

Before launching into a detailed analysis of the accidents, a most important caution must be explained. The numbers of fatalities and vessels involved which are used in this analysis are associated only with those accidents for which the Coast Guard has received a Boating Accident Report. The reporting rate for fatalities is quite high, and the results in Tables 51 and 52 are felt to be quite reliable. The reporting rate for vessels involved in reportable non-fatal accidents is much poorer, however. Of twenty-four such accidents reflected in the 1973 Nationwide Boating Survey interviews, only fourteen were reported. Furthermore, an earlier study (Reference 8) showed that the reporting rate may be as low as ten percent. Clearly, the unknown information could completely alter the results shown in Tables 53 and 54. This is especially likely to be true since the owners of boats which are expensive and insured (e.g. auxiliary sailboats, inboards, and inboard/outboards) are more likely to report an accident than owners of the less expensive, uninsured vessels.

Now that a meaningful common denominator (i.e. exposure) has been developed, we can draw cautious conclusions as to the relative risks of the various boats. A summary of fatalities is shown in Table 51 for 1973 and Table 52 for 1976. It should be noted that exposure of rental vessels, which is extensive in some vessel types, was not included in this study. The results for 1973 show that passengers in manually-propelled canoes had the highest fatality rate, with 1.21 deaths per million passenger-hours. Manually-propelled rowboats/johnboats follow closely, with a fatality rate of 1.19. It is of interest to note that outboards, while accounting for 53.5 percent of all fatalities, rank only fifth in order of fatality rates. Houseboat passengers are apparently the safest, with a 1973 fatality rate of 0.05 deaths per million passenger-hours. The overall 1973 fatality rate was 0.38 fatalities per million passenger hours. Five of the 11 categories broken out are very close to the average. The two highest categories, both non-motored vessel types, are three times the average. The four lowest types, all motorized craft, vary from one-half to one-seventh of the average.

Table 52 presents the fatality rates for 1976. There are 24 boat types listed in this table due to the change between surveys in the boat type question. Thus, a complete comparison of the tables is impossible but some important general conclusions can be drawn. The highest category was the skiffs without motors with a fatality rate of 1.89 per million passenger hours. Other open

lightweight boats without motor were right behind that with a rate of 1.80. In fact, the first nine classifications are all non-powered boats with the exception of a small percent of the canoes and kayaks. The two highest categories in the 1973 survey, canoes (no motor) and rowboats/johnboats (no motor), are down in their fatality rates in 1976. The rowboat without motor and johnboat without motor categories are .91 and .75 respectively in 1976. These are not exactly comparable to the rowboat/johnboat (no motor) type for 1973 but they are very similar, and thus show an appreciable drop. The two 1973 canoe types were combined into one in 1976 and canoes (no motor) has declined by over 50 percent from 1973.

These decreases are in line with the overall decline in the average fatality rate for all boats. The overall rate in 1976 is .17 which is less than half the 1973 rate. The decrease results from the fact that the fatalities from 1973 to 1976 went down by 27.9% while the total number of passenger hours was increasing by about two-thirds.

The final analysis concerns the rate at which the various types of vessels are involved in reportable accidents. As stated earlier, a reportable accident is one which involves a fatality, an injury in which an individual loses consciousness, requires medical treatment and/or is incapacitated for at least 24 hours; or, property damage of at least one hundred dollars. Since the majority of the accidents are the result of property damage exclusive of fatality or injury, it is not surprising that the highest rates are associated with the more expensive boats. A summary is shown in Table 53 for 1973 and Table 54 for 1976. Sailboats with auxiliary power headed the list with an accident rate of 6.22 vessels involved per million passenger-hours in 1973. Inboards and inboard/outboards follow with accident rates of 2.10 and 1.98, respectively. The manually-propelled boats are far down the line in this table.

Table 54 shows that in 1976 rowboats with motors surpassed sailboats with motors for the highest number of vessels involved per million passenger hours. The former's rate was 2.67 while the latter's was 2.65. The overall positions of powered and non-powered boats are mixed throughout this table, but again, in general, motored boats had the higher rates in this table while non-powered boats had lower rates. If the vessels involved in fatalities were not included in this table, this conclusion would be more pronounced.

The total vessels involved rate is down from 1.43 to 1.17 a drop of about 20 percent. The drop is not as sharp here due to the increase in reported vessels involved from 1973 to 1976. A part of this increase is very likely due to better reporting of accidents. The Coast Guard has taken steps over the three year period to improve the accident reporting rate.

1973

TABLE 51: FATALITY RATES BY BOAT TYPE  
(In Rank Order)

<u>Boat Type</u>	<u>Fatalities 1/</u>	<u>Fatalities Per Million Passenger-Hours</u>
Canoe (No Motor)	170	1.21
Rowboat/Johnboat (No Motor)	178	1.19
Rowboat/Johnboat <u>2/</u> (Motor)	56	0.43
Other	159	0.42
Outboard <u>2/</u>	939	0.40
Sailboat (No. Aux.)	53	0.35
Sailboat (Aux.)	25	0.33
Inboard	123	0.17
Inboard/Outboard	44	0.12
Canoe (Motor)	4	0.09
Houseboat	3	0.05
Total	1,754	0.38

1/ Derived from the information contained in the 1973 Boating Accident Reports.

2/ An unknown number of motorized johnboats may be included in the outboard category. Since this may be the case for both fatalities and exposure, the net effect is indeterminate. Accordingly, caution should be used in applying this statistic.

**NOTICE:** Table 51 and Table 52 are based only on those fatalities for which the Coast Guard has a Boating Accident Report.

1976

TABLE 52: FATALITY RATES BY BOAT TYPE  
(In Rank Order)

<u>Boat Type</u>	<u>Fatalities 1/</u>	<u>Fatalities Per Million Passenger Hours</u>
Skiff Without Motor	9	1.89
Other Open Lightweight Without Motor	10	1.80
Kayak	12	1.62
Dinghy Without Motor	6	1.30
Inflatable Raft	19	1.16
Inflatable Boat	12	.99
Rowboat Without Motor	93	.91
Johnboat Without Motor	26	.75
Canoe	134	.56
Rowboat With Motor	104	.36
Dinghy With Motor	8	.25
Skiff With Motor	28	.23
Johnboat With Motor	103	.21
Non-Bowrider Runabout	163	.18
Non-Inflatable Raft	1	.18
Other Open Lightweight With Motor	116	.17
Bowrider Runabout	179	.15
Sailboat Without Motor	56	.13
Cabin Cruiser	100	.09
Sailboat With Motor	22	.07
Houseboat	8	.06
Other	45	.04
Thrill Craft	6	.03
Pontoon Boat	4	.03
Total	1,264	.17

1/ Derived from information contained in the 1976 Boating Accident Reports.

1973

TABLE 53: VESSELS INVOLVED BY BOAT TYPE  
(In Rank Order)

<u>Boat Type</u>	<u>Vessels Involved</u> <sup>1/</sup>	<u>Vessels Involved Per Million Passenger-Hours</u>
Sailboat (Aux.)	475	6.22
Inboard	1,564	2.10
Inboard/Outboard	751	1.98
Outboard <sup>2/</sup>	2,943	1.26
Sailboat (No. Aux.)	181	1.18
Canoe (No Motor)	158	1.12
Rowboat/Johnboat (No Motor)	156	1.04
Other	362	0.95
Rowboat/Johnboat <sup>2/</sup> (Motor)	98	0.76
Houseboat	46	0.74
Canoe (Motor)	4	0.09
Total	6,738	1.46

<sup>1/</sup> Derived from the information contained in the 1973 Boating Accident Reports. The numbers include all vessels involved in accidents in which a fatality, a reportable injury, or at least \$100 property damage resulted.

<sup>2/</sup> An unknown number of motorized johnboats may be included in the outboard category. Since this may be the case for both vessels involved and exposure, the net effect is indeterminate. Accordingly, caution should be used in applying this statistic.

**NOTICE:** Table 53 and Table 54 are based on those vessels involved in serious accidents as described above for which the Coast Guard has a Boating Accident Report. Not all such accidents are reported to the Coast Guard, and this unknown information could alter the above results greatly.

1976

TABLE 54: VESSELS INVOLVED BY BOAT TYPE  
(In Rank Order)

<u>Boat Type</u>	<u>Vessels Involved</u>	<u>Vessels Involved Per Million Passenger Hours</u>
Rowboat With Motor	769	2.67
Sailboat With Motor	835	2.65
Skiff Without Motor	12	2.52
Other Open Lightweight Without Motor	13	2.34
Dinghy With Motor	62	1.97
Dinghy Without Motor	9	1.94
Kayak	14	1.89
Cabin Cruiser	1,808	1.72
Skiff With Motor	206	1.68
Johnboat With Motor	764	1.56
Non-Bowrider Runabout	1,200	1.35
Other Open Lightweight With Motor	862	1.29
Inflatable Raft	21	1.29
Rowboat Without Motor	124	1.21
Bowrider Runabout	1,307	1.08
Inflatable Boat	13	1.08
Johnboat Without Motor	34	.98
Houseboat	106	.84
Sailboat Without Motor	314	.72
Non-Inflatable Raft	4	.71
Canoe	155	.64
Other	261	.21
Thrill Craft	35	.20
Pontoon Boat	26	.18
Total	8,954	1.17

1/ Derived from the information contained in the 1976 Boating Accident Reports. The numbers include all vessels involved in accidents in which a fatality, a reportable injury or at least \$100 property damage resulted.

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COAST GUARD WASHINGTON D C OFFICE OF BOATING SAFETY  
RECREATIONAL BOATING IN THE CONTINENTAL UNITED STATES IN 1973 A--ETC(U)  
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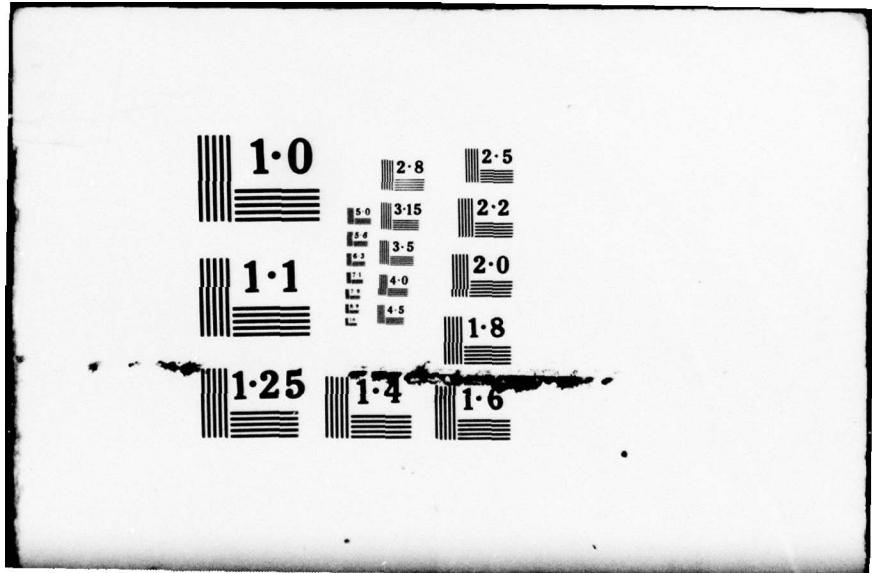
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## VI. RECREATIONAL BOATING HOUSEHOLDS AND OPERATORS

### A. Introduction.

The final chapter of this report summarizes the results of the Nationwide Boating Surveys which apply to boating households. By boating households, we mean those households for which at least one member actually operated a boat in the survey year. It is important that the reader keep this definition in mind when interpreting and using the tables presented in this chapter.

There were an estimated 10,613,000 boating households in the continental United States in 1973. That means that over one household in seven housed at least one boat operator during that year. In 1976, it is estimated that 14,895,000 continental U.S. households were boating households with at least one operator. This is an increase of 40% over the 1973 number. This is a slightly larger increase than that for total recreational boats (40% to 33%). Boat operation took place in one out of every five households in 1976.

### B. Profile of Boat Operators.

The Nationwide Boating Survey reveals that there were 19,461,000 persons in the continental United States who actually operated a boat in 1973. For 1976, the comparable number was 30,096,000. Profiles of operators per boating household are presented in Table 55. The national average for 1973 was 1.83 operators per boating household. 1976 figures indicate a growth in the average number of operators per household to 2.02 operators per boating household, despite Census data which shows a decrease in the average household size.

An analysis of operators by age and sex is shown in Table 56. Nationally, the percentage of male operators decreased from 75.3% to 69.7% between 1973 and 1976. The average age of all operators was 34.0 in 1973 and 31.5 in 1976. The average female operator age was 30.8 years in 1973 as compared to 35.0 years for the average male operator in 1973. In 1976, the average female operator age was 29.4 years and the average male was 32.4 years. This indicates a trend towards younger operators, male and female. Almost one-third of the under 20 operators were female, but just 19.1% of the operators over 50 were female.

TABLE 55: OPERATORS PER HOUSEHOLD <sup>1/</sup>

<u>Operators Per Household</u>	<u>Year</u>	<u>Households</u>	
		<u>Number</u>	<u>Percent <sup>2/</sup></u>
1	1973	5,529,000	52.1
	1976	6,373,000	42.8
2	1973	2,985,000	28.1
	1976	4,965,000	33.3
3	1973	1,119,000	10.6
	1976	1,800,000	12.1
4	1973	563,000	5.3
	1976	1,010,000	6.8
5	1973	258,000	2.4
	1976	409,000	2.7
6	1973	116,000	1.1
	1976	233,000	1.6
7	1973	20,000	0.2
	1976	37,000	0.2
8	1973	9,000	0.1
	1976	25,000	0.2
9 or more	1973	14,000	0.2
	1976	43,000	0.3
Total	1973	10,613,000	100.0
	1976	14,895,000	100.0

<sup>1/</sup> Households include only those with at least one operator.

<sup>2/</sup> Percent of that year's total operator households.

TABLE 56: PROFILE OF BOAT OPERATORS BY AGE AND SEX

<u>Age (Years)</u>	<u>Year</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Under 12	1973	324,000	99,000	423,000
	1976	561,000	365,000	926,000
12-15	1973	956,000	415,000	1,371,000
	1976	1,695,000	721,000	2,416,000
16-19	1973	1,561,000	779,000	2,340,000
	1976	2,660,000	1,284,000	3,944,000
20-25	1973	2,082,000	839,000	2,921,000
	1976	3,626,000	1,857,000	5,483,000
26-30	1973	1,960,000	604,000	2,564,000
	1976	2,742,000	1,315,000	4,057,000
31-40	1973	2,553,000	933,000	3,486,000
	1976	3,702,000	1,753,000	5,455,000
41-50	1973	2,604,000	627,000	3,231,000
	1976	3,021,000	1,118,000	4,139,000
51-60	1973	1,562,000	357,000	1,919,000
	1976	1,954,000	513,000	2,467,000
Over 60	1973	1,033,000	173,000	1,206,000
	1976	1,021,000	188,000	1,209,000
Total	1973	14,635,000	4,826,000	19,461,000
	1976	20,982,000	9,114,000	30,096,000

C. Frequency of Boat Rentals.

Table 57 gives the results of the 1973 and 1976 Nationwide Boating Surveys on frequency of boat rentals by boating households. It is of interest to note that the percent of boating households renting at least once increased from 18.2% to 25.2% between 1973 and 1976. The number of households that rented was 1,935,000 in 1973. The 1976 Nationwide Boating Survey found that 3,752,000 rented, a 94% increase from 1973. Significant increases have taken place in boat rentals.

D. Household Boating Activities.

Tables 57 and 58 give the households participating in and time spent in various boating activities in 1973 and 1976. In 1973, the activities most frequently participated in by operator households were recreational fishing (73.1%), cruising/sailing (59.0%) and water skiing (29.8%). In 1976, recreational fishing was participated in by 76.7% of the operator households, with pleasure cruising or sailing being done by 62.5% of the operator households while 37.7% of the operator households enjoyed water skiing. Generally, the figures in Table 58 show that the average boating household spent most of their time in fishing (47.7% in 1973 vs. 44.7% in 1976), pleasure cruising or sailing (30.4% in 1973 vs. 31.5% in 1976) and water skiing (11.7% in 1973 and 13.7% in 1976).

Operating households participated in an average of 1.77 boating activities in 1973. By 1976, 2.20 activities were being enjoyed on the average by each boating household, so not only are people spending more time boating, but they are also participating in a greater diversity of on the water recreation.

TABLE 57: FREQUENCY OF BOAT RENTALS IN 1973 AND 1976

<u>Times Rented</u>	<u>Year</u>	<u>Number of Households</u>	<u>Percent</u>
0	1973	8,678,000	81.8
	1976	11,143,000	74.9
1	1973	718,000	6.8
	1976	1,367,000	9.2
2	1973	360,000	3.4
	1976	799,000	5.3
3-5	1973	513,000	4.8
	1976	834,000	5.6
More than 5	1973	344,000	3.2
	1976	752,000	5.0
Total	1973	10,613,000 <sup>1/</sup>	100.0
	1976	14,895,000 <sup>2/</sup>	100.0

<sup>1/</sup> Households that operated a boat in 1973.  
<sup>2/</sup> Households that operated a boat in 1976.

TABLE 58: HOUSEHOLDS PARTICIPATING IN BOATING ACTIVITIES 1/

<u>Activity</u>	<u>1973</u>		<u>1976</u>	
	<u>Households</u> <u>Participating</u>	<u>Percent</u> <u>2/4/</u>	<u>Households</u> <u>Participating</u>	<u>Percent</u> <u>2/4/</u>
Pleasure Cruising or Sailing	6,262	59.0	9,312	62.5
Water Skiing	3,163	29.8	5,617	37.7
Recreational Fishing	7,758	73.1	11,422	76.7
Hunting	732	6.9	1,023	6.9
Racing	509	4.8	712	4.8
Commercial Use	318	3.0	391	2.6
White Water Canoeing <u>3/</u>			1,044	7.0
Other Canoeing <u>3/</u>			2,359	15.8
White Water Rafting <u>3/</u>			401	2.7
White Water Kayaking <u>3/</u>			161	1.1
Other Kayaking <u>3/</u>			289	1.9
Total Operator Households	10,613	100.0	14,895	100.0

1/ Asked only of those households that had one or more operators. Entries in thousands.

2/ Percent of total operator households.

3/ Asked only in 1976.

4/ More than one response is possible for each household.

TABLE 59: TIME SPENT IN VARIOUS BOATING ACTIVITIES

	Percent of Time Spent	
	<u>1973</u>	<u>1976</u>
Pleasure Cruising or Sailing	30.4	31.5
Water Skiing	11.7	13.7
Recreational Fishing	47.7	44.7
Hunting	1.4	1.6
Racing - Motorboat, Canoe, etc.	1.1	1.3
Commercial Use - Including Fishing	1.8	.8
White Water Canoeing <u>1/</u>		1.2
Other Canoeing <u>1/</u>		4.6
White Water Rafting <u>1/</u>		.3
White Water Kayaking <u>1/</u>		.1
Other Kayaking <u>1/</u>		.2
Subtotal	94.1	100.0
Other Responses	5.9	0.0
Total	100.0	100.0

1/ Asked only in 1976.

E. Experience of Boat Operators.

One of the questions in the Nationwide Boating Surveys concerned boating experience of the primary operator in the household. The primary operator of a boating household is defined to be that operator who had the most operating time in the survey year. The results are shown in Table 60. Nationally, the percentage of operators in each category increases as the hours increase in the total boat operating experience categories.

Table 60 also shows that operating experience is trending down. Only 10.2% of all primary operators in 1973 had less than 20 hours of boating experience. Now, in 1976, 15.0% have less than 20 hours total boating experience. In addition to this, 18.7% have less than 20 hours experience with the boat used most often. More operators fall in the over 500 hours of overall boat operating experience, 36.9% in 1973, 35.7% in 1976 than any other group. The largest hour group, for the boat used most often by the primary operator, is 101-500 hours with 29.0%.

TABLE 60: HOURS OF OPERATING EXPERIENCE <sup>1/</sup>

Hours of Experience	Total Boat Operating Experience				Operating Experience With Boat used Most Often	
	1973		1976		1976	
	Operators	Percent	Operators	Percent	Operators	Percent
0-10			1,059	7.1	1,445	9.7
11-20	1,084 <sup>2/</sup>	10.2	1,173	7.9	1,346	9.0
21-100	2,649	25.0	3,466	23.3	3,782	25.4
101-500	2,964	27.9	3,871	26.0	4,314	29.0
Over 500	3,916	36.9	5,326	35.7	4,008	26.9
Total	10,613	100.0	14,895	100.0	14,895	100.0

<sup>1/</sup> This information was asked about the person who used a boat the most often in the year of the survey.

<sup>2/</sup> This number covers 0-20 hours in the 1973 survey not just 11-20 hours.

F. Recreational Boating Rescue Situations.

In 1973, members of boating households found themselves in 780,000 boating situations where they needed rescue or assistance. In 1976, this number increased to 1,338,000. This means there were over 7.3 emergencies per hundred boating households in 1973 and almost 9.0 emergencies per hundred boating households in 1976. (Recall that we are defining a boating household to be one in which at least one member operated a boat in the survey year.) As shown in Table 61, both in 1973 and 1976, the majority (58.4% and 65.4% respectively) of rescue situations occurred on inland waters.

Table 62 gives the primary causes of rescue situations in 1973 and 1976. In 1973 and 1976, 51.3% and 48.3%, respectively, of the rescue situations were cases of boats disabled due to mechanical failures. Running out of fuel was the next principal reason in 11.8% and 14.4% of the cases in 1973 and 1976, respectively.

TABLE 61: RESCUE SITUATIONS BY BODY OF WATER

	<u>Body of Water</u>						<u>Total</u>	
	<u>Great Lakes And Oceans</u>		<u>Inland Water</u>		<u>Other</u>		<u>1973</u>	<u>1976</u>
	<u>1973</u>	<u>1976</u>	<u>1973</u>	<u>1976</u>	<u>1973</u>	<u>1976</u>		
Number of Rescue Situations	302,000	434,000	456,000	875,000	23,000	29,000	780,000	1,338,000
Percent of Rescue Situations Occurring In That Year	38.7	32.4	58.4	65.4	2.9	2.2	100.0	100.0
Percent of all Boat Operator Households Involved In Rescue Situation							7.3	9.0

TABLE 62: PRIMARY CAUSES OF RESCUE SITUATIONS IN 1973 AND 1976

Cause	1973		1976	
	No. Cases	Percent	No. Cases	Percent
Boat disabled	400,000	51.3		
propulsion, shaft or propeller <u>1/</u>			41,000	3.1
engine failure <u>1/</u>			447,000	33.4
steering failure <u>1/</u>			40,000	3.0
electrical failure <u>1/</u>			56,000	4.2
other causes <u>1/</u>			62,000	4.6
Capsizing	58,000	7.4	163,000	12.2
Flooding	4,000	.5	22,000	1.6
Flooding with capsizing <u>2/</u>	21,000	2.7		
Fire and/or explosion	5,000	.6	2,000	.1
Grounding	32,000	4.1	71,000	5.3
Collision	7,000	.9	12,000	.9
Out of fuel	92,000	11.8	192,000	14.4
Person overboard	13,000	1.7	22,000	1.6
Person hit by boat or propeller <u>2/</u>	0	0.0		
Other reason	148,000	19.0	208,000	15.6
Total	780,000	100.0	1,338,000	100.0

1/ Not asked in 1973

2/ Not asked in 1976

Tables 63 and 64 list the ways in which assistance was sought during emergencies in 1973 and 1976. In only 57.7% and 66.1% of all cases in 1973 and 1976, respectively, was any assistance sought. This may be due to the fact that an estimated 23.2% and 16.6% in 1973 and 1976, respectively, of the rescue situations occurred with no other vessel in the area (see Tables 65 and 66). The breakdowns for the distance to the nearest vessel in an emergency are different in the two surveys. It was felt in the 1976 interviews that nearer or further than one mile away would give the most reliable results. Similar data were collected on how many situations took place with no vessel in sight.

When assistance was sought the most common methods employed were arm waving, shouting and radio communication. Arm waving was the leading approach, but where 48.2% used this method in 1973, only 26.6% waved their arms for help in 1976. Likewise, the percent shouting slipped from 29.3% in 1973 to 19.2%, 1976. Radio use increased slightly, 17.1% (1973) to 18.5% (1976). Many responses could not be coded by the interviewers and thus are included in the 'other' category.

1973

TABLE 63: WAYS IN WHICH ASSISTANCE WAS SOUGHT DURING EMERGENCIES

<u>Ways</u>	<u>Number of Cases</u>	<u>Percent of Rescue Situations</u>	<u>Number of Responses 1/</u>	<u>Percent of Cases in Which Each Method Used</u>
Assistance Was Sought	450,000	57.7		
Arm Waving			217,000	48.2
Shouting			132,000	29.3
Radio			77,000	17.1
Flag			55,000	12.2
Horns			43,000	9.6
Whistles			9,000	2.0
Smoke				
Flashlight			3,000	0.7
Flare, Aerial			5,000	1.1
Flares, Hand			13,000	2.9
Other			124,000	27.6
No Assistance Was Sought	330,000	42.3		
Total Operator Households in Rescue Situations	780,000	100.0		

1/ Multiple responses possible.

1976

TABLE 64: WAYS IN WHICH ASSISTANCE WAS SOUGHT DURING EMERGENCIES

<u>Ways</u>	<u>Number of Cases</u>	<u>Percent of Rescue Situations</u>	<u>Number of Responses 1/</u>	<u>Percent of Cases in Which Each Method Used</u>
Assistance Was Sought	884,000	66.1		
Arm Waving			235,000	26.6
Shouting			170,000	19.2
Radio			164,000	18.5
Flag			93,000	10.5
Horns			58,000	6.6
Whistles			8,000	0.9
Smoke			4,000	0.5
Flashlight			3,000	0.3
Flares, Aerial			0	0.0
Flares, Hand			0	0.0
Chemical Light			0	0.0
Dye Marker			0	0.0
Mirrors			0	0.0
Strobe Light			0	0.0
Other			256,000	29.0
No Assistance Sought	454,000	33.9		
Total Operator Households in Rescue Situations	1,338,000	100.0		

1/ Multiple responses possible per boating emergency.

1973

TABLE 65: MILES TO NEAREST VESSEL DURING EMERGENCY

<u>Miles</u>	<u>Cases</u>	<u>Percent of Total</u>
No vessel in sight	181,000	23.2
Under 0.5	501,000	64.2
0.5 - 2.0	64,000	8.2
2.1 - 5.0	31,000	4.0
Over 5.0	3,000	0.4
Total	780,000	100.0

1976

TABLE 66: MILES TO NEAREST VESSEL DURING EMERGENCY

<u>Miles</u>	<u>Cases</u>	<u>Percent of Total</u>
No vessel in sight	222,000	16.6
One mile or less	936,000	70.0
More than one mile	180,000	13.4
Total	1,338,000	100.0

Tables 67 and 68 give the hours waited for help in 1973 and 1976. Interestingly, in the great majority of rescue situations (85.9% in 1973 and 80.7% in 1976) help arrived in one hour or less. In the 1976 survey interviewees were asked the number of hours and minutes until help arrived since the 1973 survey had revealed quick response times. Over half of all boaters having a boating problem received assistance (sought or unsought) within 15 minutes. It took less than 5 minutes for help to arrive in 34.4% of the cases. Almost instantaneous aid (0-1 minutes) was offered in 15.3% of the mishaps.

Tables 69 and 70 present the breakdowns on who provided assistance. These tables point out an increase in the number of rescue situations where assistance was provided. For 1973, assistance was rendered in 61.3% of the cases. By 1976, help was received in 69.6% of all situations. Comparability of who provided aid can not be done between the two years. This is so because in 1976 people could give multiple responses. While assistance was provided in 931,000 cases, 1,005,000 assisting parties were recorded. The results show that in 1976 another boater was on hand assisting in 71.1% of the cases. This is almost five times greater than the second highest assisting party, the U.S. Coast Guard, 14.7%. The Coast Guard combined with the Coast Guard Auxiliary provided assistance in about 21% of the cases in each survey year.

1973

TABLE 67: HOURS WAITED FOR HELP 1/

<u>Hours 2/</u>	<u>Number</u>	<u>Percent of Total Assisted</u>
0	107,000	22.5
1	303,000	63.4
2	39,000	8.1
3	24,000	5.0
4 or more	5,000	1.0
Total	478,000	100.0

1/ Asked only of those people who were assisted by another party.

2/ Could only respond in hours, not hours and minutes.

1976

TABLE 68: TIME WAITED FOR HELP 1/

<u>Time 2/</u>	<u>Number</u>	<u>Percent of Total Assisted</u>
0-1 minutes	204,000	15.3
2-5 minutes	256,000	19.1
6-15 minutes	253,000	18.9
16-30 minutes	197,000	14.7
31-60 minutes	170,000	12.7
Over 1 hour but not over 3 hours	132,000	9.9
Over 3 hours	36,000	2.7
No help required	90,000	6.7
Total	1,338,000	100.0

1/ Asked of all respondents with a positive rescue situation response (even those who were not assisted or took care of the situation themselves.)

2/ Respondents gave answers in hours and minutes.

1973

TABLE 69: ASSISTANCE PROVIDED

MOST SERIOUS SITUATION

<u>Assisting Party</u>	<u>Number</u>	<u>Percent of Total</u>	<u>Number 1/</u>	<u>Percent of Cases in Which Assistance Was Provided</u>
Assistance Was Provided:	478,000	61.3		
Coast Guard			78,000	16.3
Coast Guard Auxiliary			24,000	5.0
Another Boater			317,000	66.4
State or Local Official			24,000	5.0
Other			35,000	7.3
Assistance Was Not Provided:	302,000	38.7		
Total	780,000	100.0		

1/ Only one response permitted.

1976

TABLE 70: ASSISTANCE PROVIDED

MOST SERIOUS SITUATION

<u>Assisting Party</u>	<u>Number</u>	<u>Percent of Total</u>	<u>Number 1/</u>	<u>Percent of Cases in Which Assistance was Provided</u>
Assistance Was Provided:	931,000	69.6		
Coast Guard			137,000	14.7
Coast Guard Auxiliary			55,000	5.9
Another Boater			662,000	71.1
State or Local Officials			36,000	3.9
Other			115,000	12.4
Assistance Was Not Provided:				
'Took care of it myself'	152,000	11.4		
'No one'	255,000	19.0		
Total	1,338,000	100.0		

1/ May have more than one party assisting responses.

## G. Boating Safety Education.

In order to measure the extent of boating safety education efforts, respondents were asked if the primary operator in their household had ever taken a boating safety course. Nationally, in 1973, 26.5% of the primary operators had taken a boating safety course during or before 1973. In 1976, 31.3% of the primary operators had taken a boating safety course during or before 1976. Table 71 shows results from the 1976 survey of how many people took classes during 1976 or prior to 1976. It shows that not many people have taken more than one boating safety course. A high percentage of all boating households took a class in 1976, 5.4%. This is seen when this figure is compared to the 27.5% of all boating households having had a class prior to 1976.

Tables 72 and 73 present a list of sponsors of boating safety courses taken by the primary operators during or before 1973 and during or before 1976. These tables are not strictly comparable since in 1973 information was sought only on the last boating safety course taken while the 1976 survey sought information on all boating safety courses taken. For 1976, the Coast Guard Auxiliary (20.1%), the U.S. Power Squadrons (13.7%) and the scouting organizations (5.8%) led in conducting boating safety classes.

Another source of boating safety education is through the media. The Nationwide Boating Survey reveals that the largest proportion of all boating households (78.0% in 1973 and 78.2% in 1976) saw or heard boating safety information on television. A large percentage of the total boating households noticed safety information in magazines (57.6% in 1973 and 64.5% in 1976), newspapers (55.3% in 1973 and 51.7% in 1976), and posters and pamphlets (54.3% in 1973 and 52.6% in 1976).

Tables 74 and 75 show that about the same percent of boating households heard boating safety messages in 1976 as in 1973, over 93% in both years. There is a slight difference in the number of media from which boaters received information. The average was 3.42 different media in 1973. For the 1976 boating year, people saw or heard about boating safety from an average of 3.66 media.

1976

TABLE 71: BOATING SAFETY COURSES TAKEN BY PRIMARY OPERATORS

<u>Action Taken</u>	<u>Number</u>	<u>Percent of Total Households</u>
Took a Boating Course in 1976	811,000	5.4
Total Classes Taken in 1976	856,000	
Took a Boating Course in 1975 or Earlier	4,090,000	27.5
Total Classes Taken in 1975 or Earlier	4,315,000	

1973

TABLE 72: SPONSORS OF BOATING SAFETY COURSES TAKEN BY PRIMARY OPERATORS

<u>Courses</u>	<u>Number Courses 1973 or Before</u>	<u>Percent of Total</u>	<u>Number Courses 1973 or Before</u>	<u>Percent of Have Taken</u>
Have Taken A Course	2,817,000	26.5		
Local Boating Club			164,000	5.8
Commercial Boating Club			0	0.0
Boy Scout or Sea Scout			179,000	6.3
Coast Guard Auxiliary			820,000	29.1
College			125,000	4.4
Marine Dealer			28,000	1.0
U.S. Power Squadrons			397,000	14.1
Public School			84,000	3.0
Red Cross			132,000	4.7
State/Local Agency			143,000	5.1
Summer Camp			86,000	3.1
YMCA			16,000	0.6
Other			643,000	22.8
Never Taken A Course:	7,796,000	73.5		
Total	10,613,000			

1/ Only one response per primary operator; only information on the organization with which the primary operator took his/ her last course was sought.

1976

TABLE 73: SPONSORS OF BOATING SAFETY COURSES TAKEN BY PRIMARY OPERATORS

<u>Organization</u>	<u>Number Courses 1976</u>	<u>Percent 1/</u>	<u>Number Courses 1975 and Before</u>	<u>Percent 1/</u>
Local Boating Club	52,000	6.1	242,000	5.6
Commercial Boating Club	16,000	1.9	33,000	0.8
Boy Scouts or Sea Scouts	50,000	5.8	548,000	12.7
Coast Guard Auxiliary	172,000	20.1	766,000	17.7
College	39,000	4.6	106,000	2.5
Marine Dealer	8,000	0.9	76,000	1.8
U.S. Power Squadrons	117,000	13.7	462,000	10.7
Public School	57,000	6.7	147,000	3.4
Red Cross	17,000	2.0	178,000	4.1
State Agency (e.g. Marine Police, Marine Fish/Game)	42,000	4.9	134,000	3.1
Summer Camp	56,000	6.5	197,000	4.6
YMCA	15,000	1.7	122,000	2.8
Other	215,000	25.1	1,304,000	30.2
<b>Total</b>	<b>856,000</b>	<b>100.0</b>	<b>4,315,000</b>	<b>100.0</b>

1/ Percent of total.

1973

TABLE 74: DISSEMINATION OF BOATING SAFETY INFORMATION

<u>HOUSEHOLD RESPONSES</u>				
<u>Medium</u>	<u>Number 1/</u>	<u>Percent of Total</u>	<u>Number 2/</u>	<u>Percent of Number Who Saw or Heard Something</u>
Saw or heard something about boating safety:	9,950	93.8		
on television			8,280	83.2
on the radio			4,092	41.1
in newspapers			5,872	59.0
in magazines			6,112	61.4
on posters or pamphlets			5,766	57.9
through marinas			3,386	34.0
through marine dealers			2,759	27.7
Did not see or hear anything about boating safety:	663	6.2		
Total	10,613	100.0		

1/ Entries in thousands.

2/ Multiple responses possible; entries in thousands.

1976

TABLE 75: DISSEMINATION OF BOATING SAFETY INFORMATION

<u>HOUSEHOLD RESPONSES</u>				
<u>Medium</u>	<u>Number 1/</u>	<u>Percent of Total Households</u>	<u>Number 2/</u>	<u>Percent of Number Who Saw or Heard Something 2/</u>
Saw or heard something about boating safety:	13,894	93.3		
on television			11,641	83.8
on the radio			6,757	48.6
in newspapers			7,699	55.4
in magazines			9,595	69.1
on posters or pamphlets			7,842	56.4
through marinas			5,926	42.6
through marine dealers			5,081	36.6
Did not see or hear anything about boating safety:	1,001	6.7		
Total	14,895	100.0		

1/ Entries in thousands.

2/ Multiple responses possible; entries in thousands.

#### H. Demographic Information on Primary Operators.

Table 76 details how many of the primary operators over 16 years old are in the labor force. Those that are in the labor force are the employed and unemployed breakdowns. These two categories total 79.5% of all primary operators, 16 or older. Census data (Reference 4) reveals that only 63.7% of the total population over 16 years old is in the labor force.

Of those that are not in the labor force, 88.8% are either full-time students or retired. There are not very many primary operators that are houseworkers (248,000) or permanently disabled (92,000). These two types fall way below their percent share of the total U.S. population.

The next table, Table 77, shows the job or occupation of the employed people in Table 76. The people that indicated they were in the Armed Forces or could not be placed by the interviewer in one of these categories are not included so that the results can be compared with Census data (Reference 4). The results point out that 52.8% of all primary operators are white-collar workers, 36.2% are blue-collar workers, 4.6% are farm workers and 6.4% are service workers. The respective percents for the total employed labor force are 49.8, 33.0, 3.4 and 13.8. Thus the percent shares of the primary operators are slightly higher in every category except for service workers. Some of the different jobs that fall in each of the listings in this table are presented in Appendix H.

While it can be seen from the table that the overall job groupings (white-collar, etc.) are pretty much the same for primary operators and total U.S. population, within each overall grouping there are big differences. For instance, within white-collar workers, it can be seen that 43.5% of all primary operators over 16 are professional or technical, managers or administrators. Only 25.6% of the total U.S. employed population over 16 falls here. On the opposite side of the coin, a mere 2.5% of the primary operators are clerical or kindred workers. Census data portrays 17.8% of the population employed to be in this category.

TABLE 76: LABOR FORCE PARTICIPATION OF PRIMARY OPERATORS OVER 16 YEARS OLD

<u>Employment Status</u>	<u>Primary Operators</u>		<u>Percent Census Data 2/</u>
	<u>Number 1/</u>	<u>Percent of Total</u>	
Employed 3/	11,162,000	77.6	59.0
Unemployed	270,000	1.9	4.7
Student, Full Time	1,599,000	11.1	5.3
Houseworker	248,000	1.7	22.3
Disabled (permanently)	92,000	0.6	3.6
Retired	1,025,000	7.1	5.1
Total Asked	14,396,000	100.0	100.0

- 1/ Includes only those primary operators over 16 years old.  
 2/ Percent of U.S. population over 16 years old falling in each of these categories (Reference 4).  
 3/ See Table 77 for job occupations.

1976

TABLE 77: JOB OR OCCUPATION OF EMPLOYED PRIMARY OPERATORS OVER 16 YEARS OLD

<u>Job or Occupation</u>	<u>Number 1/</u>	<u>Percent of Total</u>	<u>Census Data 2/</u>
White-Collar Workers	5,400,000	52.8	49.8
Professional, Technical	2,656,000	26.0	15.1
Manager or Administrator (except farm)	1,791,000	17.5	10.5
Sales Worker	701,000	6.8	6.4
Clerical or Kindred Worker	252,000	2.5	17.8
Blue-Collar Workers	3,701,000	36.2	33.0
Craftsman or Kindred Worker	1,708,000	16.7	12.9
Operator (except transport)	634,000	6.2	11.4
Operator of Transport Equipment	528,000	5.2	3.8
Laborer (except farm)	831,000	8.1	4.9
Farm Workers	474,000	4.6	3.4
Farmer or Farm Manager	292,000	2.8	1.9
Farm Laborer or Foreman	182,000	1.8	1.5
Service Worker	655,000	6.4	13.8
Total <u>3/</u>	10,230,000	100.0	100.0

1/ Includes only those primary operators over 16 years old who are employed.

2/ Percent of U.S. population over 16 years old falling in these categories (Reference 4).

3/ Does not include Armed Services - 197,000 and 'Other' - 735,000; this was done for comparison purposes.

The next table, Table 78, gives education data for the primary operators who are 25 or older and similar Census comparisons (Reference 4). For these primary operators who did not finish 8th grade, their share of the total primary operator responses is only 2.3%. The percent of the entire U.S. population having completed less than 8th grade is 11.6%. Likewise, 3.9% of the operators interviewed completed the 8th grade; 10.4% of the operators had some high school education and 31.3% graduated from high school. The Census data indicates that 10.3% of the population completed 8th grade, 15.6% had some high school education and 36.2% graduated from high school.

More than 50% of the primary operators have more education beyond high school. Only 26.3% of the total U.S. population has some higher education. From these results it can be seen that boaters do not fit the U.S. population education profile. They have achieved a higher educational level.

TABLE 78: HIGHEST GRADE OR YEAR OF SCHOOL COMPLETED  
BY PRIMARY OPERATORS OVER 25 YEARS OLD

<u>Grade or Year</u>	<u>Primary Operators</u>		<u>Percent Census Data 2/</u>
	<u>Number 1/</u>	<u>Percent of Total</u>	
Less than 8th grade	251,000	2.3	11.6
Completed 8th grade	436,000	3.9	10.3
Some High School	1,165,000	10.4	15.6
High School Graduate	3,492,000	31.3	36.2
Some Post-High School; no College Degree	2,643,000	23.7	12.4
College Graduate or College Graduate With Graduate Work	3,165,000	28.4	13.9
Total	11,152,000	100.0	100.0

1/ Includes only those primary operators who gave their age and were over 25 years old.

2/ Percent of U.S. population over 25 years having completed these categories (Reference 4).

I. Participation in Other Recreational Activities.

Tables 79 and 80 give breakdowns on the camping, recreational fishing, hunting, athletic sport and 'other' recreational activities of the operator households. The 1976 survey shows that 98.5% of all boat operator households were active in other recreational activities. Table 79 reveals that boating households were very active in all included recreational categories. They all had 50% or higher participation rates. Fishing had the highest number of households participating with 12,970,000 of the 14,895,000 boat operating households having at least one recreational fisherman.

Those active in all five fields totaled 3,502,000 or 23.8% of all participating households. Only 8.2% of the households active in these recreational activities were participating in only one of the breakdowns.

TABLE 79: KINDS OF RECREATION OTHER THAN BOATING

Activities <u>1/</u>	Households		Number <u>2/</u>	Percent of Participants
	Number	Percent		
Did Participate in Other Recreational Activities	14,679	98.5		
Camping			10,131	69.0
Recreational Fishing			12,970	88.4
Hunting			7,341	50.0
Athletic Sports			10,483	71.4
Other Outdoor Recreation			9,976	68.0
Did Not Participate in Other Recreational Activities	216	1.5		
Total	14,895	100.0		

1/ Entries in thousands.

2/ One or more responses possible per household.

1976

TABLE 80: PARTICIPATION IN OTHER RECREATIONAL ACTIVITIES <sup>1/</sup>

<u>Activity</u>	<u>Number of Households</u>	<u>Percent of Total Participating</u>
Camping Only	129	0.9
Recreational Fishing Only	772	5.3
Hunting Only	16	0.1
Athletic Sports Only	142	1.0
Other Outdoor Recreation Only	135	0.9
Combination of 2 Activities	2,334	15.9
Combination of 3 Activities	3,073	20.9
Combination of 4 Activities	4,576	31.2
All 5 Activities	3,502	23.8
Total Households Participating	14,679	100.0

<sup>1/</sup> Entries in thousands.

## J. Personal Flotation Devices.

A series of questions were asked in the 1976 Nationwide Boating Survey concerning Personal Flotation Devices. There is great national concern on the number of drownings occurring in boating accidents. A personal flotation device, when worn, could mean the difference between life and death in many of these situations.

Table 81 gives the results of a question asking for an example of a personal flotation device (PFD). This question was asked only of those who did not know that PFD stands for personal flotation device. This table makes it evident that while most people were unable to identify the initials, PFD, they could give an example of a PFD.

1976

TABLE 81: "CAN YOU GIVE AN EXAMPLE OF A PERSONAL FLOTATION DEVICE?"

<u>Response</u>	<u>Number</u>	<u>Percent</u>
Life Preserver	2,248,000	16.0
Life Jacket	7,428,000	52.9
Water Safety Buoyant Device	92,000	0.7
Buoyant Cushion	1,012,000	7.2
Ring Life Buoy	168,000	1.2
Buoyant Vest	734,000	5.2
Other	1,544,000	11.0
Don't Know	816,000	5.8
Total Asked	14,042,000 <u>1/</u>	100.0

1/ Asked only of those who did not give correct response to Survey Question 83.

All operators were asked the question presented in Table 82. It is felt that the always wear category is inflated. Observational studies done in Coast Guard research projects have come up with much lower wear rates. For instance, 1.5% of adult males, 3.2% of adult females, 6.0% of teenage males, 11.7% of teenage females, 38.3% of male children and 34.5% of female children always wore their PFDs in a recent study (Reference 12).

If inconsistent in this regard, the question at least shows that adult females are more likely to always wear their PFDs than are adult males and children more likely than female adults. The "Not Applicable" entry means that in that boating household no people of that breakdown accompanied the primary operator; e.g., a household having only an adult male operator who never takes anyone along on his outings would have answered "Not Applicable" to Adult Female and Children wear rates.

1976

TABLE 82: "HOW OFTEN DO THE FOLLOWING CATEGORIES OF PASSENGERS, INCLUDING YOURSELF, WEAR THEIR PFDs WHEN THE BOAT IS UNDERWAY?"

Frequency of wear	Adult				Children (16 or under)	
	Male		Female		Number of Households	Percent
	Number of Households	Percent	Number of Households	Percent		
Always	4,603,000	30.9	5,927,000	39.8	9,147,000	61.2
Generally	2,583,000	17.4	2,234,000	15.0	1,002,000	6.8
Seldom	4,097,000	27.5	2,973,000	19.9	677,000	4.6
Never	3,517,000	23.6	2,620,000	17.6	652,000	4.4
Not Applicable <u>1/</u>	95,000	0.6	1,141,000	7.7	3,417,000	23.0
Total Asked	14,895,000	100.0	14,895,000	100.0	14,895,000	100.0

1/ Not applicable means that in those households that particular category of passenger is never carried. Also, it may include some of the households which never carry a PFD.

In the previous question if there were responses other than always or not applicable, as was the case in 10,386,000 operator households, the respondents were asked where they stowed their PFDs while underway. Note that the PFD was most likely stored under the seat or on the bottom of the boat. (37.7% of the operator households responded.) Table 83 also gives the number of people who sit on their seat cushions while underway. (19.6% of the responses were in this category.)

1976

TABLE 83: LOCATION OF PFDs WHILE UNDERWAY 1/

<u>PFD Location</u>	<u>Yes 2/</u>	<u>Percent of Total Asked</u>
PFD Sat Upon:		
Designed as a seat cushion	2,039	19.6
Not designed as a seat cushion	592	5.7
PFD In A Storage Box	1,443	13.9
PFD Under Seat, On Bottom	3,917	37.7
PFD Stored In Other Places	2,934	28.2
PFD Not Carried	245	2.4
Total Responses	11,170	107.5
Total Asked	10,386	100.0

1/ Entries in thousands.

2/ Multiple responses possible.

Each operator household was asked the question found in Table 84. Swimming ability, rough water conditions, and personal comfort appear to be the most important factors influencing a person's decision to wear a PFD. Unfortunately, many good swimmers drown and many drownings occur in calm water. This has been determined through analysis of the Boating Accident Reports filed with the Coast Guard.

1976

TABLE 84: "WHAT FACTORS DO YOU FEEL INFLUENCE A PERSON'S DECISION TO WEAR OR NOT WEAR A PFD?"

<u>Response</u>	<u>Number 1/</u>	<u>Percent 2/</u>
Swimming ability	5,152,000	34.6
Night boating	235,000	1.6
Rough water conditions	4,267,000	28.6
Boating in dangerous area	1,259,000	8.5
Personal comfort	2,461,000	16.5
Type of boating activity	1,371,000	9.2
Other	6,820,000	45.8
Total asked	14,895,000	100.0

1/ Respondents could give more than one answer.

2/ Percent of total asked.

#### K. Preparation For a Boating Outing.

In order to get some idea of how well operators prepared for a boating outing, questions concerning filing of a float plan and receiving weather forecasts before getting underway were asked. Table 85 shows only 10.3% of all respondents stating that the primary operator normally filed a float plan. If a float Plan was not filed at least 86.6% of these people made their trip intentions known to a family member or reliable associate. Family members and freinds or neighbors were the most likely to be the recipients of float plans.

Interestingly, Table 86 reveals 79.1% of the operator households did get weather forecasts before their boating outings. The bulk of those people (71.7%) who received forecasts received their information via commercial radio or television. Some of these people also received forecasts from other sources as well.

1976

TABLE 85: FILING OF FLOAT PLAN BEFORE EACH BOATING TRIP 1/

<u>Action</u>	<u>Percent</u>		<u>Percent</u>	
	<u>Number</u>	<u>of Total</u>	<u>Number</u>	<u>2/</u>
Plan is filed:	1,533	10.3		
With family member			916	59.8
With friend or neighbor			329	21.5
With yacht club			35	2.3
With local organization			158	10.3
With other			267	17.4
Plan is not filed:	13,362	89.7		
Intentions are known <u>3/</u>			11,577	86.6
Intentions are not known			1,785	13.4
Total	14,895	100.0		

1/ Entries in thousands.

2/ Percent of that particular action. The percents in the 'Plan is filed" subsection add up to more than 100 percent because more than one response was accepted.

3/ This answer indicates that a family member or reliable associate normally knew what the respondents' intentions were.

1976

TABLE 86: WEATHER FORECASTS BEFORE GETTING UNDERWAY 1/

Boat Operating Households

<u>Source</u>	<u>Percent</u>		<u>Percent</u>	
	<u>Number</u>	<u>of Total</u>	<u>Number</u> <u>2/</u>	<u>Percent</u> <u>3/</u>
Do get weather forecasts	11,787	79.1		
By commercial radio and television			8,446	71.7
By National Weather Service Radio			1,569	13.3
By Coast Guard Marine Information Broadcast			699	5.9
By tower or visual signals			186	1.6
By other sources			2,638	22.4
Do not get weather forecasts:	3,108	20.9		
Total	14,895	100.0		

1/ Entries in thousands.

2/ Could get weather forecasts from more than one source.

3/ Percent of those who do get weather forecasts.

#### L. Further Boating Safety Education.

In 1976, more detailed education questions were asked. Table 87 gives the results of action the public took as a result of boating safety messages they received from media sources. Most boaters, 61.6%, took no action at all, while 13.8% obtained boating safety equipment only, 8.0% sought additional information only and 7.0% did both. All other reactions were very minimal.

A question was asked concerning the number of hours primary operators were willing to spend in a boating course. Table 88 presents the results. Note that of those primary operators who had participated in a previous boating class 47.8% would be willing to spend 6 or more hours in another class while only 31.0% of those who had not participated in a previous class desired to do so. Of those who have never had a boating safety class, 50.2% are not willing to take a course. This leaves 5,173,000 people willing to take a boating safety course who have never had this material. Only 4,501,000 boaters have previously participated in a class. Of these boaters, 2,795,000 would like another class. Thus, there are 7,968,000 primary operators or 53.5% of the total primary operators who are willing to spend some time or some more time learning about boating safety.

Another question concerned the most convenient time for a course in boating safety. Table 89 indicates no significant difference in the responses between those who have had a prior course and are interested in another and those who never had a course. Logically enough, 59.9% would prefer weeknights and 21.0% would like the course held on the weekend.

Table 90 presents the results of a question on boating safety course content. These data were requested of those responding to the interview not necessarily the primary operators. It was felt that the interviewees would not be completely knowledgeable about subjects the primary operators would want to study. The results are distributed between those households where the primary operator had taken a course and those where the operator had not. (Only those desiring a course in the first place were asked this question.)

Most of the percentages are the same in each breakdown. Of the nine categories, the average respondent usually picked about six subjects to include in a course. This average is high since many people picked every subject.

1976

TABLE 87: PUBLIC REACTION TO BOATING SAFETY MESSAGE

<u>Action Taken</u>	<u>Number</u>	<u>Percent</u>
Sought Additinal Information	1,116,000	8.0
Took A Boating Course	87,000	0.6
Subscribed To A Boating Magazine	98,000	0.7
Obtained Boating Safety Equipment	1,918,000	13.8
Sought Information And Took A Course	164,000	1.2
Sought Information And Subscribed To A Magazine	50,000	0.4
Sought Information And Bought Equipment	971,000	7.0
Subscribed To A Magazine And Took A Course	13,000	0.1
Subscribed To A Magazine And Bought Equipment	78,000	0.6
Took A Course And Bought Equipment	81,000	0.6
Sought Information, Subscribed To A Magazine And Took A Course	28,000	0.2
Sought Information, Subscribed To A Magazine And Bought Equipment	246,000	1.8
Sought Information, Took A Course And Bought Equipment	293,000	2.1
Subscribed To A Magazine, Took A Course And Bought Equipment	46,000	0.3
All 4 Actions	140,000	1.0
No Action Taken	8,565,000	61.6
Total <u>1/</u>	13,894,000	100.0

1/ Total of all those who saw or heard boating safety information in 1976.

1976

TABLE 88: HOURS WILLING TO SPEND IN A BOATING COURSE  
BY HAVE OR HAVE NOT HAD A PRIOR BOATING CLASS 1/

<u>Hours</u>	<u>Have had a Previous Boating Class</u>	<u>Percent of Total</u>	<u>Haven't had a Previous Boating Class</u>	<u>Percent of Total</u>
0 hours	1,706	37.9	5,221	50.2
1-5 hours	646	14.3	1,949	18.8
6-10 hours	792	17.6	1,632	15.7
11-20 hours	723	16.1	942	9.1
Over 20 hours	634	14.1	650	6.2
Total	4,501	100.0	10,394	100.0

1/ Entries in thousands.

1976

TABLE 89: MOST CONVENIENT TIME FOR BOATING COURSE

<u>Time of Week</u>	<u>Have had a Previous Boating Class <u>1/</u></u>	<u>Percent of Total</u>	<u>Have not had a Previous Boating Class <u>2/</u></u>	<u>Percent of Total</u>
Weekdays	266	9.5	560	10.8
Weeknights	1,752	62.7	3,020	58.4
Weekends	595	23.3	1,081	20.9
Anytime During The Week	120	4.3	271	5.2
Not Interested	62	2.2	241	4.7
Total	2,795	100.0	5,173	100.0

1/ Asked only of those interested in another course.

2/ Asked only of those interested in a course.

1976

TABLE 90: INTEREST IN BOATING COURSE CONTENT <sup>1/</sup>

<u>Subject Matter</u>	<u>Number 2/</u>	<u>Percent of Total Asked</u>	<u>Number 3/</u>	<u>Percent of Total Asked</u>
Boat Handling	2,176	77.9	4,170	80.6
Engine Maintenance	1,850	66.2	3,307	63.9
Boat Maintenance	2,029	72.6	3,725	72.0
Rope Work	1,554	55.6	2,686	51.9
Navigation	2,301	82.3	3,737	72.2
Radio Procedure	1,753	62.7	2,947	57.0
Weather	2,115	75.7	3,563	68.9
Legal Requirements	1,977	70.7	3,898	75.3
Piloting	1,820	65.1	3,257	63.0
Total Asked	2,795	100.0	5,173	100.0

<sup>1/</sup> Entries in thousands.

<sup>2/</sup> Number of positive responses for each respondent where the primary operator had participated in a prior boating safety course and was interested in an additional course. Multiple responses given.

<sup>3/</sup> Number of positive responses for each respondent where the primary operator had not participated in a prior boating safety course and was interested in taking one. Multiple responses given.

M. Hypothermia.

A question concerning survival time in cold water (50° F) was asked of the primary operator in the 1976 Nationwide Boating Survey. The Operator was asked how long he could survive, wearing a PFD, in 50° F water. The responses to the question are listed in Table 91:

1976

TABLE 91: ESTIMATED SURVIVAL TIME IN COLD WATER (50° F.)

<u>Estimated Survival Time</u>	<u>Number</u>	<u>Percent</u>
Less than one hour	4,117,000	27.6
One to less than 2 hours	2,627,000	17.6
Two to 4 hours <u>1/</u>	3,255,000	21.9
Over 4 and to 6 hours	1,175,000	7.9
Over 6 and to 10 hours	1,200,000	8.1
Over 10 and to 24 hours	1,779,000	11.9
More than 24 hours	742,000	5.0
Total	14,895,000	100.0

1/ Correct response.

It is interesting to observe that only 21.9% of the respondents gave the correct answer of two to four hours. Many (45.2%) thought they would survive less than two hours. Almost one-third, 32.9%, predicted they could survive longer than four hours. Research has indicated that conserving your body heat will enable one to survive longer in the water than two hours but that help must come before four hours. Predicted survival times are given below:

<u>With Flotation</u>	<u>Predicted Survival Time (Hours)</u>
Swimming	2.0
Holding Still	2.7
Huddle With Others	4.0
Heat Escape Lessening Posture	4.0

This information comes from "Man in Cold Water" with permission of Dr. Martin Collis, University of Victoria, British Columbia, Canada (Reference 11). A pamphlet containing this information and more "Hypothermia and Cold Water Survival" is available through the U.S. Coast Guard (G-BA/TP42) Washington, D.C. 20590.

N. Beverages Carried on a Normal Boating Outing.

Response to the question on beverages carried may be quite biased. Table 92 gives the results of these responses. Of the operator households, 33.7% indicated that they carried beer on a typical outing while 6.4% of the operator households carried other alcoholic beverages. The interviewers felt that many of the interviewees 'hedged' somewhat in answering this question.

1976

TABLE 92: BEVERAGES CARRIED ON A NORMAL BOATING OUTING

<u>Beverage Group</u>	<u>Households</u>	
	<u>Number</u>	<u>Percent of Total</u>
Non-alcoholic Beverages: (Water, coffee, tea, milk, soft drinks, etc.)		
Carried	12,011,000	80.6
Not carried	2,884,000	19.4
Beer:		
Carried	5,023,000	33.7
Not carried	9,872,000	66.3
Other Alcoholic beverages:		
Carried	950,000	6.4
Not carried	13,945,000	93.6
Total responses for each group	14,895,000	100.0

**APPENDIX A:**  
**THE 1973 NATIONWIDE BOATING SURVEY QUESTIONNAIRE**

Chilton Research Services  
Radnor, Pennsylvania

OMB # 04-S-74012  
Exp. Date-February, 1974

Study #8625  
April, 1974

NATIONWIDE BOATING STUDY

Int. # \_\_\_\_\_  
(1-4)

READ INTRODUCTION IF NECESSARY

Good \_\_\_\_\_. I'm \_\_\_\_\_ calling long distance for the U.S. Coast Guard. We are conducting a nationwide study concerned with people's boating activities in 1973. May I speak to the person in your household who did the most recreational boating in 1973? (IF THIS PERSON NOT AVAILABLE, SPEAK TO SOMEONE KNOWLEDGEABLE ABOUT HOUSEHOLD'S BOATING ACTIVITIES)

Time Int. Began \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

Time Int. Ended \_\_\_\_\_ A.M. \_\_\_\_\_ P.M.

3. How many boats were owned by members of your household in 1973?

(# of boats) (5-6)

(IF "NONE", SKIP TO Q. 67)

(ALSO RECORD ON FLAP)

4. What type of boat is your primary boat? That is, the boat you use most often?

(IF "MOTORBOAT" OR "SPEEDBOAT," ASK IF IT IS INBOARD OR OUTBOARD MOTOR) (7, 8)

Canoe		01
Houseboat		02
Inboard	Gas, Single engine	03
	Gas, Twin engine	04
	Diesel, Single engine	05
	Diesel, Twin engine	06
Inboard/Outboard	Single engine	07
	Twin engine	08
Inflatable		09
Jonboat		10
Kayak		11
Outboard	Single engine	12
	Twin engine	13
Rowboat		14
Sailboat	Gas auxiliary	15
	Diesel auxiliary	16
	No auxiliary	17
Other powerboat		18
Other		19
Don't Know		20

5. Is this boat home made?

9-

Yes	1
No	2
Don't know	3

6. What is the total horsepower of this boat?

(Horsepower) (10-13)

(IF TWIN ENGINE, COMBINED HORSEPOWER)  
(ALSO RECORD ON FLAP)

7. And approximately what is the length, in feet, of this boat?

(length) (14-16)

8. What materials is your boat hull made of?

(CIRCLE AS MANY AS APPLY)

Aluminum	17-	1
Canvas	72-	2
Ferrocement	18-	3
Fiber Glass	19-	4
Steel	20-	5
Wood	21-	6
Other	22-	7
Don't know	17-	8

<p>9. Does this boat weigh less than 200 pounds, not counting the engine? 23-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Yes</td><td>1</td></tr> <tr><td>No</td><td>2</td></tr> <tr><td>Don't Know</td><td>3</td></tr> </table>	Yes	1	No	2	Don't Know	3	<p>15. During the 1973 boating season, about how many times a month was your boat used, on the average?</p> <p style="text-align: center;">_____ (33-34) (# of times)</p>																																																
Yes	1																																																						
No	2																																																						
Don't Know	3																																																						
<p>10. Is this boat numbered either with your State or with the U.S. Coast Guard? 24-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Yes</td><td>1</td></tr> <tr><td>No</td><td>2</td></tr> <tr><td>Don't Know</td><td>3</td></tr> </table> <p style="text-align: center;">SKIP TO Q. 12</p>	Yes	1	No	2	Don't Know	3	<p>16. Overall, about what percent of the time was your boat operated during the hours of darkness in 1973?</p> <p style="text-align: center;">_____ (35-37) (% darkness)</p>																																																
Yes	1																																																						
No	2																																																						
Don't Know	3																																																						
<p>11. (IF "YES") In what State is it numbered?</p> <p style="text-align: center;">_____ (State) (25-26)</p>	<p>17. Now, thinking of a typical outing in 1973; about how many hours was your boat used on a typical outing?</p> <p style="text-align: center;">_____ (38-39) (# of hours)</p>																																																						
<p>12. About how many years old is this boat? (# years) _____ (27-28)</p>	<p>18. On the average, about how many gallons of fuel were used for each outing in this boat in 1973?</p> <p style="text-align: center;">_____ (40-42) (# gallons)</p>																																																						
<p>13. In what month of 1973 was your boat first used? (RECORD IN COL. 13)</p>	<p>19. On the average, about how many persons including the operator and water-skiers, were carried aboard your boat on a normal outing in 1973?</p> <p style="text-align: center;">_____ (43-44) (# persons)</p>																																																						
<p>14. And in what month was it last used? (RECORD IN COL. 14)</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th></th> <th style="text-align: center;">(29-30) COL. 13</th> <th style="text-align: center;">(31-32) COL. 14</th> </tr> <tr> <th></th> <th style="text-align: center;">First Used</th> <th style="text-align: center;">Last Used</th> </tr> </thead> <tbody> <tr><td>January</td><td style="text-align: center;">01</td><td style="text-align: center;">01</td></tr> <tr><td>February</td><td style="text-align: center;">02</td><td style="text-align: center;">02</td></tr> <tr><td>March</td><td style="text-align: center;">03</td><td style="text-align: center;">03</td></tr> <tr><td>April</td><td style="text-align: center;">04</td><td style="text-align: center;">04</td></tr> <tr><td>May</td><td style="text-align: center;">05</td><td style="text-align: center;">05</td></tr> <tr><td>June</td><td style="text-align: center;">06</td><td style="text-align: center;">06</td></tr> <tr><td>July</td><td style="text-align: center;">07</td><td style="text-align: center;">07</td></tr> <tr><td>August</td><td style="text-align: center;">08</td><td style="text-align: center;">08</td></tr> <tr><td>September</td><td style="text-align: center;">09</td><td style="text-align: center;">09</td></tr> <tr><td>October</td><td style="text-align: center;">10</td><td style="text-align: center;">10</td></tr> <tr><td>November</td><td style="text-align: center;">11</td><td style="text-align: center;">11</td></tr> <tr><td>December</td><td style="text-align: center;">12</td><td style="text-align: center;">12</td></tr> <tr><td>Don't know</td><td style="text-align: center;">13</td><td style="text-align: center;">13</td></tr> <tr> <td style="text-align: center;">SKIP TO Q. 20</td> <td style="text-align: center;">Not used</td> <td style="background-color: #cccccc;"></td> </tr> </tbody> </table>		(29-30) COL. 13	(31-32) COL. 14		First Used	Last Used	January	01	01	February	02	02	March	03	03	April	04	04	May	05	05	June	06	06	July	07	07	August	08	08	September	09	09	October	10	10	November	11	11	December	12	12	Don't know	13	13	SKIP TO Q. 20	Not used		<p>20. Thinking of the boat itself, is this boat insured? 45-</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td>Yes</td><td>1</td></tr> <tr><td>No</td><td>2</td></tr> <tr><td>Don't know</td><td>3</td></tr> </table> <p style="text-align: center;">SKIP TO Q. 22</p>	Yes	1	No	2	Don't know	3
	(29-30) COL. 13	(31-32) COL. 14																																																					
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Yes	1																																																						
No	2																																																						
Don't know	3																																																						
<p>21. (IF "YES") Is it insured under a homeowner's policy? 46-</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td>Yes</td><td>1</td></tr> <tr><td>No</td><td>2</td></tr> <tr><td>Don't know</td><td>3</td></tr> </table>	Yes	1	No	2	Don't know	3																																																	
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No	2																																																						
Don't know	3																																																						

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<p>22. Please tell me which of the following safety equipment items you carry on your boat? Do you carry . . . (READ EACH ITEM ONE AT A TIME)?</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 10%;">Yes</th> <th style="width: 10%;">No</th> <th style="width: 10%;">Don't Know</th> </tr> </thead> <tbody> <tr> <td>Distress Signals (e.g. flares) 47-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>A First Aid Kit 48-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Spare engine parts 49-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Tools 50-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Anchor and line 51-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Charts 52-</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Compass 53-</td> <td>1</td> <td>2</td> <td>3</td> </tr> </tbody> </table>		Yes	No	Don't Know	Distress Signals (e.g. flares) 47-	1	2	3	A First Aid Kit 48-	1	2	3	Spare engine parts 49-	1	2	3	Tools 50-	1	2	3	Anchor and line 51-	1	2	3	Charts 52-	1	2	3	Compass 53-	1	2	3	<p>25. Which of the following waste disposal methods is used? (READ LIST) 56-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Direct discharge into water,</td> <td style="width: 20%;">1</td> </tr> <tr> <td>A portable holding tank, or</td> <td>2</td> </tr> <tr> <td>A permanent holding tank</td> <td>3</td> </tr> <tr> <td>Other</td> <td>4</td> </tr> <tr> <td>Don't Know/No answer</td> <td>5</td> </tr> </tbody> </table> <p style="text-align: center;">DO NOT READ</p>	Direct discharge into water,	1	A portable holding tank, or	2	A permanent holding tank	3	Other	4	Don't Know/No answer	5
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<p>23. Does your boat have a marine toilet system? 54-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 10%;">Yes</th> <th style="width: 10%;">No</th> <th style="width: 10%;">Don't Know</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>1</td> <td></td> <td></td> </tr> <tr> <td>No</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>Don't Know</td> <td></td> <td></td> <td>3</td> </tr> </tbody> </table> <p style="text-align: center;">SKIP TO Q. 26</p>		Yes	No	Don't Know	Yes	1			No		2		Don't Know			3	<p>26. Is there a marine waste pump-out facility available in your primary boating area? 57-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Yes</td> <td style="width: 20%;">1</td> </tr> <tr> <td>No</td> <td>2</td> </tr> <tr> <td>Don't Know</td> <td>3</td> </tr> </tbody> </table>	Yes	1	No	2	Don't Know	3																				
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<p>(IF "YES" ASK Q.'s 24 AND Q. 25)</p> <p>24. What waste treatment method, if any, is used? 55-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Maceration/Chlorination</td> <td style="width: 20%;">1</td> </tr> <tr> <td>Recirculating chemical</td> <td>2</td> </tr> <tr> <td>Incineration</td> <td>3</td> </tr> <tr> <td>Biological</td> <td>4</td> </tr> <tr> <td>Other</td> <td>5</td> </tr> <tr> <td>Don't Know/No answer</td> <td>6</td> </tr> <tr> <td>None</td> <td>7</td> </tr> </tbody> </table>	Maceration/Chlorination	1	Recirculating chemical	2	Incineration	3	Biological	4	Other	5	Don't Know/No answer	6	None	7	<p>27. Do you have a two-way radio aboard this boat? 58-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Yes</td> <td style="width: 20%;">1</td> </tr> <tr> <td>No</td> <td>2</td> </tr> <tr> <td>Don't Know</td> <td>3</td> </tr> </tbody> </table> <p style="text-align: center;">SKIP TO Q. 30</p> <p>(IF "YES" ASK Q.'s 28 &amp; 29)</p> <p>28. Can you reach the Marine Telephone Operator or the Coast Guard with your radio? 59-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Yes</td> <td style="width: 20%;">1</td> </tr> <tr> <td>No</td> <td>2</td> </tr> <tr> <td>Don't Know</td> <td>3</td> </tr> </tbody> </table> <p style="text-align: center;">SKIP TO Q. 30</p>	Yes	1	No	2	Don't Know	3	Yes	1	No	2	Don't Know	3																
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<p>29. If you want to call the Coast Guard with this radio, which of the following do you use? (READ LIST) 60-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Channel 51 which is 2182 Kilohertz</td> <td style="width: 20%;">1</td> </tr> <tr> <td>Channel 16 which is 156.8 Kilohertz</td> <td>2</td> </tr> <tr> <td>Or, both channel 51 and channel 16</td> <td>3</td> </tr> <tr> <td>Don't Know</td> <td>4</td> </tr> </tbody> </table>	Channel 51 which is 2182 Kilohertz	1	Channel 16 which is 156.8 Kilohertz	2	Or, both channel 51 and channel 16	3	Don't Know	4	<p>30. Does this boat have any electronic navigation equipment on board? 61-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 80%;">Yes</td> <td style="width: 20%;">1</td> </tr> <tr> <td>No</td> <td>2</td> </tr> <tr> <td>Don't Know</td> <td>3</td> </tr> </tbody> </table> <p style="text-align: center;">SKIP TO Q. 32</p>	Yes	1	No	2	Don't Know	3																												
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31. Does it have . . . (READ LIST ONE AT A TIME)

	Yes	No	Don't know
A Direction Finder (DF) 62-	1	2	3
Loran A Automatic 63-	1	2	3
Loran A Manual 64-	1	2	3
Loran C 65-	1	2	3
Loran A/C 66-	1	2	3
Omega 67-	1	2	3
Radar 68-	1	2	3

(IF ANSWER TO QUESTION 6 WAS "NONE", SKIP TO QUESTION 35 OR 67, WHICHEVER IS APPROPRIATE. OTHERWISE, CONTINUE.)

32. When was the last year this motorboat was awarded a Courtesy Motorboat Examination Decal by the Coast Guard Auxiliary?

	69-
CONTINUE	1974 1
SKIP TO INSTRUCTIONS BELOW	1973 2
SKIP TO Q. 34	Prior to 1973 3
	Never 4
SKIP TO INSTRUCTIONS BELOW	Don't know 5

33. When was the last time, before 1974, that this boat was awarded a Courtesy Motorboat Examination Decal?

	70-
SKIP TO INSTRUCTIONS BELOW	1973 1
CONTINUE	Prior to 1973 2
	Never 3
SKIP TO INSTRUCTIONS BELOW	Don't know 4

34. Why didn't you receive the decal in 1973?

	71-
Failed exam	1
Owner or operator refused or declined to be examined	2
Other	3
Don't Know	4

**INSTRUCTIONS:**

IF "ONE" BOAT ANSWERED IN Q. 3, SKIP TO Q. 67, OTHERWISE, CONTINUE.

<p>35. What type of boat is your secondary boat? That is, the boat you use next most often?</p> <p>(IF "MOTORBOAT" OR "SPEEDBOAT," ASK IF IT IS INBOARD OR OUTBOARD MOTOR)</p> <p style="text-align: right;">(7-8)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2">Canoe</td><td style="text-align: right;">01</td></tr> <tr><td colspan="2">Houseboat</td><td style="text-align: right;">02</td></tr> <tr><td rowspan="4" style="text-align: center; vertical-align: middle;">Inboard</td><td>Gas, Single engine</td><td style="text-align: right;">03</td></tr> <tr><td>Gas, Twin engine</td><td style="text-align: right;">04</td></tr> <tr><td>Diesel, Single engine</td><td style="text-align: right;">05</td></tr> <tr><td>Diesel, Twin engine</td><td style="text-align: right;">06</td></tr> <tr><td rowspan="2" style="text-align: center; vertical-align: middle;">Inboard/Outboard</td><td>Single engine</td><td style="text-align: right;">07</td></tr> <tr><td>Twin engine</td><td style="text-align: right;">08</td></tr> <tr><td colspan="2">Inflatable</td><td style="text-align: right;">09</td></tr> <tr><td colspan="2">Jonboat</td><td style="text-align: right;">10</td></tr> <tr><td colspan="2">Kayak</td><td style="text-align: right;">11</td></tr> <tr><td rowspan="2" style="text-align: center; vertical-align: middle;">Outboard</td><td>Single engine</td><td style="text-align: right;">12</td></tr> <tr><td>Twin engine</td><td style="text-align: right;">13</td></tr> <tr><td colspan="2">Rowboat</td><td style="text-align: right;">14</td></tr> <tr><td rowspan="3" style="text-align: center; vertical-align: middle;">Sailboat</td><td>Gas auxiliary</td><td style="text-align: right;">15</td></tr> <tr><td>Diesel auxiliary</td><td style="text-align: right;">16</td></tr> <tr><td>No auxiliary</td><td style="text-align: right;">17</td></tr> <tr><td colspan="2">Other powerboat</td><td style="text-align: right;">18</td></tr> <tr><td colspan="2">Other</td><td style="text-align: right;">19</td></tr> <tr><td colspan="2">Don't know</td><td style="text-align: right;">20</td></tr> </table>	Canoe		01	Houseboat		02	Inboard	Gas, Single engine	03	Gas, Twin engine	04	Diesel, Single engine	05	Diesel, Twin engine	06	Inboard/Outboard	Single engine	07	Twin engine	08	Inflatable		09	Jonboat		10	Kayak		11	Outboard	Single engine	12	Twin engine	13	Rowboat		14	Sailboat	Gas auxiliary	15	Diesel auxiliary	16	No auxiliary	17	Other powerboat		18	Other		19	Don't know		20	<p>36. Is this <u>boat</u> home made?</p> <p style="text-align: right;">9-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Yes</td><td style="text-align: right;">1</td></tr> <tr><td>No</td><td style="text-align: right;">2</td></tr> <tr><td>Don't know</td><td style="text-align: right;">3</td></tr> </table> <p>37. What is the total horsepower of this <u>boat</u>?</p> <p style="text-align: right;">(Horsepower) (10-13)</p> <p>(ALSO RECORD ON FLAP) (IF TWIN ENGINE, COMBINED HORSEPOWER)</p> <p>38. And approximately what is the length, in feet, of this <u>boat</u>?</p> <p style="text-align: right;">(Length) (14-16)</p> <p>39. What materials is your boat <u>hull</u> made of?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Aluminum</td><td style="text-align: right;">17-</td><td style="text-align: right;">1</td></tr> <tr><td>Canvas</td><td style="text-align: right;">72-</td><td style="text-align: right;">2</td></tr> <tr><td>Ferrocement</td><td style="text-align: right;">18-</td><td style="text-align: right;">3</td></tr> <tr><td>Fiber Glass</td><td style="text-align: right;">19-</td><td style="text-align: right;">4</td></tr> <tr><td>Steel</td><td style="text-align: right;">20-</td><td style="text-align: right;">5</td></tr> <tr><td>Wood</td><td style="text-align: right;">21-</td><td style="text-align: right;">6</td></tr> <tr><td>Other</td><td style="text-align: right;">22-</td><td style="text-align: right;">7</td></tr> <tr><td>Don't know</td><td style="text-align: right;">17-</td><td style="text-align: right;">8</td></tr> </table>	Yes	1	No	2	Don't know	3	Aluminum	17-	1	Canvas	72-	2	Ferrocement	18-	3	Fiber Glass	19-	4	Steel	20-	5	Wood	21-	6	Other	22-	7	Don't know	17-	8
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No	2																																																																																			
Don't know	3																																																																																			
Aluminum	17-	1																																																																																		
Canvas	72-	2																																																																																		
Ferrocement	18-	3																																																																																		
Fiber Glass	19-	4																																																																																		
Steel	20-	5																																																																																		
Wood	21-	6																																																																																		
Other	22-	7																																																																																		
Don't know	17-	8																																																																																		

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<p>40. Does this boat weigh less than 200 pounds, not counting the engine? 23-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Yes</td><td style="text-align: center;">1</td></tr> <tr><td>No</td><td style="text-align: center;">2</td></tr> <tr><td>Don't Know</td><td style="text-align: center;">3</td></tr> </table>	Yes	1	No	2	Don't Know	3	<p>46. During the 1973 boating season, about how many times a month was your boat used, on the average?</p> <p style="text-align: right;">_____ (# of times) (33-34)</p>																																									
Yes	1																																															
No	2																																															
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<p>41. Is this boat numbered either with your State or with the U.S. Coast Guard? 24-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Yes</td><td style="text-align: center;">1</td></tr> <tr><td>No</td><td style="text-align: center;">2</td></tr> <tr><td>Don't Know</td><td style="text-align: center;">3</td></tr> </table> <p style="margin-left: 20px;">SKIP TO Q. 43</p>	Yes	1	No	2	Don't Know	3	<p>47. Overall, about what percent of the time was your boat operated during the hours of darkness in 1973?</p> <p style="text-align: right;">_____ (% darkness) (35-37)</p>																																									
Yes	1																																															
No	2																																															
Don't Know	3																																															
<p>42. (IF "YES") In what State is it numbered?</p> <p style="text-align: right;">_____ (State) (25-26)</p>	<p>48. Now, thinking of a typical outing in 1973; about how many hours was your boat used on a typical outing?</p> <p style="text-align: right;">_____ (# of hours) (38-39)</p>																																															
<p>43. About how many years old is this boat? (# years) _____ (27-28)</p>	<p>49. On the average, about how many gallons of fuel were used for each outing in this boat in 1973?</p> <p style="text-align: right;">_____ (# gallons) (40-42)</p>																																															
<p>44. In what month of 1973 was your boat first used? (RECORD IN COL. 44)</p> <p>45. And in what month was it last used? (RECORD IN COL. 45)</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2"></th> <th style="text-align: center;">(29-30) COL. 44</th> <th style="text-align: center;">(31-32) COL. 45</th> </tr> <tr> <th style="text-align: center;">First Used</th> <th style="text-align: center;">Last Used</th> </tr> </thead> <tbody> <tr><td>January</td><td style="text-align: center;">01</td><td style="text-align: center;">01</td></tr> <tr><td>February</td><td style="text-align: center;">02</td><td style="text-align: center;">02</td></tr> <tr><td>March</td><td style="text-align: center;">03</td><td style="text-align: center;">03</td></tr> <tr><td>April</td><td style="text-align: center;">04</td><td style="text-align: center;">04</td></tr> <tr><td>May</td><td style="text-align: center;">05</td><td style="text-align: center;">05</td></tr> <tr><td>June</td><td style="text-align: center;">06</td><td style="text-align: center;">06</td></tr> <tr><td>July</td><td style="text-align: center;">07</td><td style="text-align: center;">07</td></tr> <tr><td>August</td><td style="text-align: center;">08</td><td style="text-align: center;">08</td></tr> <tr><td>September</td><td style="text-align: center;">09</td><td style="text-align: center;">09</td></tr> <tr><td>October</td><td style="text-align: center;">10</td><td style="text-align: center;">10</td></tr> <tr><td>November</td><td style="text-align: center;">11</td><td style="text-align: center;">11</td></tr> <tr><td>December</td><td style="text-align: center;">12</td><td style="text-align: center;">12</td></tr> <tr><td>Don't know</td><td style="text-align: center;">13</td><td style="text-align: center;">13</td></tr> <tr> <td>SKIP TO Q. 51</td> <td style="text-align: center;">Not used</td> <td style="text-align: center;">14</td> </tr> </tbody> </table>		(29-30) COL. 44	(31-32) COL. 45	First Used	Last Used	January	01	01	February	02	02	March	03	03	April	04	04	May	05	05	June	06	06	July	07	07	August	08	08	September	09	09	October	10	10	November	11	11	December	12	12	Don't know	13	13	SKIP TO Q. 51	Not used	14	<p>50. On the average, about how many persons including the operator and water-skiers, were carried aboard your boat on a normal outing in 1973?</p> <p style="text-align: right;">_____ (# persons) (43-44)</p>
		(29-30) COL. 44	(31-32) COL. 45																																													
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December	12	12																																														
Don't know	13	13																																														
SKIP TO Q. 51	Not used	14																																														
<p>51. Thinking of the boat itself, is this boat insured?</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td>Yes</td><td style="text-align: center;">1</td></tr> <tr><td>No</td><td style="text-align: center;">2</td></tr> <tr><td>Don't know</td><td style="text-align: center;">3</td></tr> </table> <p style="margin-left: 20px;">SKIP TO Q. 53</p>	Yes	1	No	2	Don't know	3	<p>52. (IF "YES") Is it insured under a homeowner's policy?</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td>Yes</td><td style="text-align: center;">1</td></tr> <tr><td>No</td><td style="text-align: center;">2</td></tr> <tr><td>Don't know</td><td style="text-align: center;">3</td></tr> </table>	Yes	1	No	2	Don't know	3																																			
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Don't know	3																																															

53. Please tell me which of the following safety equipment items you carry on your boat? Do you carry . . . (READ EACH ITEM ONE AT A TIME)?

	Yes	No	Don't Know
Distress Signals (e.g. flares) 47-	1	2	3
A First Aid Kit 48-	1	2	3
Spare engine parts 49-	1	2	3
Tools 50-	1	2	3
Anchor and line 51-	1	2	3
Charts 52-	1	2	3
Compass 53-	1	2	3

54. Does your boat have a marine toilet system? 54-

	Yes	No	Don't Know
	1	2	3
SKIP TO Q. 57			

(IF "YES" ASK Q.'s 55 AND Q. 56)

55. What waste treatment method, if any, is used? 55-

Maceration/Chlorination	1
Recirculating chemical	2
Incineration	3
Biological	4
Other	5
Don't Know/No answer	6
None	7

56. Which of the following waste disposal methods is used? (READ LIST) 56-

Direct discharge into water,	1
A portable holding tank, or	2
A permanent holding tank	3
Other	4
Don't Know/No answer	5

DO NOT READ

57. Is there a marine waste pump-out facility available in your primary boating area? 57-

Yes	1
No	2
Don't Know	3

58. Do you have a two-way radio aboard this boat? 58-

Yes	1
SKIP TO Q. 61	
No	2
Don't Know	3

(IF "YES" ASK Q.'s 59 & 60)

59. Can you reach the Marine Telephone Operator or the Coast Guard with your radio? 59-

Yes	1
SKIP TO Q. 61	
No	2
Don't Know	3

60. If you want to call the Coast Guard with this radio, which of the following do you use? (READ LIST) 60-

Channel 51 which is 2182 Kilohertz	1
Channel 16 which is 156.8 Kilohertz	2
Or, both channel 51 and channel 16	3
Don't Know	4

61. Does this boat have any electronic navigation equipment on board? 61-

Yes	1
SKIP TO Q. 63	
No	2
Don't Know	3

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62. Does it have . . . (READ LIST ONE AT A TIME)

	Yes	No	Don't know
A Direction Finder (DF) 62-	1	2	3
Loran A Automatic 63-	1	2	3
Loran A Manual 64-	1	2	3
Loran C 65-	1	2	3
Loran A/C 66-	1	2	3
Omega 67-	1	2	3
Radar 68-	1	2	3

(IF ANSWER TO QUESTION 37 WAS "NONE", SKIP TO QUESTION 67. OTHERWISE, CONTINUE.)

63. When was the last year this motorboat was awarded a Courtesy Motorboat Examination Decal by the Coast Guard Auxiliary?

	69-
CONTINUE	1974 1
SKIP TO Q. 67	1973 2
SKIP TO Q. 34	Prior to 1973 3
	Never 4
SKIP TO Q. 67	Don't know 5

64. When was the last time, before 1974, that this boat was awarded a Courtesy Motorboat Examination Decal?

	70-
SKIP TO Q. 67	1973 1
CONTINUE	Prior to 1973 2
	Never 3
SKIP TO Q. 67	Don't know 4

65. Why didn't you receive the decal in 1973?

	71-
Failed exam	1
Owner or operator refused or declined to be examined	2
Other	3
Don't Know	4

67. How many times did you or anyone in your household rent a boat during 1973?  
 \_\_\_\_\_ (# Times) (5-6)

68. How many persons in your household, including yourself, actually operated, that is, drove or sailed a boat in 1973? (IF "DON'T KNOW", PROBE FOR APPROXIMATE NUMBER)  
 \_\_\_\_\_ (# Persons) (7-8)  
 (IF "NONE", TERMINATE)  
 (IF "DON'T KNOW", SKIP TO Q. 71)

69. What are the ages of these (# IN Q. 68) operators? (RECORD IN COL. 69 AND ALSO INDICATE SEX OF EACH ONE)  
 (IF MORE THAN FIVE IN Q. 68, ASK: "What are the ages of the five people who operated a boat most often?")  
 (ASK Q. 70 FOR EACH PERSON WHOSE AGE IS RECORDED IN COL. 69)  
 70. Think of the total time members of your household operated a boat in 1973. What percent of this time was the (AGE) year old (SEX) the operator? (RECORD IN COL. 70)

Ages (SPECIFY)	COL. 69			COL. 70
	Male	Female	Ref.	Percentage (SPECIFY)
11-1 (9-10)	1	2	3	(24-26)
14-1 (12-13)	1	2	3	(27-28)
17-1 (15-16)	1	2	3	(29-30)
20-1 (18-19)	1	2	3	(31-32)
23-1 (21-22)	1	2	3	(33-34)
				100%

71. Again, thinking of your household's total boating time in 1973. Was any of this time spent . . . (READ LIST ONE AT A TIME)? (RECORD IN COL. 72)  
 (ASK Q. 72 FOR EACH "YES" IN COL. 71)

72. Of the boating activities the people in your household participated in, in 1973, what percent of the total boating time was spent (ACTIVITY)? (RECORD IN COL. 72)

Activity	COL. 71			COL. 72
	Yes	No	DK	Percentage of Time
Pleasure Cruising or sailing 35-	1	2	3	(41-42)
Water Skiing 36-	1	2	3	(44-46)
Recreational fishing 37-	1	2	3	(47-49)
Hunting 38-	1	2	3	(50-52)
Racing 39-	1	2	3	(53-55)
Commercial Use 40- (including fishing)	1	2	3	(56-58)

73. Was anyone in your household involved in an accident of any kind while boating in 1973?  
 \_\_\_\_\_ 59-  

Yes	1
No	2
D. K.	3

 SKIP TO Q. 85

74. How many times was anyone in your household in an accident while boating in 1973?  
 \_\_\_\_\_ (# accidents) (60-61)  
 (ALSO RECORD ON FLAP)

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75. Did anyone lose his or her life in this accident (in the most serious accident)?

62-

Yes	1
No	2
Don't Know	3

76. Did anyone receive a personal injury which kept him or her from doing the things he or she usually does for more than 24 hours?

63-

Yes	1
No	2
Don't Know	3

77. Did this accident (the most serious accident) involve property damage in excess of \$100?

64-

Yes	1
No	2
Don't Know	3

(ASK Q. 78 IF "YES" TO Q. 75, Q. 76 OR Q. 77. OTHERWISE SKIP TO Q. 83)

78. Was this accident reported to state authorities or the Coast Guard?

65-

Yes	1
No	2
Don't Know	3

IF "ONE" IN Q. 74, SKIP TO Q. 85.

IF "MORE THAN ONE" IN Q. 74, CONTINUE

79. Did anyone lose his or her life in the next most serious accident in 1973?

66-

Yes	1
No	2
Don't Know	3

80. Did anyone receive a personal injury which kept him or her from doing the things he or she normally does for more than 24 hours?

67-

Yes	1
No	2
Don't Know	3

81. Did this accident involve property damage in excess of \$100?

68-

Yes	1
No	2
Don't Know	3

(ASK Q. 82 IF "YES" TO Q. 79, Q. 80, OR Q. 81. OTHERWISE SKIP TO Q. 83)

82. Was this accident reported to state authorities or the Coast Guard?

69-

SKIP TO Q. 85	Yes	1
	No	2
	Don't Know	3

83. As a result of this accident, did anyone in your household require medical attention?

70-

SKIP TO Q. 85	Yes	1
	No	2
	Don't Know	3

84. What type of injury was it that required medical attention? 71-		87. How far offshore did this situation take place? 75-		
(CIRCLE ONLY MOST SERIOUS)	Back injury	1	Secured to shore or shore facility/Not offshore	1
	Bones(s) broken	2	Under 1 mile	2
	Bruise	3	1 - 3 miles	3
	Concussion	4	Over 3 - 10 miles	4
	Major Cut (Laceration)	5	Over 10 miles	5
	Minor Cut	6	Don't Know	6
	Sprain	7		
	Other	8		
	Don't Know	9		
85. In 1973, how many times were you or anyone in your household in a boating situation where you felt you needed rescue or assistance?  _____ (# Times) (72-73) (IF "NONE" OR "DON'T KNOW, SKIP TO Q.97)		88. At what time of day did this situation occur? 76-		
		12:01 AM - 6:00 AM	1	
		6:01 AM - Noon	2	
		12:01 PM - 6:00 PM	3	
		6:01 PM - Midnight	4	
		Don't Know	5	
86. In what type of body of water did this situation (the most serious situation) take place? 74-		89. What was the primary reason assistance was needed? (5-6)		
CONTINUE	Great Lakes, oceans, bays- sounds, or seas	1	Boat disabled - mechanical failure	01
SKIP TO Q. 88	Inland lake, river, pond, creek, swamp, quarry	2	Boat disabled - other	02
SKIP TO Q. 88	Other	3	Capsizing	03
	_____		Collision	04
	Don't Know	4	Fire and/or explosion	05
			Flooding	06
			Flooding with capsizing	07
			Grounding	08
			Out of fuel	09
			Person overboard	10
			Person struck by boat or propellor	11
			Other	12
			_____	
			Don't Know	13

<p>90. You may have already answered this but let me check it out. Did anyone seek assistance? <span style="float: right;">7-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Yes</td> <td style="width: 40%; text-align: center;">1</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">SKIP TO Q. 93</td> <td style="text-align: center;">No</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">Don't Know</td> <td style="text-align: center;">3</td> </tr> </table> <p>91. In what ways did anyone seek assistance? Any other ways?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; vertical-align: top;">8,9- 10,11- 12,13- 14,15- 16,17-</td> <td style="width: 60%;">Arm waving</td> <td style="width: 25%; text-align: center;">01</td> </tr> <tr> <td></td> <td>Flag</td> <td style="text-align: center;">02</td> </tr> <tr> <td></td> <td rowspan="2" style="text-align: center;">Flares</td> <td style="text-align: center;">Aerial 03</td> </tr> <tr> <td></td> <td style="text-align: center;">Hand 04</td> </tr> <tr> <td></td> <td>Flashlight</td> <td style="text-align: center;">05</td> </tr> <tr> <td></td> <td>Horns</td> <td style="text-align: center;">06</td> </tr> <tr> <td></td> <td>Mirrors</td> <td style="text-align: center;">07</td> </tr> <tr> <td></td> <td>Radio</td> <td style="text-align: center;">08</td> </tr> <tr> <td></td> <td>Shouting</td> <td style="text-align: center;">09</td> </tr> <tr> <td></td> <td>Whistles</td> <td style="text-align: center;">10</td> </tr> <tr> <td></td> <td>Other (SPECIFY)</td> <td style="text-align: center;">11</td> </tr> <tr> <td></td> <td>Don't Know</td> <td style="text-align: center;">12</td> </tr> </table> <p>92. Did anyone provide assistance? <span style="float: right;">18-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Yes</td> <td style="width: 40%; text-align: center;">1</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">SKIP TO Q. 96</td> <td style="text-align: center;">No</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">Don't Know</td> <td style="text-align: center;">3</td> </tr> </table>		Yes	1	SKIP TO Q. 93	No	2	Don't Know	3	8,9- 10,11- 12,13- 14,15- 16,17-	Arm waving	01		Flag	02		Flares	Aerial 03		Hand 04		Flashlight	05		Horns	06		Mirrors	07		Radio	08		Shouting	09		Whistles	10		Other (SPECIFY)	11		Don't Know	12		Yes	1	SKIP TO Q. 96	No	2	Don't Know	3	<p>93. 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During this situation, approximately how many miles away was the nearest vessel which could be seen? <span style="float: right;">22-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">No vessel in sight</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td>1/2 mile or less</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Over 1/2 mile - 2 miles</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Over 2 miles - 5 miles</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Over 5 miles</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Don't know</td> <td style="text-align: center;">6</td> </tr> </table>		CONTINUE	Coast Guard	1	SKIP TO Q. 95		Coast Guard Auxiliary	2		Another boater	3		State or local officials	4		Other	5		Don't Know	6		Regular Coast Guard	1		Coast Guard Auxiliary	2		Don't Know	3	No vessel in sight	1	1/2 mile or less	2	Over 1/2 mile - 2 miles	3	Over 2 miles - 5 miles	4	Over 5 miles	5	Don't know	6
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97. Now, just a few questions on another boating subject. The next few questions are about the person in your household who operated a boat most often in 1973.

In total, how many hours of boat operating experience does this person (do you) have? Would it be . . . (READ LIST)

23-

	Under 20	1
	20 to 100	2
	101 - 500	3
	501 or over	4
DO NOT READ	Don't Know	5

98. On the average, about how far off shore does this person (do you) normally operate a boat?

24-

	Less than one mile	1
	1 - 3 miles	2
	4 - 5 miles	3
	6 - 10 miles	4
	11 - 25 miles	5
	Over 25 miles	6
	Don't know	7

99. Has he/she (have you) ever taken a boating safety course?

25-

	Yes	1
SKIP TO Q. 101	No	2
	Don't Know	3

100. Who gave the last course he/she/you took?

(26-27)

Boating Club	Local	01
	Commercial	02
Boy Scouts or Sea Scouts		03
Coast Guard Auxiliary		04
College		05
Marine dealer or Marina dealer		06
Power Squadron		07
Public school		08
Red Cross		09
State Agency (e.g. Marine Police, Marine Fish/Game, etc.)		10
Summer camp		11
YMCA		12
Other		13
Don't Know		14

101. As far as you know, would he/she/you consider taking a (another) boating course?

28-

SKIP TO Q. 103	Yes	1
CONTINUE	No	2
SKIP TO Q. 105	D. K.	3



Thank you very much for your cooperation.

Now, for verification purposes, I did reach you by dialing:

\_\_\_\_\_  
(Area Code)

(41-43)

\_\_\_\_\_  
(Number)

(44-50)

Thank you very much. Have a pleasant day.

Interviewer \_\_\_\_\_ Date \_\_\_\_\_

State Code  
from sample slip \_\_\_\_\_  
(51-52)

**APPENDIX B:**  
**THE 1976 NATIONWIDE BOATING SURVEY QUESTIONNAIRE**

Chilton Research Services  
Radnor, Pennsylvania

OMB # 04-S-77004  
Exp. Date - August, 1977

Study #9413  
April, 1977

Int. # \_\_\_\_\_  
(1-4)

RECREATIONAL BOATING STUDY

Good \_\_\_\_\_, I'm \_\_\_\_\_ calling long distance for the U. S. Coast Guard. We are conducting a nationwide study concerned with people's boating activities during 1976. May I speak to the person in your household who did the most recreational boating in 1976? (IF THE PERSON WHO ANSWERS IS THE ONE WHO DID THE MOST RECREATIONAL BOATING, READ THE PRIVACY STATEMENT BELOW. THEN GO DIRECTLY TO Q. 3.

IF NOT, ASK TO SPEAK WITH SOMEONE ELSE IN THE HOUSEHOLD WHO IS THE MOST KNOWLEDGEABLE ABOUT THE HOUSEHOLD'S RECREATIONAL BOATING IN 1976. WHEN THIS KNOWLEDGEABLE PERSON TAKES THE PHONE, READ THE PRIVACY STATEMENT BELOW. THEN GO DIRECTLY TO Q. 3.

IF THERE IS NO ONE AVAILABLE WHO IS KNOWLEDGEABLE ABOUT THE HOUSEHOLD'S RECREATIONAL BOATING, ASK WHEN A KNOWLEDGEABLE PERSON WILL BE THERE AND CAN BE CALLED. THEN ARRANGE FOR A CALLBACK)

Time Interview Began \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

Time Interview Ended \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

PRIVACY ACT STATEMENT

(TO BE READ TO EVERY ELIGIBLE RESPONDENT:)

"The Coast Guard is responsible, by law\*, for making efforts to improve the safety of recreational boating. Your answers will be used to help us, both by showing how well we are doing in present programs and by showing the need for new programs. Your participation in this survey is voluntary, and any answers you give us will be kept confidential."

\*(IF RESPONDENT ASKS "WHAT LAW" (OR SIMILAR), SAY "FEDERAL BOAT SAFETY ACT OF 1971")

3. How many boats were owned by members of your household in 1976?

(BEGIN CARD 1)

\_\_\_\_\_ (# of Boats) (5-6)

(IF "NONE" OR "DON'T KNOW," SKIP TO Q. 73)

Let's talk about your primary boat, that is, the boat you use most often.

4. How many engines if any, does your boat (your primary boat) have?

(NOTE: ENGINES REFERRED TO ARE PROPULSION ENGINES)

5-

BEGIN  
CARD 5  
DUP 1-4

One	1
Two	2
More than two	3
None	4
Don't Know	8
No answer	9

SKIP TO  
Q. 10

5. What is the total horsepower of this (these) engine(s)?

\_\_\_\_\_ (Horsepower) (6-9)

6. What type(s) of engine(s) does your boat (your primary boat) have?

10-

	Outboard	1
	Outboard Jet	2
SKIP	Inboard	3
	Inboard Jet	4
TO	Inboard/Outboard (Inboard/Outdrive I/O Stern Drive)	5
	Other	6
Q. 8	Don't Know	8
	No Answer	9

7. Does this outboard boat have a motor well?

11-

Yes	1
No	2
Don't Know	8
No Answer	9

8. What kind of fuel does this boat use?

12-

Gasoline/Oil	1
Diesel Fuel	2
Other	3
Don't Know	8
No Answer	9

9. What kind of fuel tank(s) does this boat have? (READ LIST)

13-

	Portable	1
	Permanent (Fixed)	2
	Both	3
DO NOT READ	Don't Know	8
	No Answer	9

10. How would you describe your primary boat? That is, what type of boat is it? (DO NOT READ LIST. PROBE IF NECESSARY)

(14 - 15)

Rowboat	01
Skiff	02
Dinghy	03
Jonboat (Flatbottom, blunt bow)	04
Other open, lightweight boat	05
Sailboat	06
Canoe	07
Kayak	08
Bow rider runabout	09
Non-bow rider runabout	10
Cabin Cruiser	11
Houseboat	12
Inflatable boat	13
Inflatable raft	14
Other kind of raft	15
Pontoon boat	16
Thrill-craft (Jet-ski, Ski-doo, Waterbicycle, etc)	17
Other	18
Don't Know	98
No Answer	99

11. Was this boat bought new, used, or was it homemade?

16-

CONTINUE	New	1
ASK Q.12 THEN SKIP TO Q.15	Used	2
ASK Q.12 THEN SKIP TO Q.14	Homemade	3
ASK Q.12 THEN SKIP TO Q.15	Don't Know	8
	No Answer	9

12. About how many years old is this boat?

\_\_\_\_\_ (17 - 18)  
(# years)

13. How long do you expect to keep this boat before selling it or trading it in on another boat?

\_\_\_\_\_ (# years)      \_\_\_\_\_ (# months)  
(19 - 21)

(SKIP TO Q.15)

14. Was this boat built from a kit?

22-

Yes	1
No	2
Don't Know	8
No Answer	9

15. Approximately what is the length, in feet, of this boat?

\_\_\_\_\_ (23 - 25)  
(Length)

16. (TO BE ASKED ONLY IF Q.10 IS DINGHY, SAILBOAT, CABIN CRUISER, HOUSEBOAT OR PONTOON BOAT.)

And what is the height, in feet, from the waterline to the top of your mast or the highest point of this boat?

\_\_\_\_\_ (Height) (27-29)

19. Is this boat numbered either with your state or with the U.S. Coast Guard?

		40-
	Yes	1
SKIP	No	2
TO	Don't Know	8
Q. 21	No Answer	9

17. Does this boat have a Coast Guard capacity plate

	30-
Yes	1
No	2
Don't Know	8
No Answer	9

20. (IF "YES") In what State is it numbered?

\_\_\_\_\_ (State) (41-42)

18. What principal material or materials is your boat hull made of? (CIRCLE AS MANY AS APPLY)

Aluminum	31-	1
Canvas	32-	1
Ferrocement (concrete and steel)	33-	1
Fiber glass	34-	1
Plastic (non-reinforced, rigid)	35-	1
Rubber	36-	1
Steel or steel alloys	37-	1
Wood	38-	1
Other	39-	1
Don't Know	31-	8
No Answer	31-	9

21. During the boating season do you normally trailer or carry your primary boat to a launching site on each outing?

		43-
	Yes	1
	No	2
SKIP TO Q. 23	Don't Know	8
	No Answer	9

22. About how many miles, round trip, do you normally trailer or carry your boat on each outing?

\_\_\_\_\_ (# miles) (44-46)

(INSTRUCTIONS: IF RESPONDENT SAYS "METAL" ASK: "IS THAT ALUMINUM OR STEEL?")

<p>23. In approximately how many different months did you use your primary boat in 1976?</p> <p style="text-align: center;">_____ (47-48) (# of Months)</p> <p>(IF "NONE", SKIP TO Q.30. IF "DON'T KNOW" SKIP TO Q.29)</p>	<p>29. On the average, about how many persons including the operator and water skiers were carried aboard your boat on a typical outing in 1976?</p> <p style="text-align: center;">_____ (60-61) (# of Persons)</p>																				
<p>24. During the 1976 boating season, on the average, about how many <u>times a month</u> was your boat used?</p> <p style="text-align: center;">_____ (49-50) (# of Times)</p>	<p>30. Thinking of the boat itself, what kind of insurance if any, do you carry on this boat? (READ LIST IF NECESSARY) 62-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td style="width: 85%;">Special boat insurance</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td></td> <td>Homeowners policy</td> <td style="text-align: center;">2</td> </tr> <tr> <td></td> <td>Other kind of insurance</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">DO</td> <td>No insurance</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">NOT</td> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">READ</td> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>		Special boat insurance	1		Homeowners policy	2		Other kind of insurance	3	DO	No insurance	4	NOT	Don't Know	8	READ	No Answer	9		
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	Other kind of insurance	3																			
DO	No insurance	4																			
NOT	Don't Know	8																			
READ	No Answer	9																			
<p>25. Now, thinking of a typical outing in 1976, about how many hours was your boat (your primary boat) used on a typical outing?</p> <p style="text-align: center;">_____ (51-52) (# of Hours)</p>	<p>31. Does this boat have level flotation? That is, will it float and stay level even when full of water? 63-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 85%;">Yes</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	Yes	1	No	2	Don't Know	8	No Answer	9												
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No	2																				
Don't Know	8																				
No Answer	9																				
<p>26. Was your boat operated during hours of darkness in 1976? 53-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 60%;">Yes</td> <td style="width: 15%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">SKIP TO</td> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">Q. 28</td> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td></td> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>		Yes	1	SKIP TO	No	2	Q. 28	Don't Know	8		No Answer	9	<p>32. Does your primary boat have a marine toilet system? 64-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 85%;">Yes</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	Yes	1	No	2	Don't Know	8	No Answer	9
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SKIP TO	No	2																			
Q. 28	Don't Know	8																			
	No Answer	9																			
Yes	1																				
No	2																				
Don't Know	8																				
No Answer	9																				
<p>27. Overall, about what percent of the total time operated was this boat operated during hours of darkness in 1976?</p> <p style="text-align: center;">_____ (54-56) (% of Time)</p>	<p>33. Is there a marine waste pump-out facility available in the area where you use your boat (your primary boat)? 65-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 85%;">Yes</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	Yes	1	No	2	Don't Know	8	No Answer	9												
Yes	1																				
No	2																				
Don't Know	8																				
No Answer	9																				
<p>28. (TO BE ASKED ONLY IF AT LEAST ONE ENGINE WAS INDICATED IN Q.4) On the average, about how many gallons of fuel were used on a typical outing in this boat in 1976?</p> <p style="text-align: center;">_____ (57-59) (# of gallons)</p>																					

34. Please tell me which of the following items you regularly carry on your boat.  
Do you carry . . . (READ ITEMS ONE AT A TIME)

		Yes	No	Don't Know	No Answer
ASK ONLY IF ONE OR MORE ENGINES INDICATED IN Q. 4, OTHERWISE CODE AS "NO"	Spare engine parts 66-	1	2	8	9
	Tools (Hand Tools) 67-	1	2	8	9
	Anchor and line 68-	1	2	8	9
	Paddle or oar 69-	1	2	8	9
	Bailing device or bilge pump 70-	1	2	8	9
	Sound amplification device 71-	1	2	8	9
	Fire extinguisher 72-	1	2	8	9
	First aid kit 73-	1	2	8	9

**INSTRUCTIONS:** IF LENGTH OF BOAT IN Q.15 IS LESS THAN "16 FEET", ASK Q. 35A. IF LENGTH IS 16 FEET OR MORE, SKIP TO Q.35B.

35A. Do you carry any type of radio on your boat (your primary boat)?

		74-	
ASK Q. 35B, BUT DO NOT READ "SINGLE SIDE BAND RADIO" OR "SCANNER"  CODE ALL Q. 35B RESPONSES AS "NO" AND ALL Q. 36 RESPONSES AS "NO" AND SKIP TO Q. 37.	Yes	1	
	No	2	
	Don't Know	8	
	No Answer	9	

END CARD 5 80 = 5

35B. Which of the following communication equipment items do you carry aboard this boat? (READ ITEMS ONE AT A TIME)

		Yes	No	Don't Know	Answer
START CARD 6 DUP 1-4					
	CB Radio 5-	1	2	8	9
	VHF-FM Two-Way Radio 6-	1	2	8	9
IF "YES" TO Q. 35A, DO NOT READ. CODE AS "NO"	Single Side Band Radio (SSB) 7-	1	2	8	9
	Commercial Broadcast Receiver (Standard Radio) 8-	1	2	8	9
	Weather Monitor 9-	1	2	8	9
IF "YES" TO Q. 35A, DO NOT READ. CODE AS "NO"	Scanner 10-	1	2	8	9
	EPIRB, an Emergency Position Indicating Radio Beacon 11-	1	2	8	9
	Emergency Locator Transmitter (ELT) 12-	1	2	8	9
	Other type of communication equipment 13-	1	2	8	9

36. (INSTRUCTIONS: IF LENGTH IN Q. 15 IS LESS THAN "16 FEET", RECORD ALL Q. 36 RESPONSES AS "NO" AND SKIP TO Q. 37)

Does your primary boat have any of the following long-range navigation equipment on board? (READ ITEMS ONE AT A TIME)

		Yes	No	Don't Know	No Answer
Radio Direction Finder (RDF)	14-	1	2	8	9
Loran A Automatic	15-	1	2	8	9
Loran A Manual	16-	1	2	8	9
Loran C	17-	1	2	8	9
Loran A/C	18-	1	2	8	9
Omega	19-	1	2	8	9
Radar	20-	1	2	8	9

37. Was your primary boat given a Courtesy Motorboat Examination by the Coast Guard Auxiliary in 1976?

21-

Yes	1
No	2
Don't Know	8
No Answer	9

39. I'd now like to ask you some questions about your secondary boat, that is, the boat you use next most often?

How many engines, if any, does your secondary boat have?

(NOTE: ENGINES REFERRED TO ARE PROPULSION ENGINES)

BEGIN CARD 7  
DUP 1-4

5-

38A. Prior to 1976, did you ever have any boat given a Courtesy Motorboat Examination by the Coast Guard Auxiliary?

22-

Yes	1
No	2
Don't Know	8
No Answer	9

One	1
Two	2
More than two	3
None	4
Don't Know	8
No Answer	9

SKIP TO  
Q. 45

38B. If you found that your boat had been improperly constructed such that there was a safety-related defect, whom would you contact? (CIRCLE AS MANY AS APPLY)

Your marine dealer (seller)	23-	1
The manufacturer	24-	1
The Coast Guard	25-	1
Someone else	26-	1
No one	27-	1
Don't Know	23-	8
No Answer	23-	9

40. What is the total horsepower of this (these) engine(s)?

\_\_\_\_\_ (6-9)  
(Horsepower)

INSTRUCTIONS: IF "ONE" BOAT ANSWERED IN Q. 3, SKIP TO Q. 73. OTHERWISE CONTINUE.

END CARD 6 80 = 6

B-7

41. What type(s) of engine(s) does your secondary boat have?

		10-	
		Outboard	1
		Outboard jet	2
SKIP		Inboard	3
		Inboard jet	4
TO		Inboard/Outboard (Inboard/Outdrive, I/O Stern Drive)	5
		Other	6
Q. 43		Don't know	8
		No answer	9

42. Does this outboard boat have a motor well?

		11-	
	Yes		1
	No		2
	Don't know		8
	No answer		9

43. What kind of fuel does this boat use?

		12-	
	Gasoline/Oil		1
	Diesel fuel		2
	Other		3
	Don't know		8
	No answer		9

44. What kind of fuel tank(s) does this boat have? (READ LIST.)

		13-	
	Portable		1
	Permanent (fixed)		2
	Both		3
	Don't know		8
	No answer		9

45. How would you describe your secondary boat? That is, what type of a boat is it? (DO NOT READ LIST. PROBE, IF NECESSARY) (14-15)

Rowboat	01
Skiff	02
Dinghy	03
Jonboat (Flat bottom, blunt bow)	04
Other open, lightweight boat	05
Sailboat	06
Canoe	07
Kayak	08
Bow rider runabout	09
Non-bow rider runabout	10
Cabin Cruiser	11
Houseboat	12
Inflatable boat	13
Inflatable raft	14
Other kind of raft	15
Pontoon boat	16
Thrill-craft (Jet-ski, Ski-doo, water bicycle, etc.)	17
Other	18
Don't Know	98
No Answer	99

<p>46. Was this boat bought new, used or was it homemade? <span style="float: right;">16-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">CONTINUE</td> <td style="width: 60%;">New</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td>ASK Q.47 THEN SKIP TO Q.50</td> <td>Used</td> <td style="text-align: center;">2</td> </tr> <tr> <td>ASK Q.47 THEN SKIP TO Q.49</td> <td>Homemade</td> <td style="text-align: center;">3</td> </tr> <tr> <td rowspan="2">ASK Q.47 THEN SKIP TO Q.50</td> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	CONTINUE	New	1	ASK Q.47 THEN SKIP TO Q.50	Used	2	ASK Q.47 THEN SKIP TO Q.49	Homemade	3	ASK Q.47 THEN SKIP TO Q.50	Don't Know	8	No Answer	9	<p>51. (TO BE ASKED ONLY IF Q. 45 IS DINGHY SAILBOAT, CABIN CRUISER, HOUSEBOAT, OR PONTOON BOAT)</p> <p>And what is the height in feet from the waterline to the top of your mast or the highest point of this boat?</p> <p style="text-align: center;">_____ ft. (Height) (27 - 29)</p>																			
CONTINUE	New	1																																
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<p>47. About how many years old is this boat?</p> <p style="text-align: center;">_____ (17 - 18) (Number of Years)</p>	<p>52. Does this boat have a Coast Guard capacity plate? <span style="float: right;">30-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Yes</td> <td style="width: 30%; text-align: center;">1</td> </tr> <tr> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	Yes	1	No	2	Don't Know	8	No Answer	9																									
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<p>48. How long do you expect to keep this boat before selling it or trading it in on another boat?</p> <p style="text-align: center;">_____ (# years)      _____ (# months) (19 - 21)</p> <p>(SKIP TO Q. 50)</p>	<p>53. What principal materials is your boat hull made of? (CIRCLE AS MANY AS APPLY)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Aluminum</td> <td style="width: 10%; text-align: center;">31-</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td>Canvas</td> <td style="text-align: center;">32-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Ferrocement (Concrete and Steel)</td> <td style="text-align: center;">33-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Fiber glass</td> <td style="text-align: center;">34-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Plastic (non-reinforced, rigid)</td> <td style="text-align: center;">35-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Rubber</td> <td style="text-align: center;">36-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Steel or steel alloys</td> <td style="text-align: center;">37-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Wood</td> <td style="text-align: center;">38-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">39-</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">31-</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">31-</td> <td style="text-align: center;">9</td> </tr> </table> <p>INSTRUCTIONS: IF RESPONDENT SAYS "METAL" ASK: "IS THAT ALUMINUM OR STEEL"?</p>	Aluminum	31-	1	Canvas	32-	1	Ferrocement (Concrete and Steel)	33-	1	Fiber glass	34-	1	Plastic (non-reinforced, rigid)	35-	1	Rubber	36-	1	Steel or steel alloys	37-	1	Wood	38-	1	Other	39-	1	Don't Know	31-	8	No Answer	31-	9
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<p>49. Was this boat built from a kit? <span style="float: right;">22-</span></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Yes</td> <td style="width: 40%; text-align: center;">1</td> </tr> <tr> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't Know</td> <td style="text-align: center;">8</td> </tr> <tr> <td>No Answer</td> <td style="text-align: center;">9</td> </tr> </table>	Yes	1	No	2	Don't Know	8	No Answer	9																										
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No Answer	9																																	
<p>50. Approximately what is the length, in feet, of this boat?</p> <p style="text-align: center;">_____ feet (23 - 25) (Length)</p>																																		

<p>54. Is this boat numbered either with your state or with the U. S. Coast Guard?</p> <p style="text-align: right;">40-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 65%;">Yes</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">SKIP TO</td> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't know</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">Q. 55</td> <td>No answer</td> <td style="text-align: center;">9</td> </tr> </table>		Yes	1	SKIP TO	No	2	Don't know	8	Q. 55	No answer	9	<p>58. In approximately how many different months did you use your secondary boat in 1976?</p> <p style="text-align: right;">(Number of Months) (47-48)</p> <p>(IF "NONE", SKIP TO Q. 65. IF "DON'T KNOW", SKIP TO Q. 64.)</p>
	Yes	1										
SKIP TO	No	2										
	Don't know	8										
Q. 55	No answer	9										
<p>55. (IF "YES".) In what state is it numbered?</p> <p style="text-align: right;">(State) (41-42)</p>	<p>59. During the 1976 boating season on the average about how many <u>times a month</u> was your secondary boat used?</p> <p style="text-align: right;">(Number of Times) (49-50)</p>											
<p>56. During the boating season do you normally trailer or carry your secondary boat to a launching site on each outing?</p> <p style="text-align: right;">43-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 65%;">Yes</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">SKIP TO</td> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't know</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">Q. 58</td> <td>No answer</td> <td style="text-align: center;">9</td> </tr> </table>		Yes	1	SKIP TO	No	2	Don't know	8	Q. 58	No answer	9	<p>60. Now thinking of a typical outing in 1976 about how many hours was your secondary boat used on a typical outing?</p> <p style="text-align: right;">(Number of Hours) (51-52)</p>
	Yes	1										
SKIP TO	No	2										
	Don't know	8										
Q. 58	No answer	9										
<p>57. About how many miles, round trip, do you normally trailer or carry your boat on each outing?</p> <p style="text-align: right;">(Number of Miles) (44-46)</p>	<p>61. Was your secondary boat operated during hours of darkness in 1976?</p> <p style="text-align: right;">53-</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 65%;">Yes</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">SKIP TO</td> <td>No</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Don't know</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">Q. 63</td> <td>No answer</td> <td style="text-align: center;">9</td> </tr> </table>		Yes	1	SKIP TO	No	2	Don't know	8	Q. 63	No answer	9
	Yes	1										
SKIP TO	No	2										
	Don't know	8										
Q. 63	No answer	9										
<p>58. (TO BE ASKED ONLY IF AT LEAST ONE ENGINE WAS INDICATED IN Q. 39.) On the average about how many gallons of fuel were used on a typical outing in this boat in 1976?</p> <p style="text-align: right;">(Number of Gallons) (57-59)</p>	<p>62. Overall about what percent of the total time operated was this boat operated during hours of darkness in 1976?</p> <p style="text-align: right;">(% of Time) (54-56)</p>											

64. On the average about how many persons including the operator and water skiers were carried aboard your boat on a typical outing in 1976?

(Number of persons) (60-61)

65. Thinking of the boat itself, what kind of insurance, if any, do you carry on your secondary boat? (READ LIST, IF NECESSARY.)

62-

	Special boat insurance	1
	Homeowners policy	2
	Other kind of insurance	3
DO	No insurance	4
NOT	Don't know	8
READ	No answer	9

66. Does this boat have level flotation? That is, will it float and stay level even when full of water?

63-

	Yes	1
	No	2
	Don't know	8
	No answer	9

67. Does your secondary boat have a marine toilet system?

64-

	Yes	1
	No	2
	Don't know	8
	No answer	9

68. Is there a marine waste pump-out facility available in the area where you use your secondary boat?

65-

Yes	1
No	2
Don't know	8
No answer	9

69. Please tell me which of the following items you regularly carry on your secondary boat. Do you carry . . . (READ ITEMS ONE AT A TIME)

		Yes	No	Don't Know	Answer
ASK ONLY IF ONE OR MORE ENGINES INDICATED IN Q. 39. OTHERWISE, CODE AS "NO"	Spare engine parts 66-	1	2	8	9
	Tools (Hand tools) 67-	1	2	8	9
	Anchor and Line 68-	1	2	8	9
	Paddle or oar 69-	1	2	8	9
	Bailing device or bilge pump 70-	1	2	8	9
	Sound amplification device 71-	1	2	8	9
	Fire extinguisher 72-	1	2	8	9
	First aid kit 73-	1	2	8	9

INSTRUCTIONS: IF LENGTH OF BOAT IN Q. 50 IS LESS THAN "16 FEET", ASK Q. 70A. IF LENGTH IN Q. 50 IS "16 FEET" OR MORE, SKIP TO Q. 70B.

70A. Do you carry any type of radio on your secondary boat?

74-

ASK Q. 70B, BUT DO NOT READ "SINGLE SIDE BAND RADIO" OR "SCANNER"	Yes	1
CODE ALL Q. 70B RESPONSES AS "NO" AND ALL Q. 71 RESPONSES AS "NO" AND SKIP TO Q. 72.	No	2
	Don't Know	8
	No Answer	9

END CARD 7 80=7

70B. Which of the following communication equipment items do you carry aboard your secondary boat? (READ ITEMS ONE AT A TIME)

BEGIN CARD 8 DUP 1-4

		Yes	No	Don't Know	No Answer
	CB Radio 5-	1	2	8	9
	VHF-FM Two-Way Radio 6-	1	2	8	9
IF "YES" TO Q. 70A, DO NOT READ. CODE AS "NO"	Single Side Band Radio (SSB) 7-	1	2	8	9
	Commercial Broadcast Receiver (Standard Radio) 8-	1	2	8	9
	Weather Monitor 9-	1	2	8	9
IF "YES" TO Q. 70A, DO NOT READ. CODE AS "NO"	Scanner 10-	1	2	8	9
	EPIRB, an Emergency Position Indicating Radio Beacon 11-	1	2	8	9
	Emergency Locator Transmitter (ELT) 12-	1	2	8	9
	Other type of communication equipment 13-	1	2	8	9



78. Again, thinking of your household's total boating time in 1976, was any of this time spent...(READ LIST, ONE AT A TIME. RECORD IN Q. 78 GRID BELOW.)

(ASK Q. 79 FOR EACH "YES" IN Q. 78 GRID.)

79. Of the boating activities the people in your household participated in in 1976, what percent of the total boating time was spent (ACTIVITY)? (RECORD IN Q. 79 GRID BELOW.)

	Question 78				Question 79 Percentage of Time	
	Activity					
	Yes	No	Don't Know	No Answer		
Pleasure cruising or sailing	43-	1	2	8	9	(54-56)
Water skiing	44-	1	2	8	9	(57-59)
Recreational fishing	45-	1	2	8	9	(60-62)
Hunting	46-	1	2	8	9	(63-65)
Racing (Motorboat, canoe, kayak, sailboat, etc.)	47-	1	2	8	9	(66-68)
Commercial use (Including fishing)	48-	1	2	8	9	(69-71)
White water canoeing	49-	1	2	8	9	(72-74)
Other canoeing	50-	1	2	8	9	(75-77)
White water rafting	51-	1	2	8	9	BEGIN CARD 2 (5-7)
White water kayaking	52-	1	2	8	9	(8-10)
Other kayaking	53-	1	2	8	9	(11-13)
					100%	

END  
CAR:  
80-  
DUP  
1-4

INSTRUCTIONS: IF TOTAL IS AT LEAST 90%, BUT LESS THAN 100%, ADD THE REMAINDER INTO "PLEASURE CRUISING".

80. Does anyone in your household belong to (READ LIST, ONE AT A TIME. CIRCLE AS MANY AS APPLY.)

	Yes	No	D. K.	N. A.	
The Coast Guard Auxiliary	14-	1	2	8	9
A Power Squadron	15-	1	2	8	9
The Sea Scouts	16-	1	2	8	9
A yacht club	17-	1	2	8	9
A boating club	18-	1	2	8	9
Any other boating organization	19-	1	2	8	9

81. Does anyone in your household subscribe to or get any magazines on (READ LIST, ONE AT A TIME; CIRCLE AS MANY AS APPLY)

		Yes	No	D.K.	N.A.
Boating	20-	1	2	8	9
Fishing	21-	1	2	8	9
Hunting	22-	1	2	8	9

82. Does anyone in your household take part in (READ LIST ONE AT A TIME)

		Yes	No	D.K.	N.A.
Camping	23-	1	2	8	9
Recreational fishing	24-	1	2	8	9
Hunting	25-	1	2	8	9
Athletic sports	26-	1	2	8	9
Other outdoor recreation	27-	1	2	8	9

Now, I'd like to ask you a few questions about another boating subject.

83. What do the letters PFD stand for? (DO NOT PROMPT)

28-

SKIP TO Q. 85	Personal Flotation Device	1
CONTINUE	Other	2
	Don't Know	8
	No Answer	9

84. PFD stands for "Personal Flotation Device." Can you give me an example of a Personal Flotation Device? (DO NOT PROMPT. RECORD ONLY THE FIRST RESPONSE)

29-

Life Preserver	1
Life Jacket	2
Water safety buoyant device	3
Buoyant cushion	4
Ring life buoy	5
Buoyant vest	6
Other	7
Don't Know	8
No Answer	9

(IF "OTHER", "DON'T KNOW" OR "NO ANSWER" TO Q. 84, READ THE FOLLOWING:)

Some common examples of PFD's are safety devices such as life jackets or buoyant cushions.

(GO TO Q. 85)

85. I'd like you to tell me how often the following categories of passengers, including yourself, wear their PFD's when the boat is underway? Do the (CATEGORY) wear their PFD's (READ CHOICES)?

		DO NOT READ						
		Always	Generally	Seldom	Never	Not Applicable	Don't Know	No Answer
Male adults	30-	1	2	3	4	5	8	9
Female adults	31-	1	2	3	4	5	8	9
Children (16 years or younger)	32-	1	2	3	4	5	8	9

(IF THERE ARE RESPONSES OTHER THAN "ALWAYS" OR "NOT APPLICABLE", CONTINUE WITH Q.86, OTHERWISE, SKIP TO Q.88.)

86. When you're underway on your boat and you or your passengers are not wearing your PFD's, where do you usually keep them? (DO NOT READ LIST) (CIRCLE AS MANY AS APPLY)

	Passengers sit on them	33-	1
	They are always worn	34-	1
SKIP	Under the seat or on the bottom of the boat	35-	1
	In a storage box	36-	1
TO	Other	37-	1
Q. 88	Don't carry PFD's	38-	1
	Don't Know	33-	8
	No Answer	33-	9

87. Are those PFD's that you sit on designed as seat cushions?

39-	
Yes	1
No	2
Don't Know	8
No Answer	9

88. What are the factors that you feel influence a person's decision to wear or not wear a PFD? (DO NOT READ LIST.)

Swimming ability	40-	1
Boating at night	41-	1
Rough water conditions - bad weather, etc.	42-	1
Boating in dangerous area - near waterfalls, dams, etc.	43-	1
Personal comfort	44-	1
Type of boating activity	45-	1
Other	46-	1
Don't know	40-	8
No answer	40-	9

89. Do you normally file a "float plan" prior to each trip.

		47-
ASK Q. 90, THEN SKIP TO Q. 92	Yes	1
SKIP TO Q. 91	No	2
	Don't know	8
	No answer	9

90. With whom do you normally file this "float plan"? (DO NOT READ LIST.)

Family member	48-	1
Friend/Neighbor	49-	1
Yacht club	50-	1
Local organization	51-	1
Other	52-	1
Don't know	48-	8
No answer	46-	9

(SKIP TO Q. 92)

91. Does some family member or reliable associate normally know your precise intentions for the trip?

		53-
Yes		1
No		2
Don't Know		8
No Answer		9

<p>92. How, if at all, do you get weather forecasts before getting underway?</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="padding: 2px;">I don't get them</td> <td style="padding: 2px; text-align: right;">54-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Regular/Commercial broadcasts (TV or radio)</td> <td style="padding: 2px; text-align: right;">55-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">National Weather Service radio</td> <td style="padding: 2px; text-align: right;">56-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Coast Guard Marine Information Broadcast</td> <td style="padding: 2px; text-align: right;">57-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Tower/Visual Signals</td> <td style="padding: 2px; text-align: right;">58-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Other</td> <td style="padding: 2px; text-align: right;">59-</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Don't Know</td> <td style="padding: 2px; text-align: right;">54-</td> <td style="padding: 2px; text-align: center;">8</td> </tr> <tr> <td style="padding: 2px;">No Answer</td> <td style="padding: 2px; text-align: right;">54-</td> <td style="padding: 2px; text-align: center;">9</td> </tr> </table>	I don't get them	54-	1	Regular/Commercial broadcasts (TV or radio)	55-	1	National Weather Service radio	56-	1	Coast Guard Marine Information Broadcast	57-	1	Tower/Visual Signals	58-	1	Other	59-	1	Don't Know	54-	8	No Answer	54-	9	<p>96. In 1976, how many times were you or anyone in your household in a boating situation where you may have needed, or did need rescue or assistance?</p> <p style="text-align: right; margin-right: 50px;">_____ (66-67) (# of Times)</p> <p>(IF "NONE", "DON'T KNOW", OR "NO ANSWER" SKIP TO Q. 104)</p>
I don't get them	54-	1																							
Regular/Commercial broadcasts (TV or radio)	55-	1																							
National Weather Service radio	56-	1																							
Coast Guard Marine Information Broadcast	57-	1																							
Tower/Visual Signals	58-	1																							
Other	59-	1																							
Don't Know	54-	8																							
No Answer	54-	9																							
<p>93. The Coast Guard records boating accidents which result in loss of life, property damage over \$100 or an injury resulting in loss of consciousness, medical treatment or disability in excess of 24 hours.</p> <p>During 1976, how many boating accidents of this type, if any, were members of your household involved in?</p> <p style="text-align: right; margin-right: 50px;">_____ (60-61) (# of accidents)</p> <p>(IF "NONE" OR "DON'T KNOW" SKIP TO Q. 96)</p>	<p>97. In 1976, how many times did you or anyone else in your household encounter a boating situation where you may have needed rescue or assistance, but in which you took care of the situation yourself?</p> <p style="text-align: right; margin-right: 50px;">_____ (68-69) (# of Times)</p>																								
<p>94. How many persons in your household, if any, lost their lives in a boating accident in 1976?</p> <p style="text-align: right; margin-right: 50px;">_____ (62-63) (# of persons)</p>	<p>98. The next few questions deal with the most serious situation in which you or members of your household were involved in 1976, regardless of who assisted you, if anyone.</p> <p>In what type of body of water did this situation (the most serious situation) take place?</p> <p style="text-align: right; margin-right: 50px;">70-</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="padding: 2px;">Great Lakes, oceans, bays, sound, tidal waters</td> <td style="padding: 2px; text-align: center;">1</td> </tr> <tr> <td style="padding: 2px;">Inland lake, river, pond, creek, swamp, quarry</td> <td style="padding: 2px; text-align: center;">2</td> </tr> <tr> <td style="padding: 2px;">Other</td> <td style="padding: 2px; text-align: center;">3</td> </tr> <tr> <td style="padding: 2px;">Don't Know</td> <td style="padding: 2px; text-align: center;">8</td> </tr> <tr> <td style="padding: 2px;">No Answer</td> <td style="padding: 2px; text-align: center;">9</td> </tr> </table>	Great Lakes, oceans, bays, sound, tidal waters	1	Inland lake, river, pond, creek, swamp, quarry	2	Other	3	Don't Know	8	No Answer	9														
Great Lakes, oceans, bays, sound, tidal waters	1																								
Inland lake, river, pond, creek, swamp, quarry	2																								
Other	3																								
Don't Know	8																								
No Answer	9																								
<p>95. How many persons in your household, if any, were injured in a boating accident in 1976? (NOTE: REPORTABLE TYPE INJURY AS DESCRIBED IN Q. 93)</p> <p style="text-align: right; margin-right: 50px;">_____ (64-65) (# persons)</p>																									

99. What was the main reason that assistance was needed?

(71-72)

Boat disabled	Propulsion, shaft/ propeller	01
	Engine failure	02
	Steering failure	03
	Electrical failure (battery, etc.)	04
	Other causes	05
Capsizing		06
Flooding		07
Out of fuel		08
Person overboard		09
Collision		10
Fire/Explosion		11
Grounding		12
Other reason		13
Don't Know		98
No Answer		99

END CARD 2

80 = 2

100. In what ways, if any, did anyone seek assistance? Any other ways? (DO NOT READ LIST. CIRCLE AS MANY AS APPLY)

BEGIN CARD 3 DUP 1-4

Arm waving	5-	1
Flag	6-	1
Flares (aerial or hand)	7-	1
Smoke	8-	1
Dye Marker	9-	1
Flashlight	10-	1
Strobe light	11-	1
Chemical light	12-	1
Horns	13-	1
Mirrors	14-	1
Radio	15-	1
Shouting	16-	1
Whistles	17-	1
Other	18-	1
Did not seek assistance	19-	1
Don't Know	5-	8
No Answer	5-	9

101. Who if anyone, provided assistance?  
(CIRCLE AS MANY AS APPLY)

Coast Guard ASK: IS THAT THE:	Regular Coast Guard, or	20-	1
	Coast Guard Auxiliary	21-	1
Another boater		22-	1
State or local officials		23-	1
Took care of it myself		24-	1
Other		25-	1
No one		26-	1
Don't Know		20-	8
No Answer		20-	9

102. How long did you wait for help to arrive?

(# of hours)      (# of minutes)  
(27-30)

103. At the time you needed rescue or assistance, approximately how many miles away was the nearest vessel which could be seen?

31-

No vessel in sight	1
One mile or less	2
More than one mile	3
Don't know	8
No answer	9

104. The next few questions are about the person in your household who operated a boat most often in 1976.

In total, how many hours of boat operating experience does this person (do you) have? Would it be . . . (READ LIST)

32-

0-10 hours	1
11-20 hours	2
21-100 hours	3
101-500 hours	4
501 hours or more	5
DO NOT READ Don't Know	8
No Answer	9

105. How many hours of boat operating experience does this person have with the type of boat he (she/you) uses most often?

33-

0-10 hours	1
11-20 hours	2
21-100 hours	3
101-500 hours	4
501 hours or more	5
Don't Know	8
No Answer	9

106. Did he (she/you) take any boating courses in 1976?				108. Did he (she/you) take any boating courses in any year before 1976?			
		34-				48-	
		Yes	1			Yes	1
SKIP		No	2	SKIP		No	2
	TO		Don't Know		8	TO	
Q. 108			No Answer	9	Q. 110		
107. Who gave this course (these courses)?				109. Who gave this course (these courses)?			
Boating Club	Local	35-	1	Boating Club	Local	49-	1
	Commercial	36-	1		Commercial	50-	1
Boy Scouts or Sea Scouts		37-	1	Boy Scouts or Sea Scouts		51-	1
Coast Guard Auxiliary		38-	1	Coast Guard Auxiliary		52-	1
College		39-	1	College		53-	1
Marine dealer or Marina dealer		40-	1	Marine dealer or Marina dealer		54-	1
Power Squadron		41-	1	Power Squadron		55-	1
Public school		42-	1	Public school		56-	1
Red Cross		43-	1	Red Cross		57-	1
State Agency (e.g. Marine Police, Marine Fish/Game, etc.)		44-	1	State Agency (e.g. Marine Police, Marine Fish/Game, etc.)		58-	1
Summer camp		45-	1	Summer camp		59-	1
YMCA		46-	1	YMCA		60-	1
Other		47-	1	Other		61-	1
Don't Know		35-	8	Don't Know		49-	8
No Answer		35-	9	No Answer		49-	9

110. What would be the total number of hours you (he, she) would be willing to spend in a (another) boating course?

\_\_\_\_\_ (62-64)  
(# of Hours)

(IF "NONE", SKIP TO Q. 113)

111. If you were to consider taking a (another) boating course, would you be interested in studying any of the following subjects? (READ LIST)

		Yes	No	D.K.	N.A.
Boat Handling	65-	1	2	8	9
Engine Maintenance	66-	1	2	8	9
Boat Maintenance	67-	1	2	8	9
Rope Work (knots, splices, etc.)	68-	1	2	8	9
Navigation	69-	1	2	8	9
Radio Procedures	70-	1	2	8	9
Weather	71-	1	2	8	9
Legal Requirements	72-	1	2	8	9
Piloting	73-	1	2	8	9

112. What would be the most convenient time for you (him/her) to take a boating course if you (he/she) wished to take one?

74-

Weekdays	1
Weeknights	2
Weekends	3
Anytime during the week	4
Not interested	5
Don't Know	8
No Answer	9

113. Into which of the following employment categories does the primary operator fit? Is he/she: (READ LIST)

75-

SKIP TO Q.115	Full-time Student	1
CONTINUE TO Q.114	Employed	2
SKIP TO 115	Unemployed	3
	Houseworker	4
DO NOT READ	Disabled (Permanently)	5
	Retired	6
DO NOT READ	Don't Know	8
	No Answer/Refused	9

114. (IF THE PRIMARY OPERATOR IS EMPLOYED, CODE THE JOB.)

What is the job or occupation of the primary operator?

76-77

Professional, technical or similar	01
Manager or administrator (except farm)	02
Operator of transport equipment	03
Craftsman or kindred worker	04
Operator (except farm)	05
Service worker (except private household)	06
Farmer or farm manager	07
Sales worker	08
Clerical or kindred worker	09
Laborer (except farm)	10
Farm laborer or foreman	11
Armed Services	12
Other	13
Don't Know	98
No Answer/Refused	99

INSTRUCTIONS: IF RESPONDENT MENTIONS AN OCCUPATION WITHIN ARMED SERVICES, CODE AS "ARMED SERVICES".

END CARD 3

80 = 3

115. And what was the highest grade or year of school which you (the primary operator) have completed?

BEGIN CARD 4  
DUP 1-4

5-	
Less than 8th grade	1
Completed 8th grade	2
Some high school	3
High school graduate	4
Some post-high school education; no college degree	5
College graduate	6
Graduate work	7
Don't Know	8
No Answer/Refused	9

116. During 1976 did you happen to see or hear anything about boating safety in any of the following ways? (READ LIST ONE AT A TIME)

		Yes	No	D.K.	N.A.
On television	6-	1	2	8	9
On the radio	7-	1	2	8	9
In newspapers	8-	1	2	8	9
Magazines	9-	1	2	8	9
On posters or pamphlets	10-	1	2	8	9
Through marinas	11-	1	2	8	9
Marine dealers	12-	1	2	8	9

(IF NO "YES" RESPONSES TO Q. 116, SKIP TO Q. 118)

117. Did seeing or hearing this boating safety information cause you or any other boat operator in your household to . . . (READ LIST ONE AT A TIME)

		Yes	No	Don't Know	No Answer
Seek additional information	13-	1	2	8	9
Take a boating course	14-	1	2	8	9
Subscribe to a boating magazine	15-	1	2	8	9
Obtain boating safety equipment	16-	1	2	8	9

118. Suppose your boat capsized (turned over) and you fell into the water. You were wearing your "PFD" and therefore could stay on top but the water was very cold, around 50 degrees Fahrenheit. How long do you think you could survive before someone came along with his boat and picked you up? (DO NOT READ LIST)

17-

Less than 1 hour	1
1 hr. but less than 2 hrs.	2
2 - 4 hours	3
More than 4 hours but not more than <u>6</u> hours	4
More than 6 hours but not more than <u>10</u> hours	5
More than 10 hours but not more than <u>24</u> hours	6
More than 24 hours	7
Don't Know	8
No Answer	9

119. On your boating outings, do you normally carry . . . (READ LIST, ONE AT A TIME)

		Yes	No	Don't Know	No Answer
Water, Coffee, Tea, Milk, Soft Drinks (Non-alcoholic beverages)	18-	1	2	8	9
Beer	19-	1	2	8	9
Other Alcoholic beverages	20-	1	2	8	9

Thank you very much for your cooperation. Now, for verification purposes, did I reach you by dialing:

\_\_\_\_\_  
 (Area Code)      (Exchange)      (Number)  
 (21-23)            (24-26)

Thank you very much. Have a pleasant day.

Interviewer \_\_\_\_\_

Date \_\_\_\_\_

State Code \_\_\_\_\_

Stratum # \_\_\_\_\_ (27-30)

Respondent: \_\_\_\_\_ 31-

Primary Operator	1
Knowledgeable Person	2

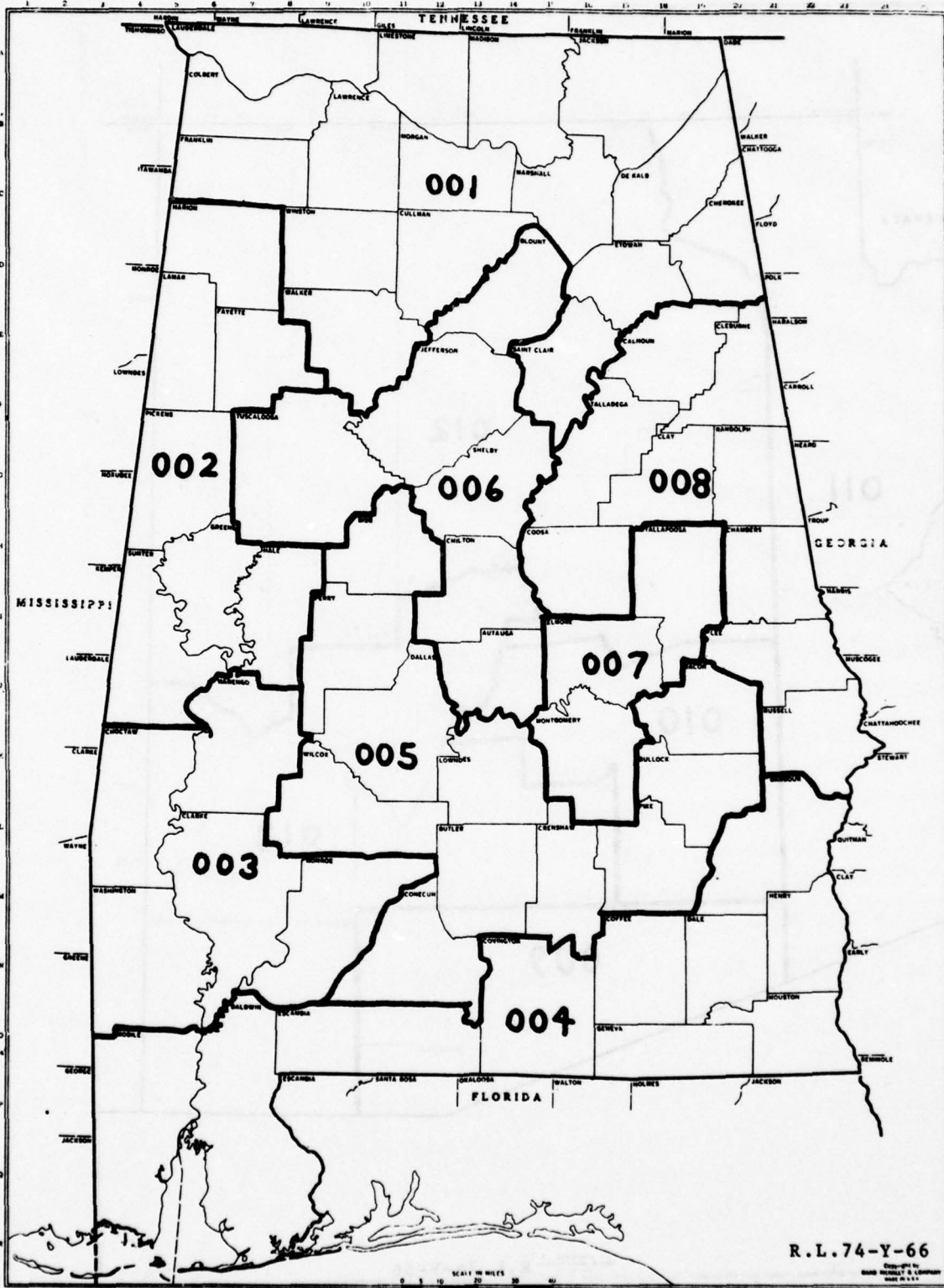
END CARD 4

80 = 4

APPENDIX C:  
GEOGRAPHICAL SAMPLING STRATIFICATION

**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**ALABAMA**  
SIZE 8 1/2 x 11



R.L. 74-Y-66

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C-1

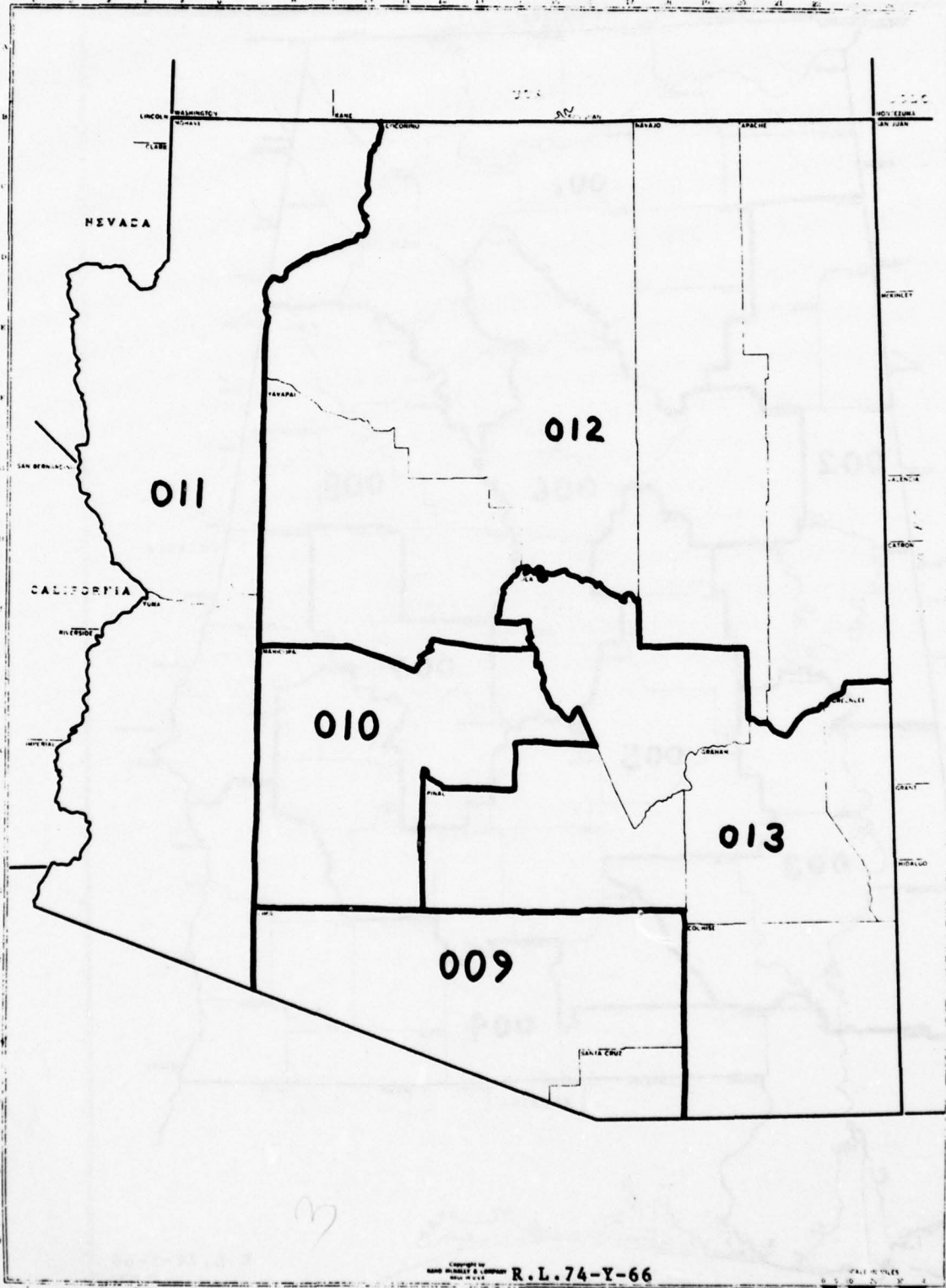
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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**ARIZONA**  
SIZE 8 1/2 x 11



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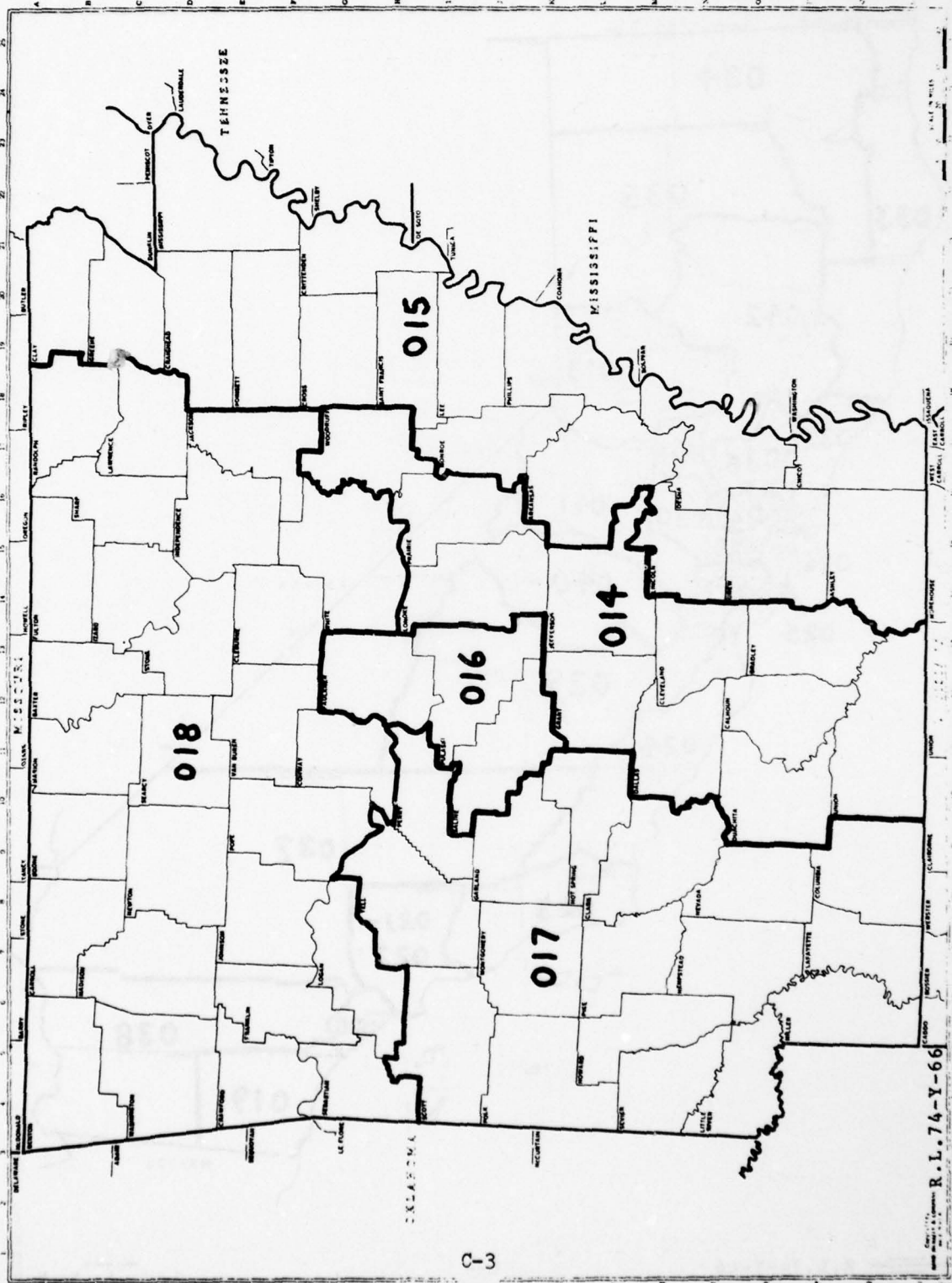
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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**ARKANSAS**  
SIZE 8 1/2 x 11



R. L. 74-Y-66

C-3

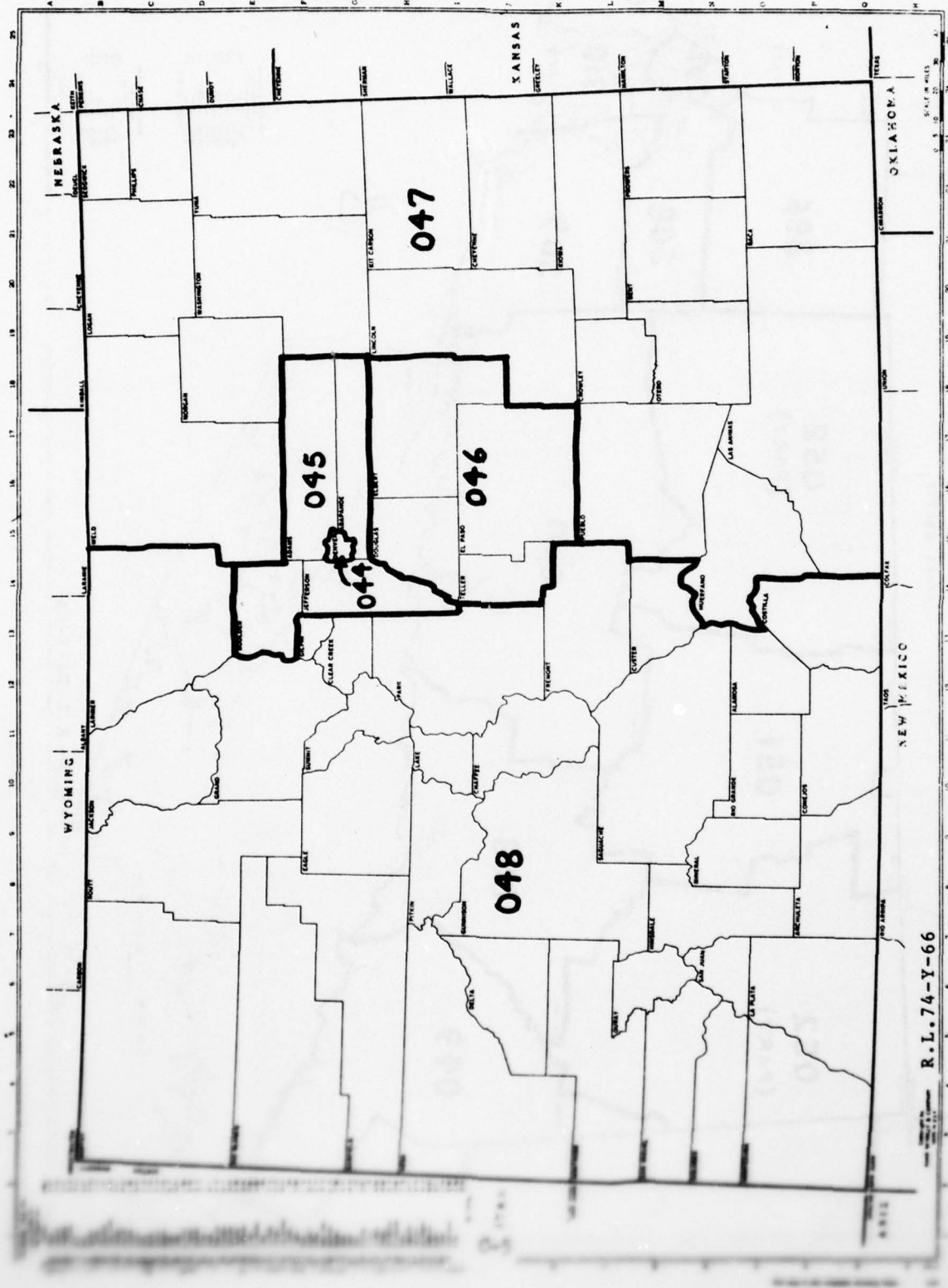
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STATE COUNTY OUTLINE MAP**

**COLORADO**  
SIZE 8 1/2 x 11

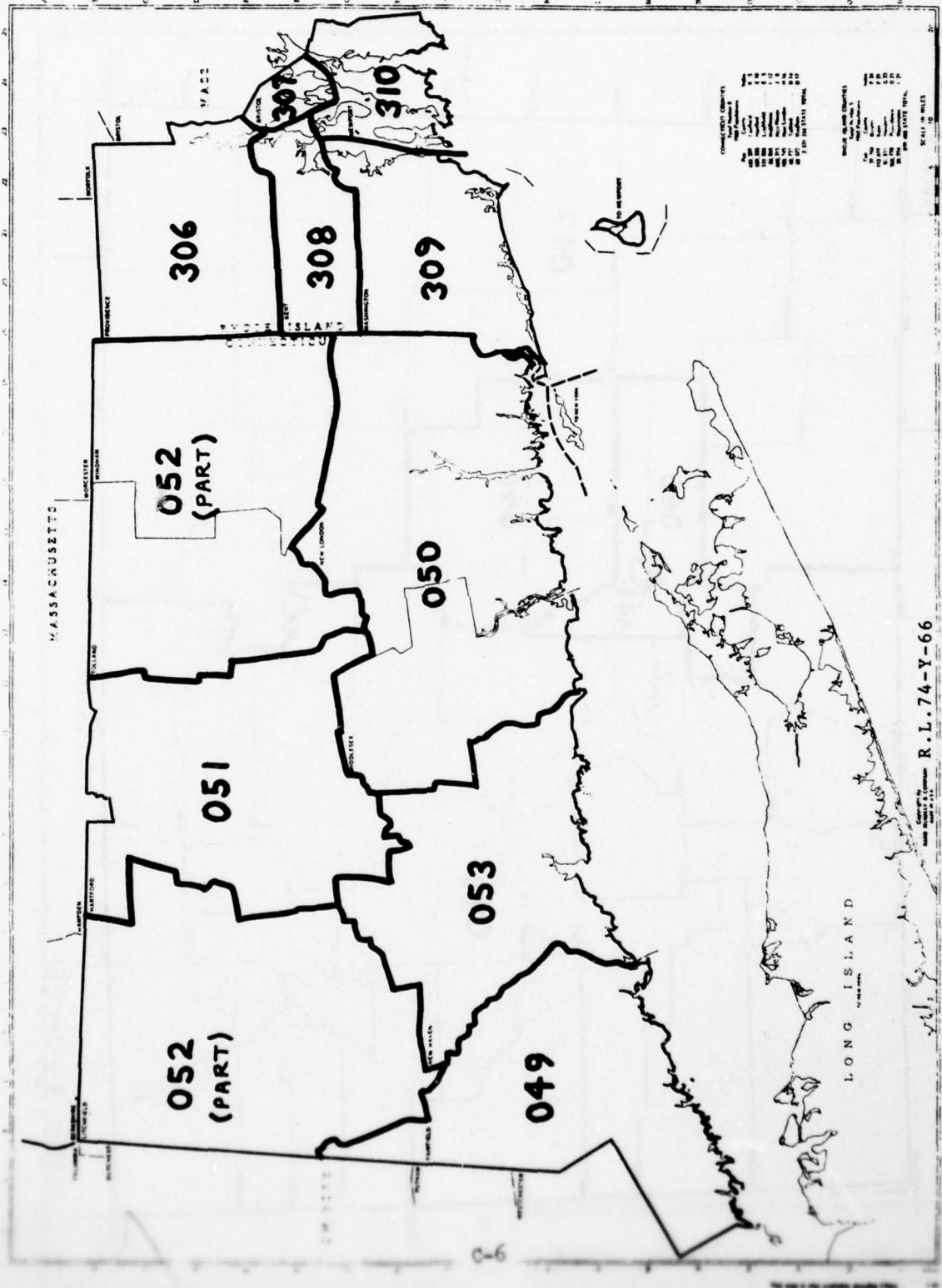


R. L. 74-Y-66

6

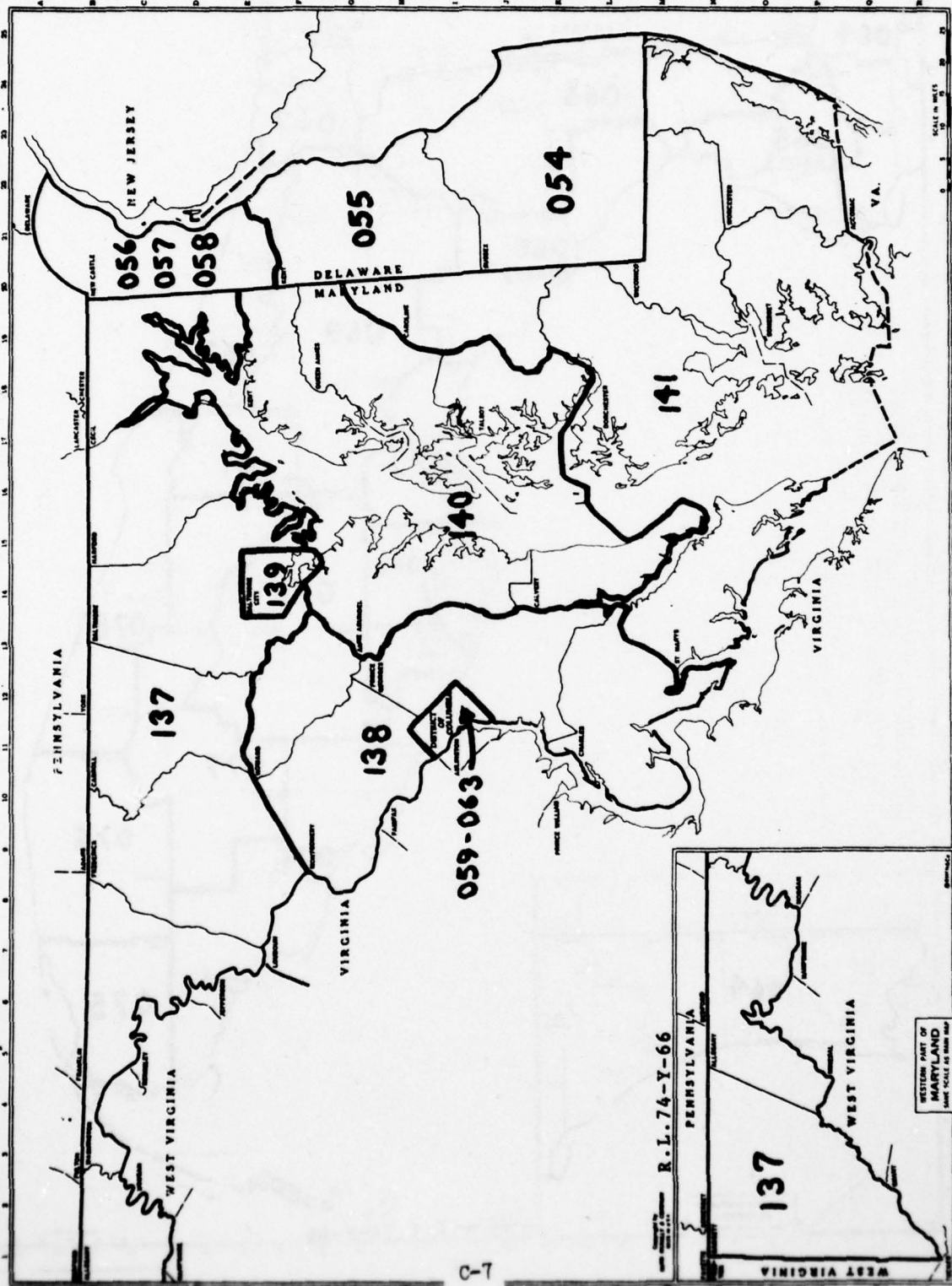
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STATE COUNTY OUTLINE MAP**

**CONN. & R.I.**  
SIZE 8 1/2 x 11



**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**MARYLAND & DEL.**  
SIZE 8 1/2 x 11



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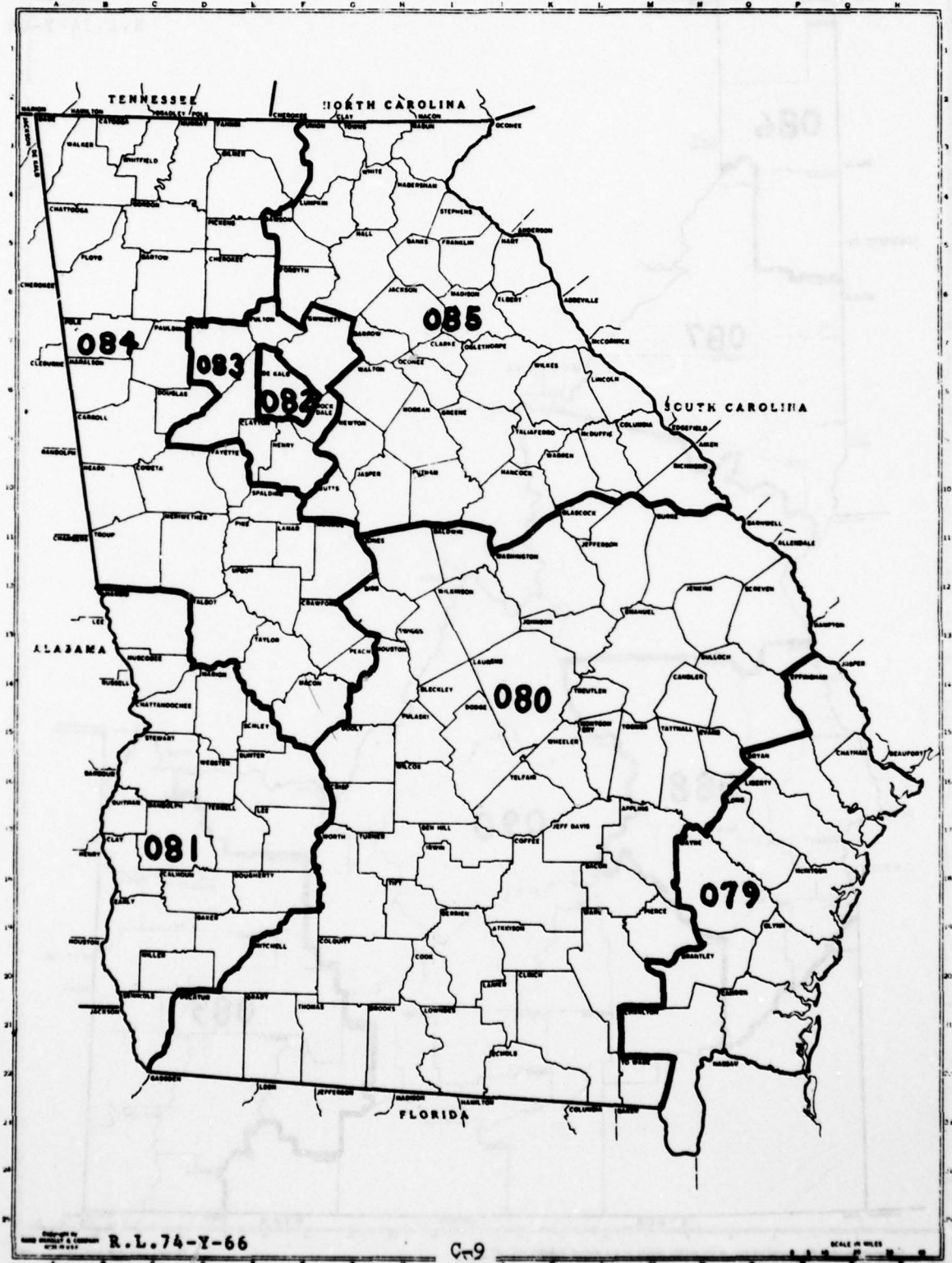
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8



**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**GEORGIA**  
SIZE 8 1/2 x 11



R.L. 74-Y-66

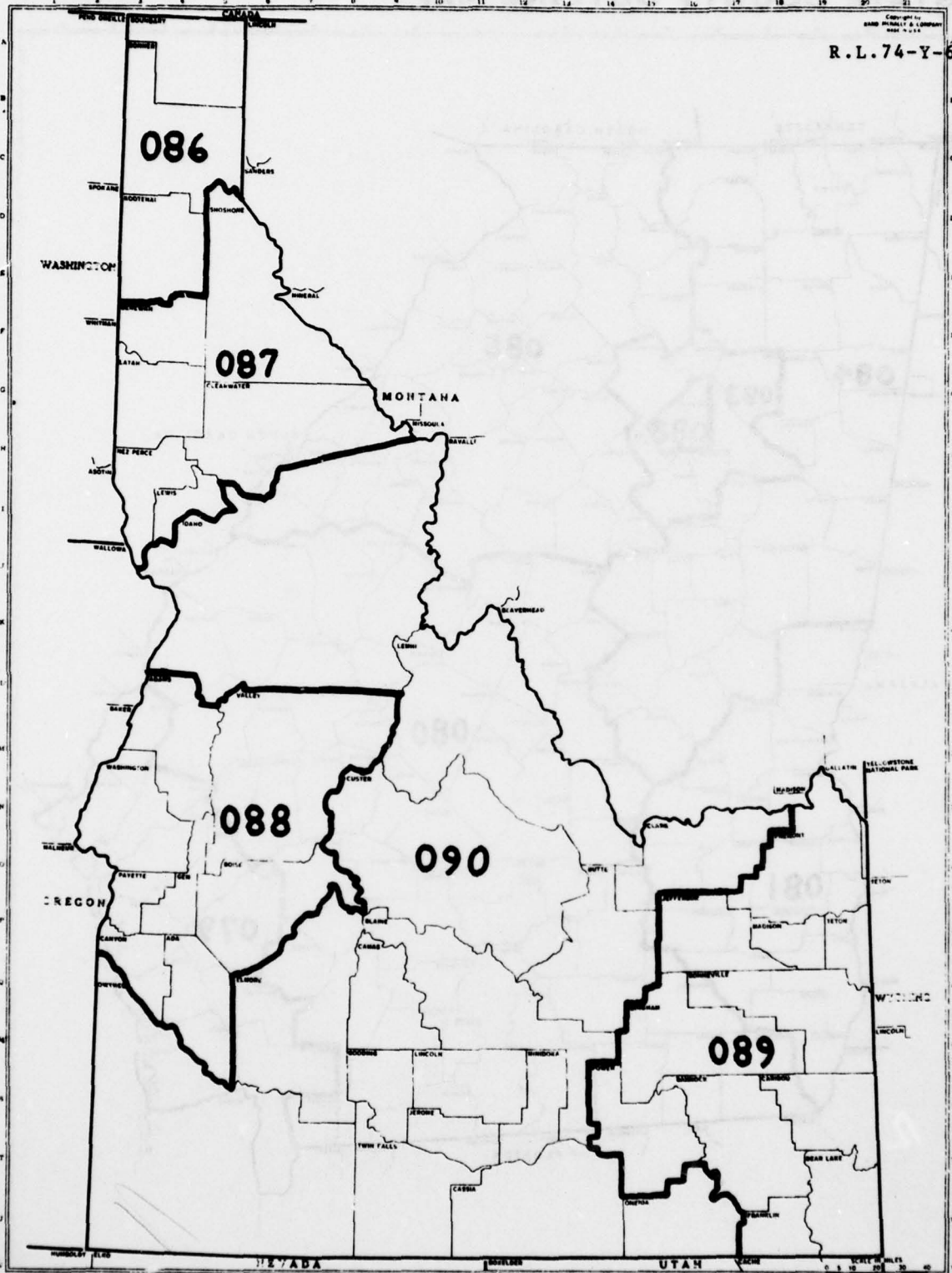
C-9

SCALE IN MILES

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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**IDAHO**  
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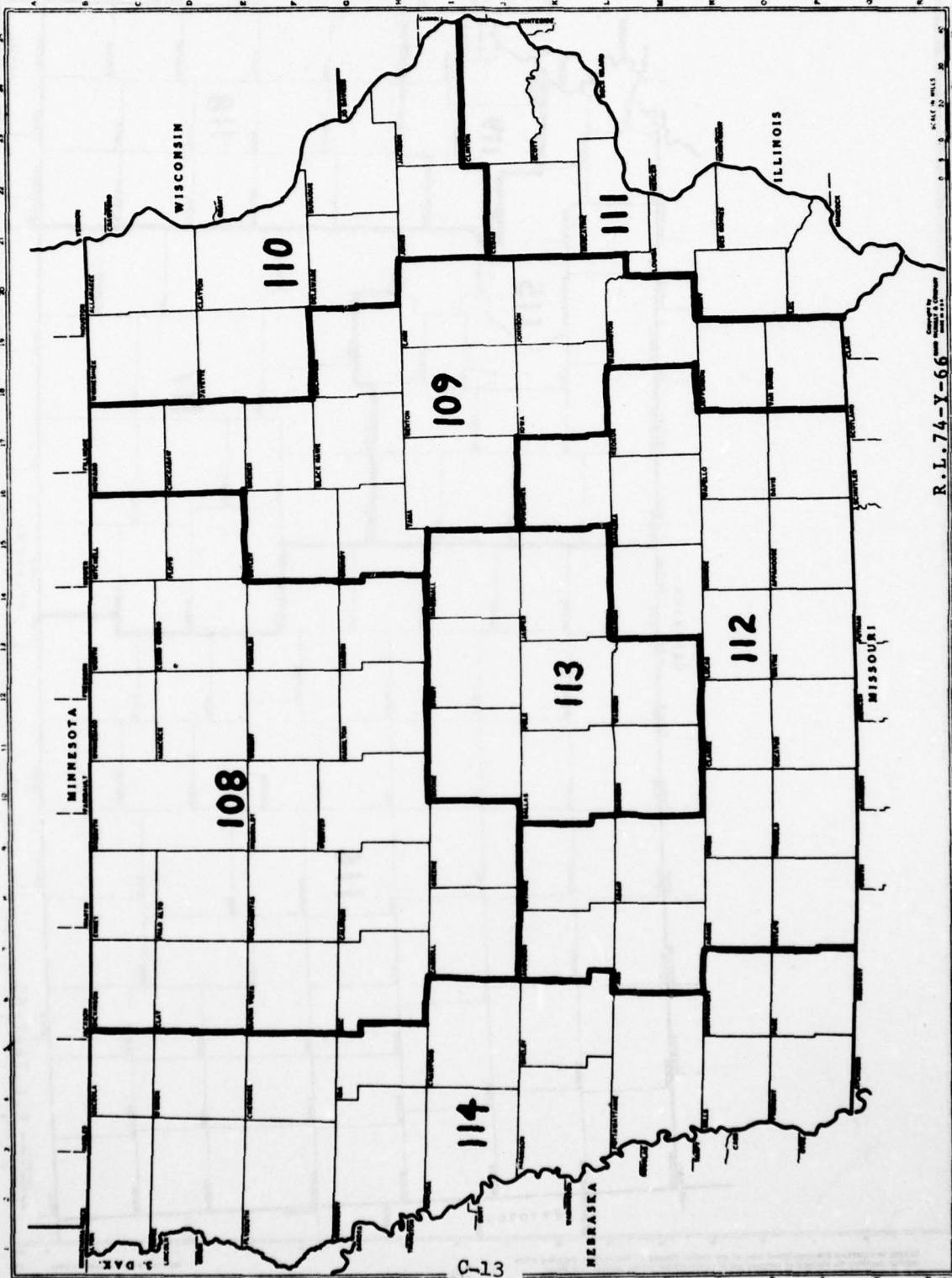
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STATE COUNTY OUTLINE MAP

IOWA  
SIZE 9 1/2" x 11"



R. L. 74-Y-66

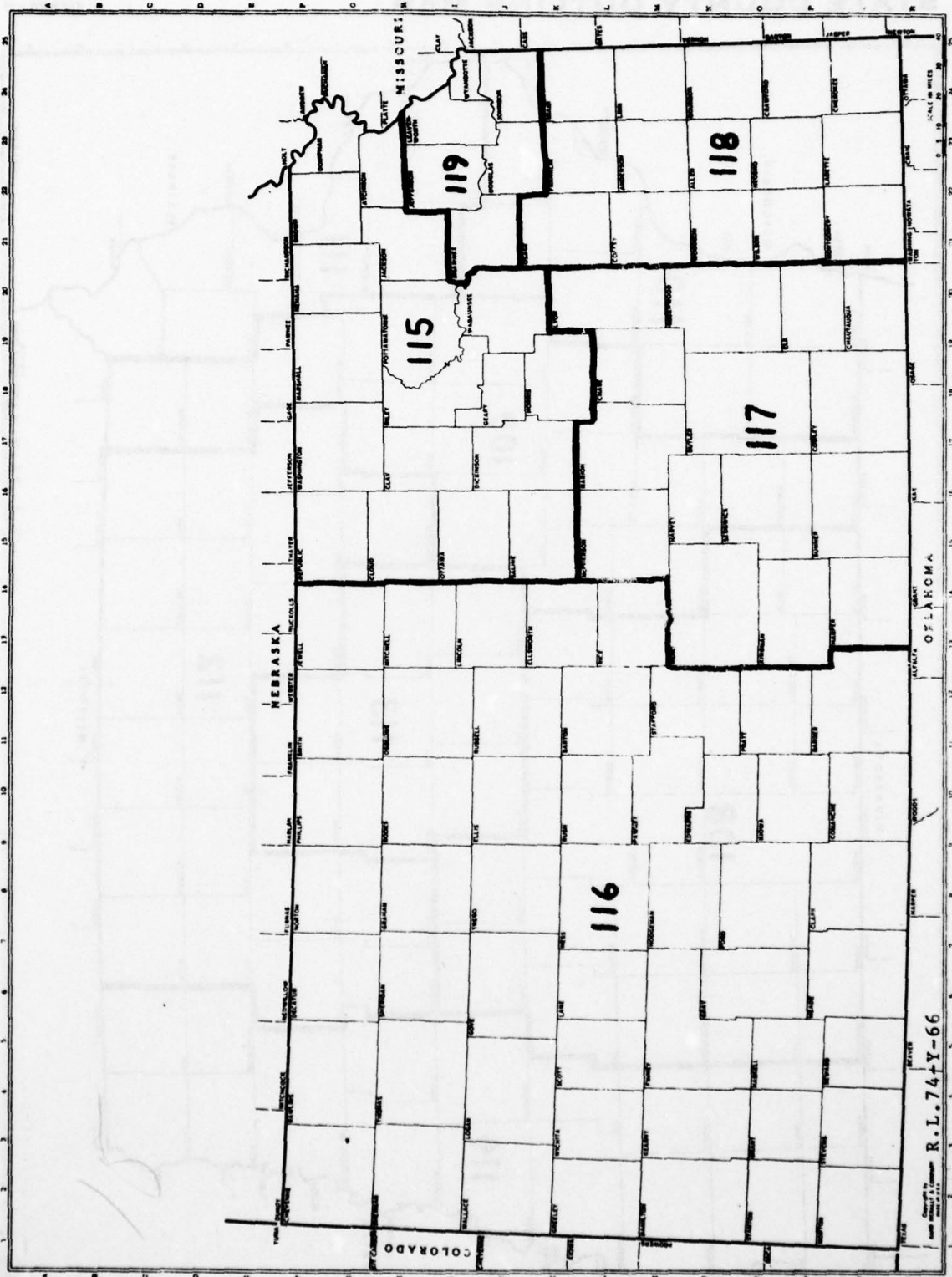
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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**KANSAS**  
SIZE 8 1/2 x 11



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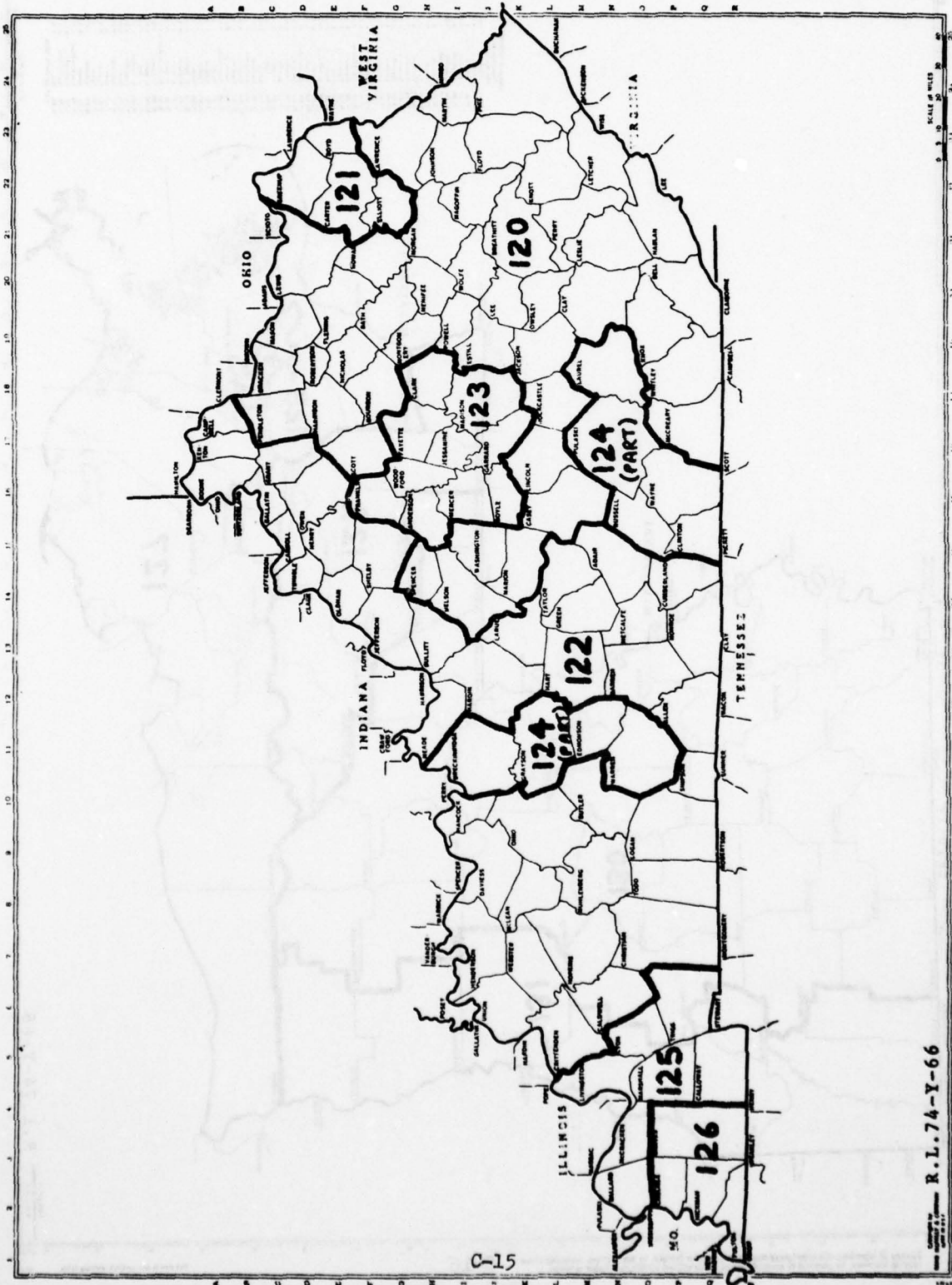
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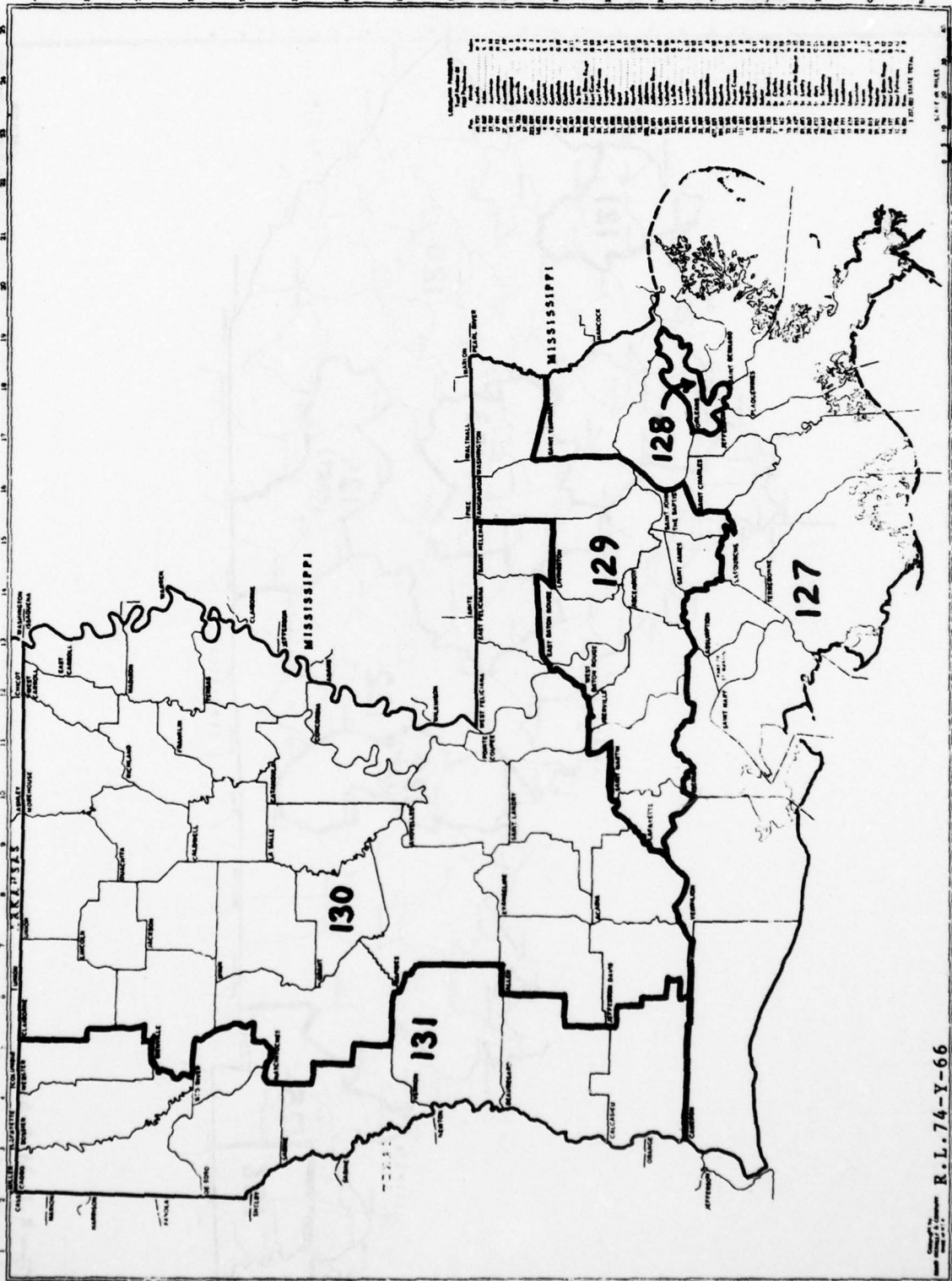
**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**KENTUCKY**  
SIZE 8 1/2 x 11



**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**LOUISIANA**  
SIZE 8 1/2 x 11



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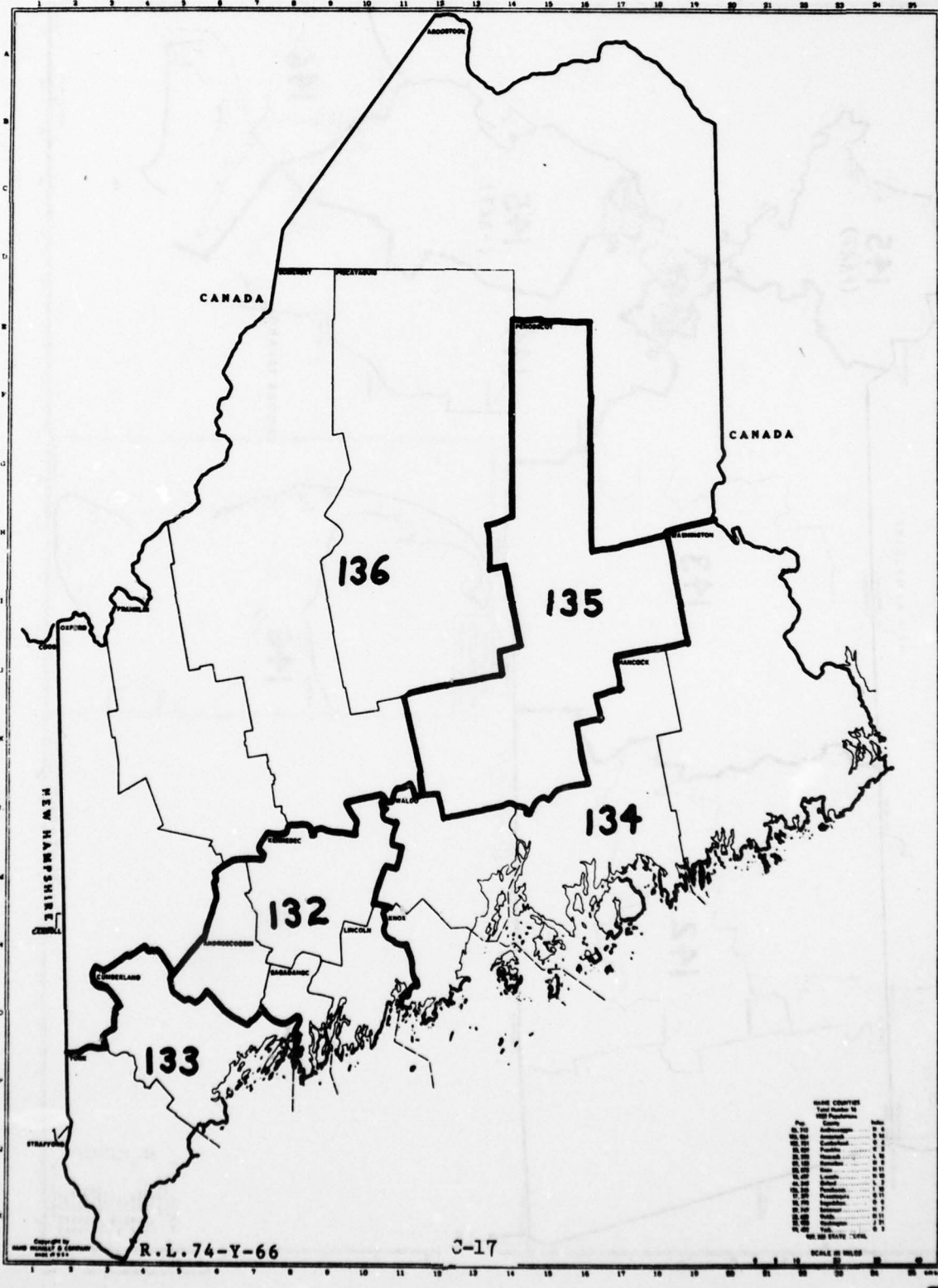
C-16

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STATE COUNTY OUTLINE MAP**

**MAINE**  
SIZE 8 1/2 x 11



18

AD-A052 907

COAST GUARD WASHINGTON D C OFFICE OF BOATING SAFETY  
RECREATIONAL BOATING IN THE CONTINENTAL UNITED STATES IN 1973 A--ETC(U)  
MAR 78

F/G 13/10

UNCLASSIFIED

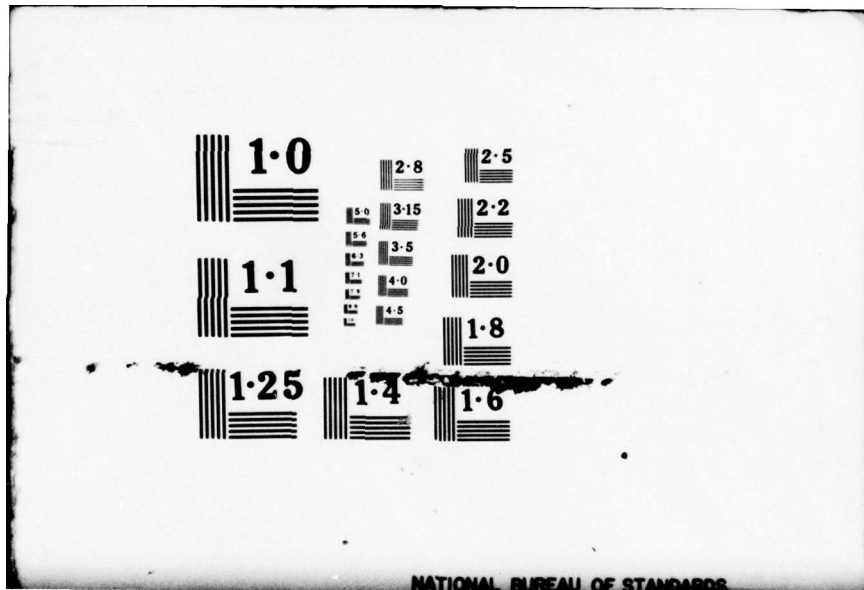
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3 OF 3  
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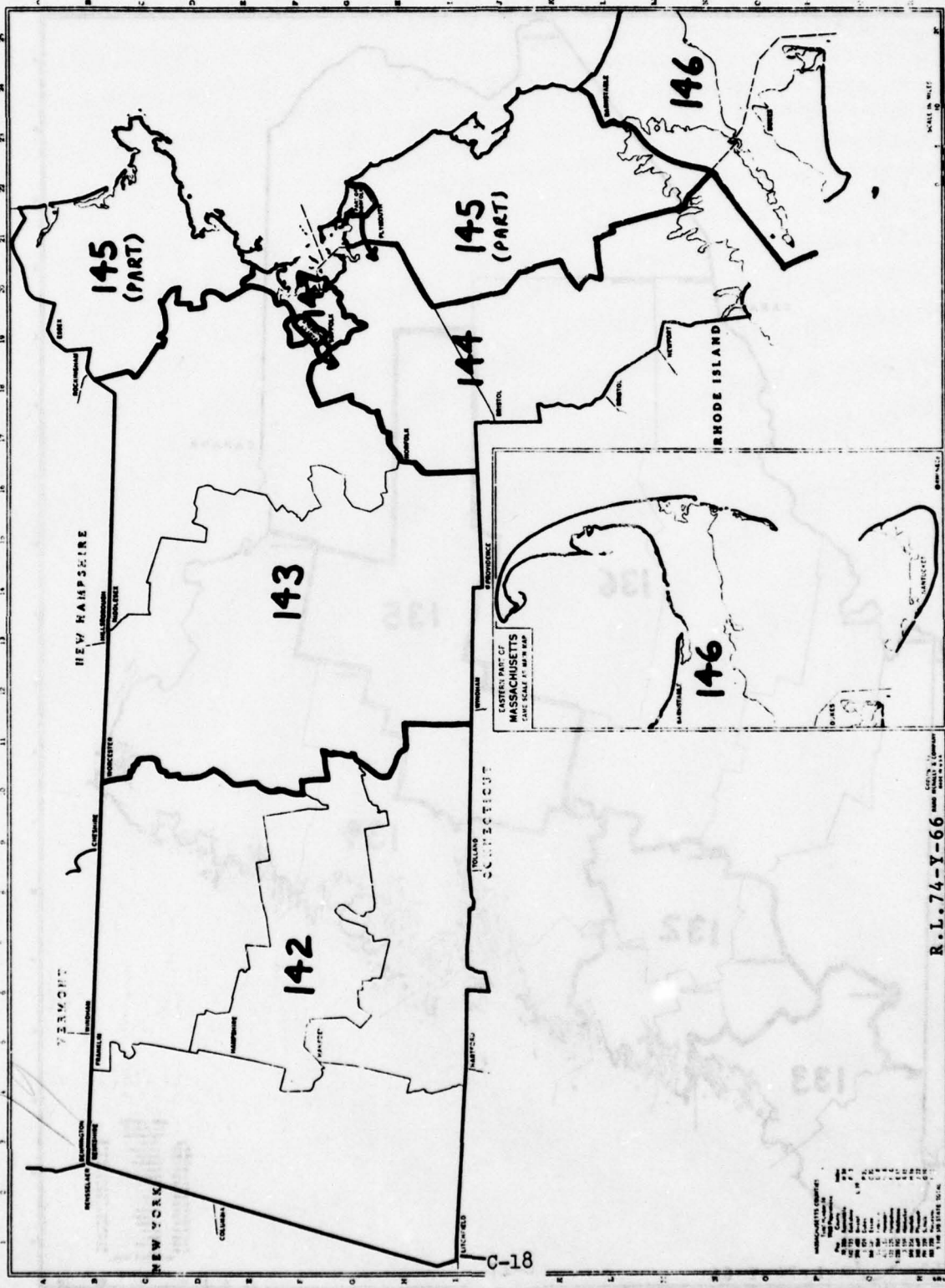
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NATIONAL BUREAU OF STANDARDS

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STATE COUNTY OUTLINE MAP**

**MASSACHUSETTS**  
REF 0 1/2 x 11



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STATE COUNTY OUTLINE MAP**

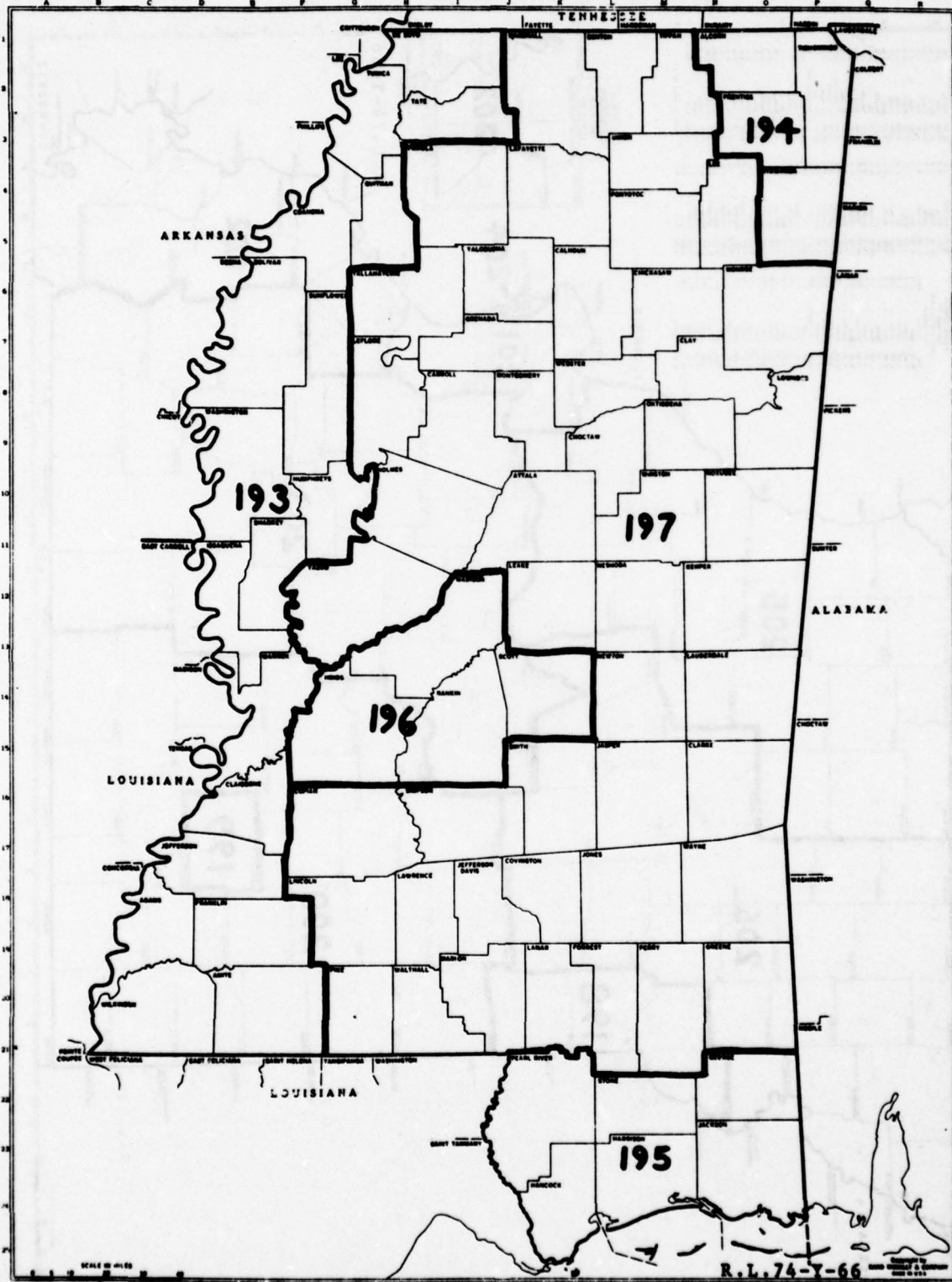
**MICHIGAN**  
SIZE 8 1/2 x 11





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STATE COUNTY OUTLINE MAP**

**MISSISSIPPI**  
SIZE 8 1/2 x 11



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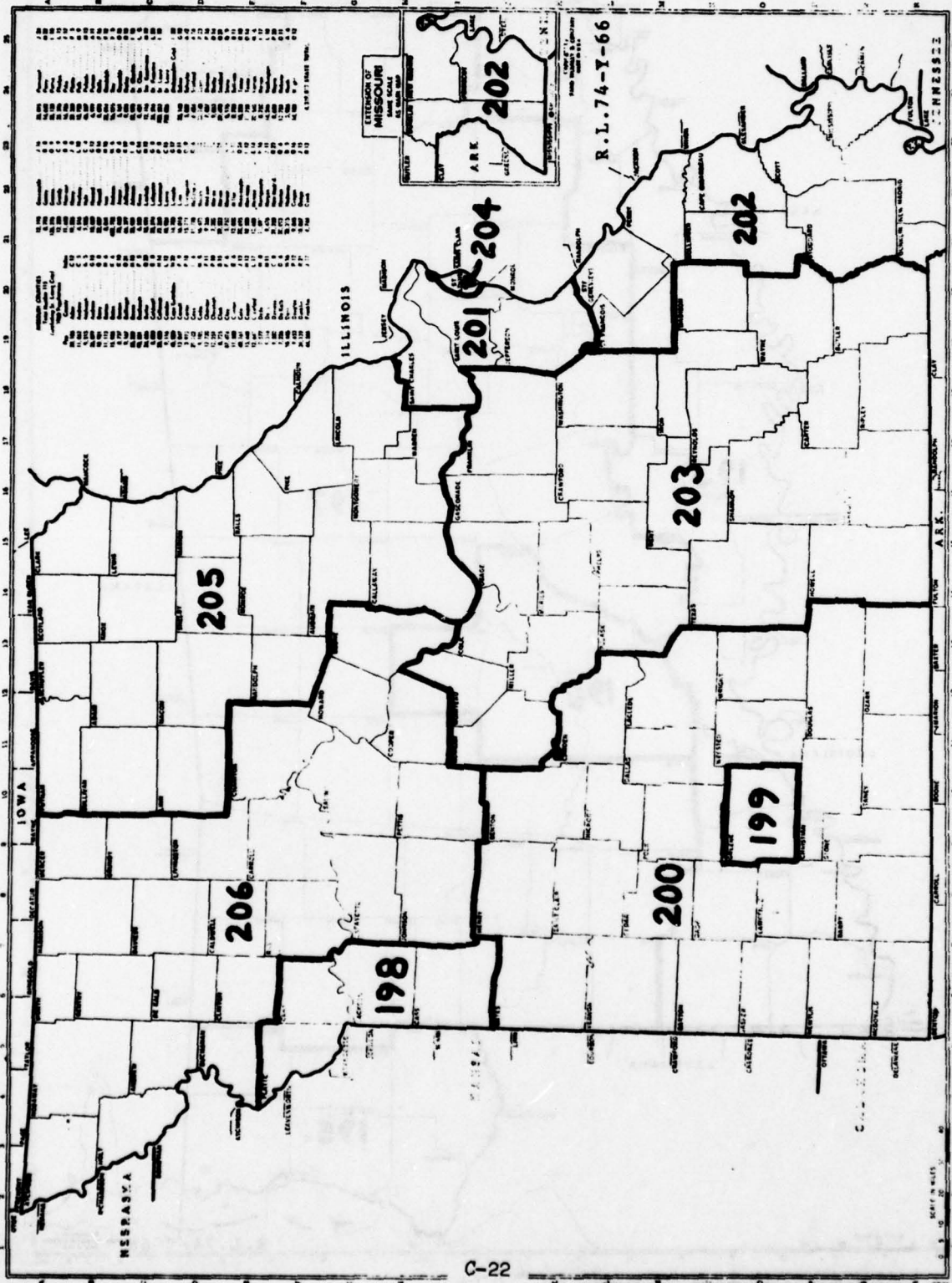
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STATE COUNTY OUTLINE MAP**

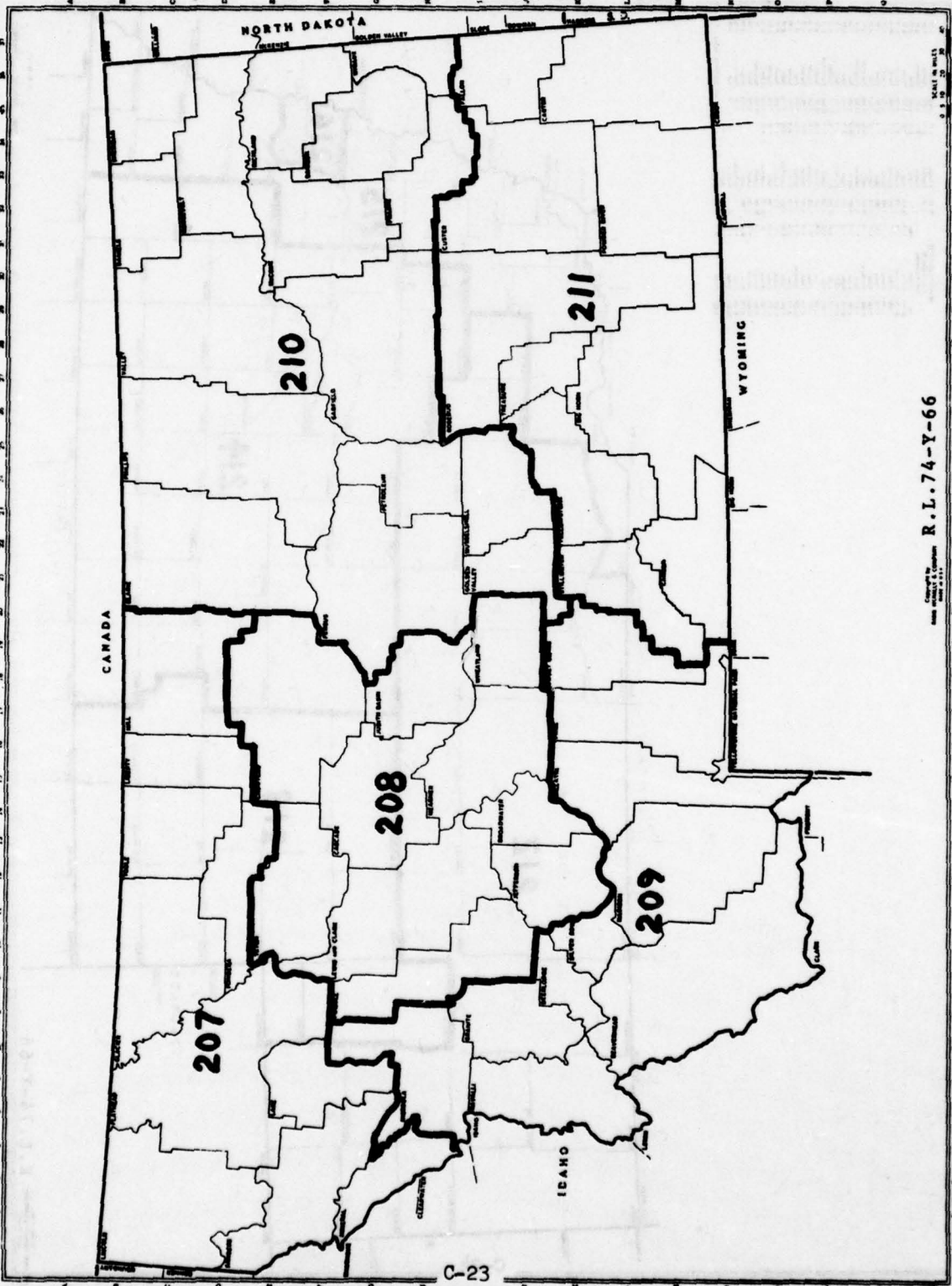
**MISSOURI**  
SIZE 8 1/2 x 11



23

**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**MONTANA**  
SIZE 8 1/2 x 11



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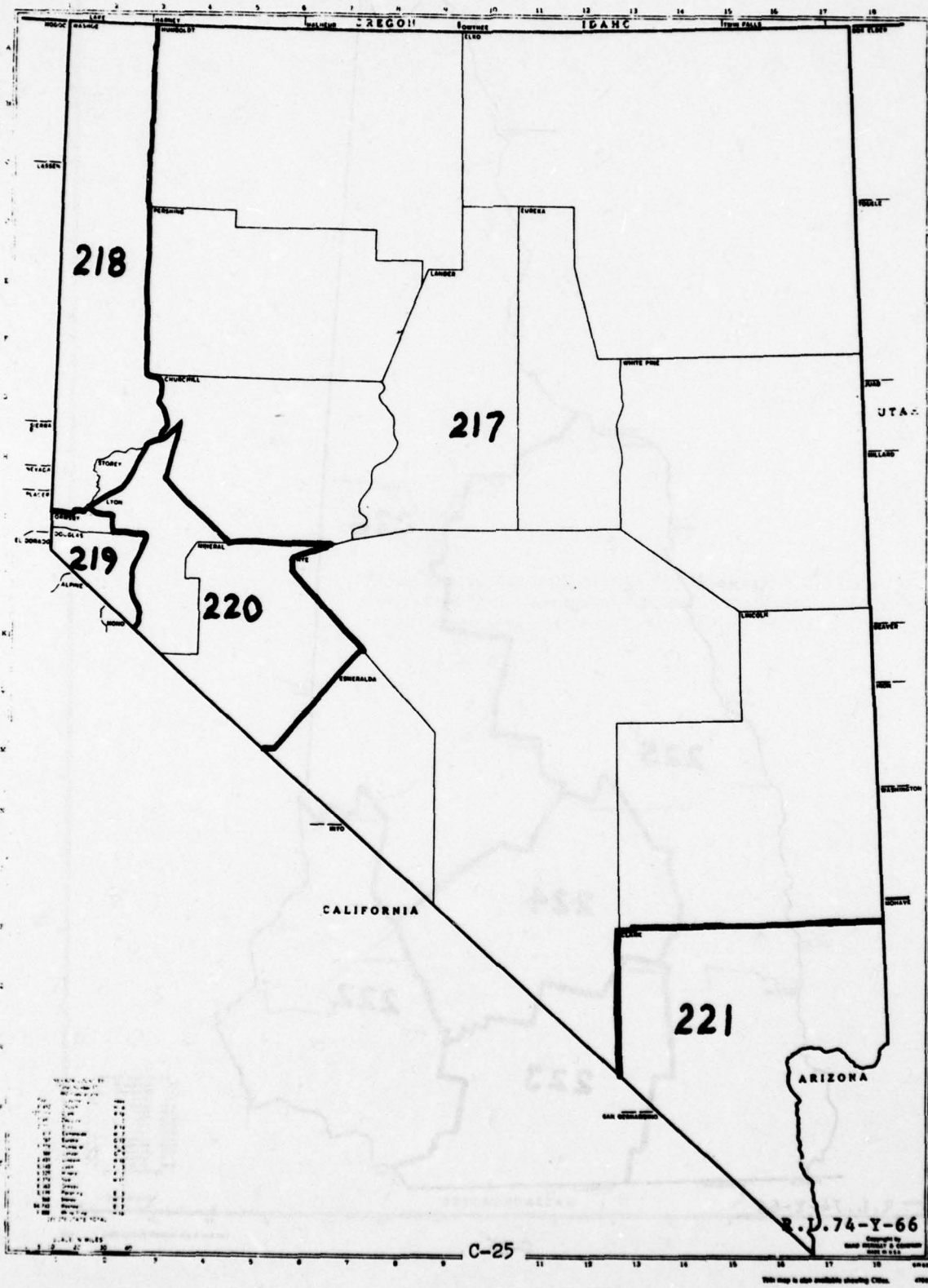
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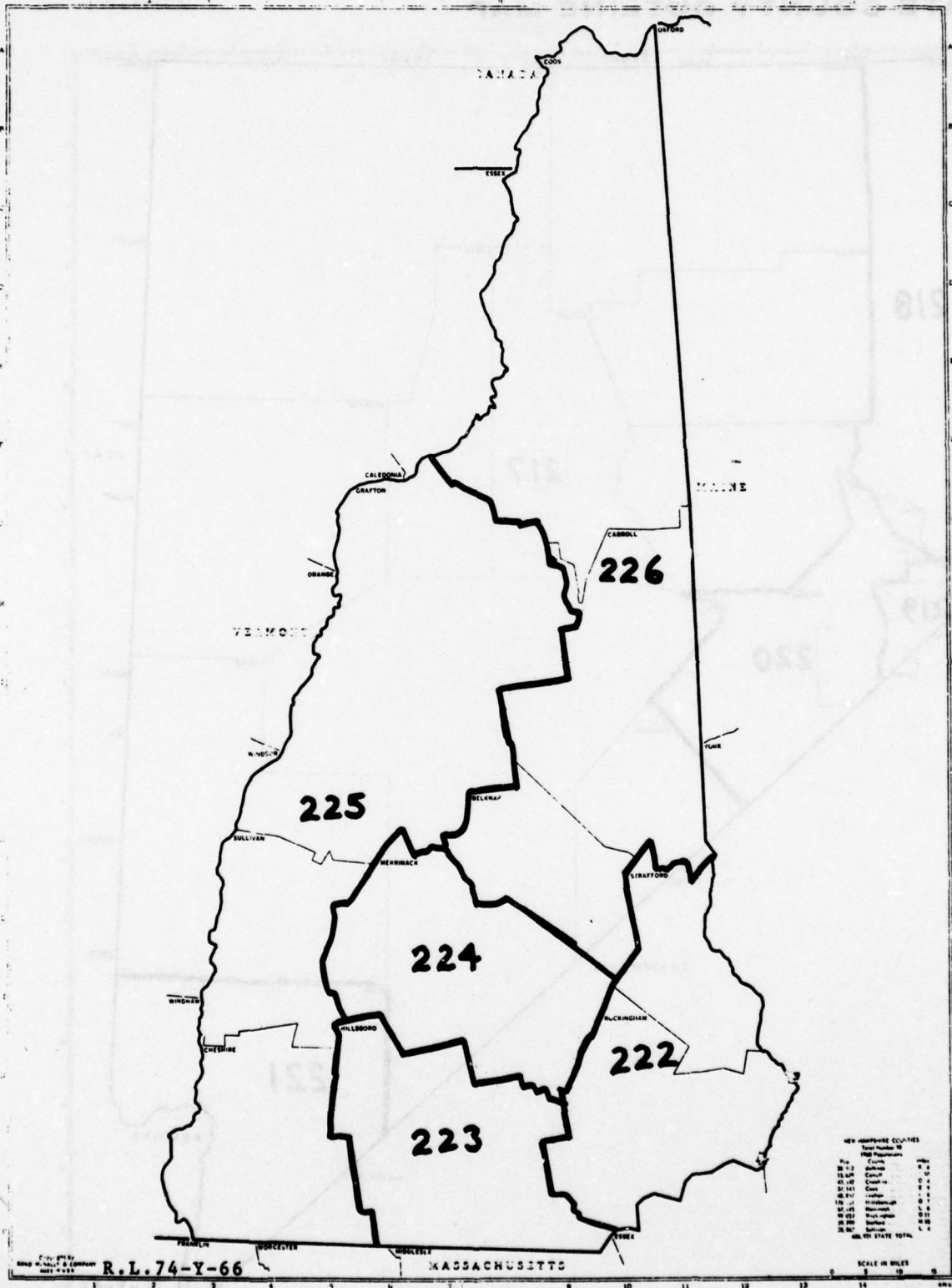
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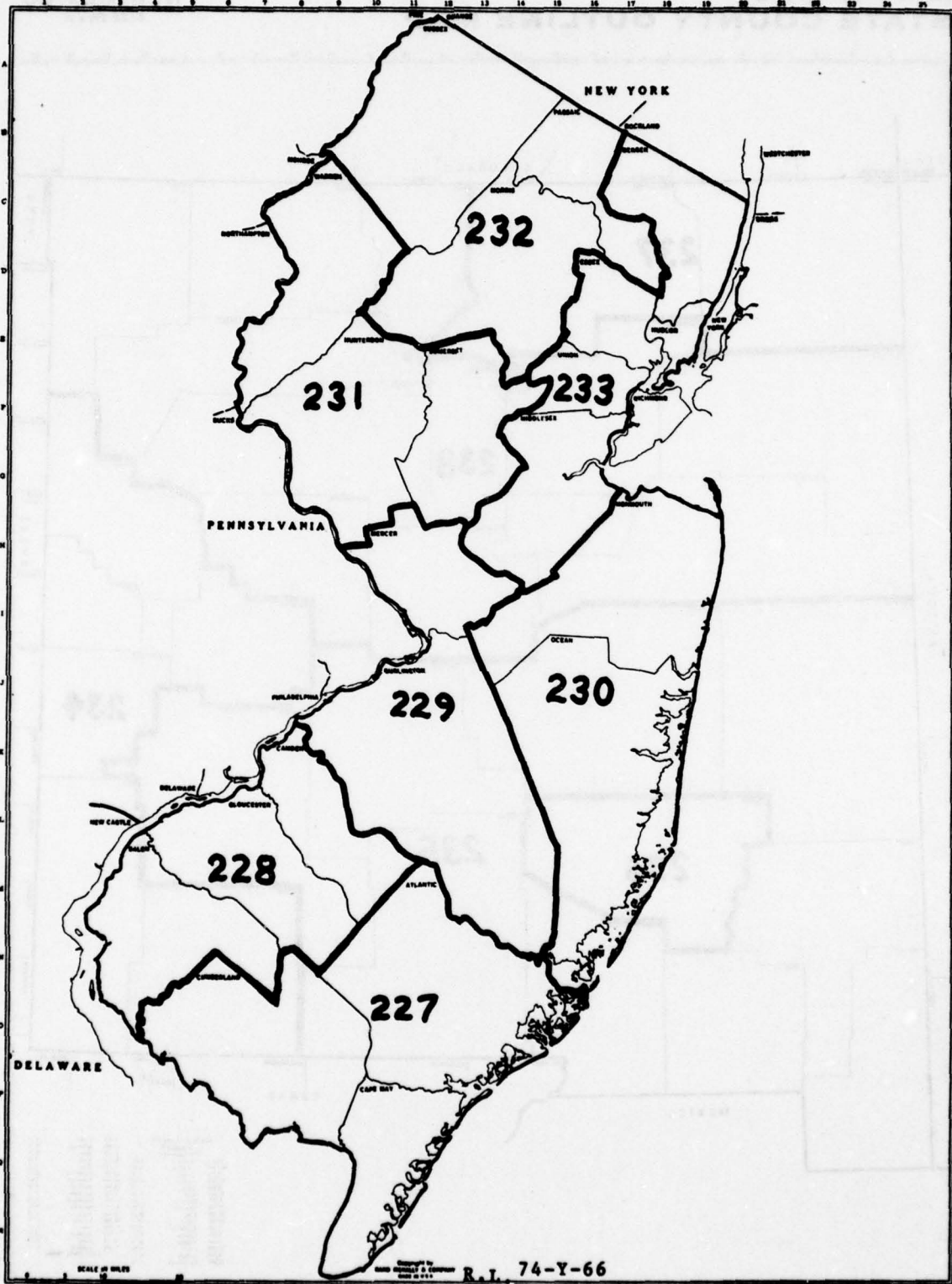
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**NEW JERSEY**  
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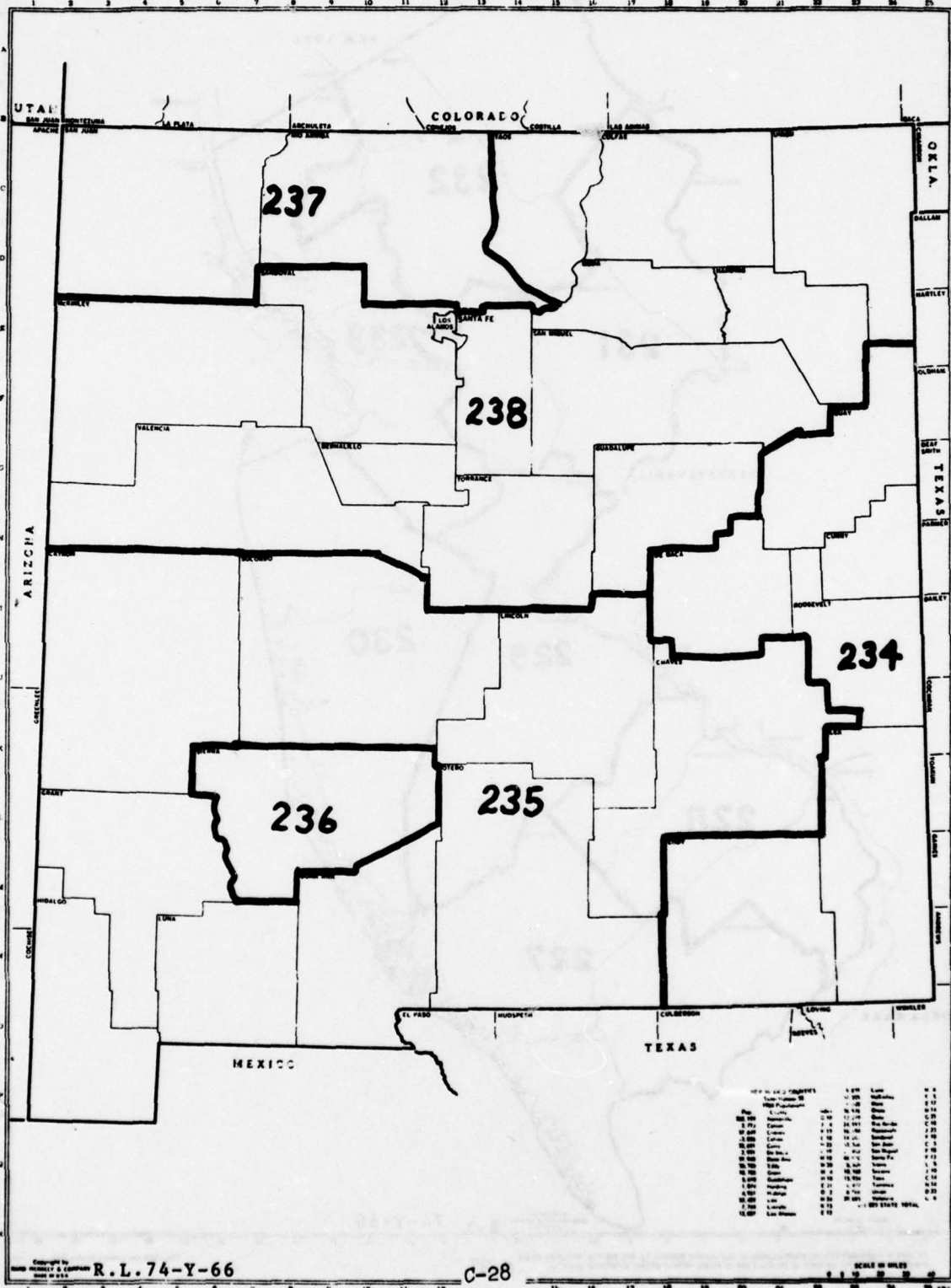
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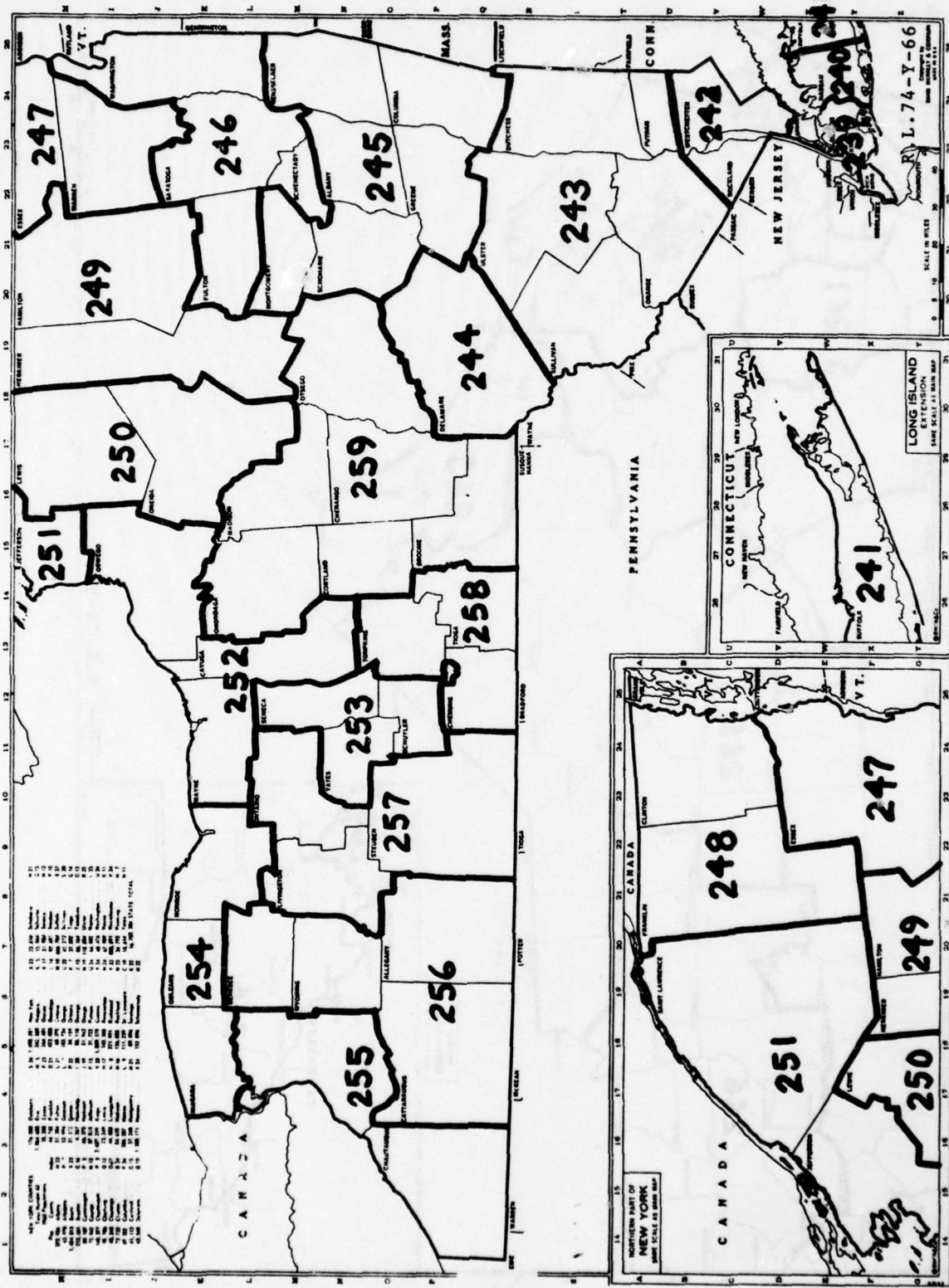
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STATE COUNTY OUTLINE MAP**

**NEW MEXICO**  
SIZE 8 1/2 x 11



**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**NEW YORK**  
SIZE 8 1/2 x 11

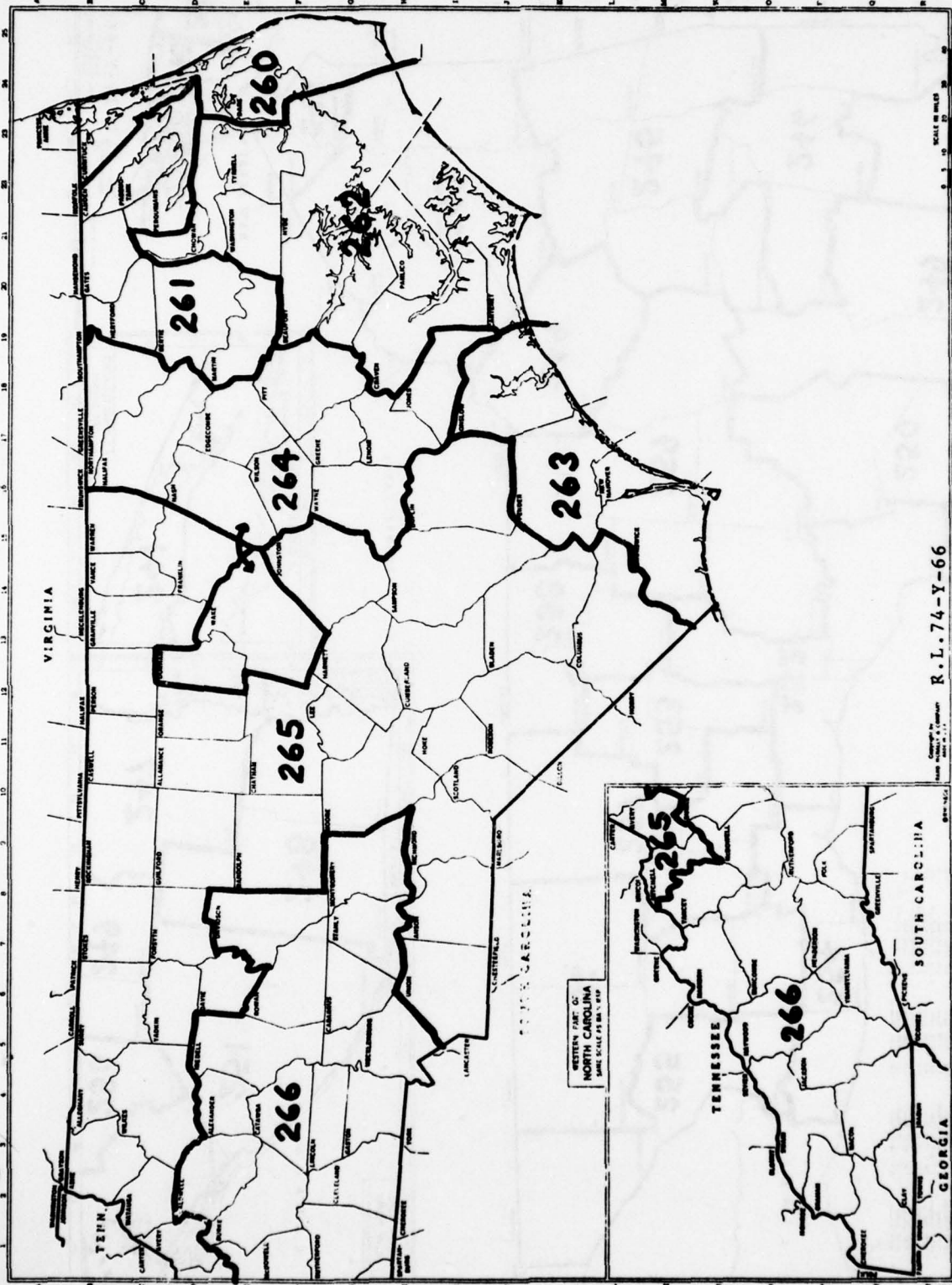


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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**NORTH CAR.**  
SIZE 8 1/2 x 11

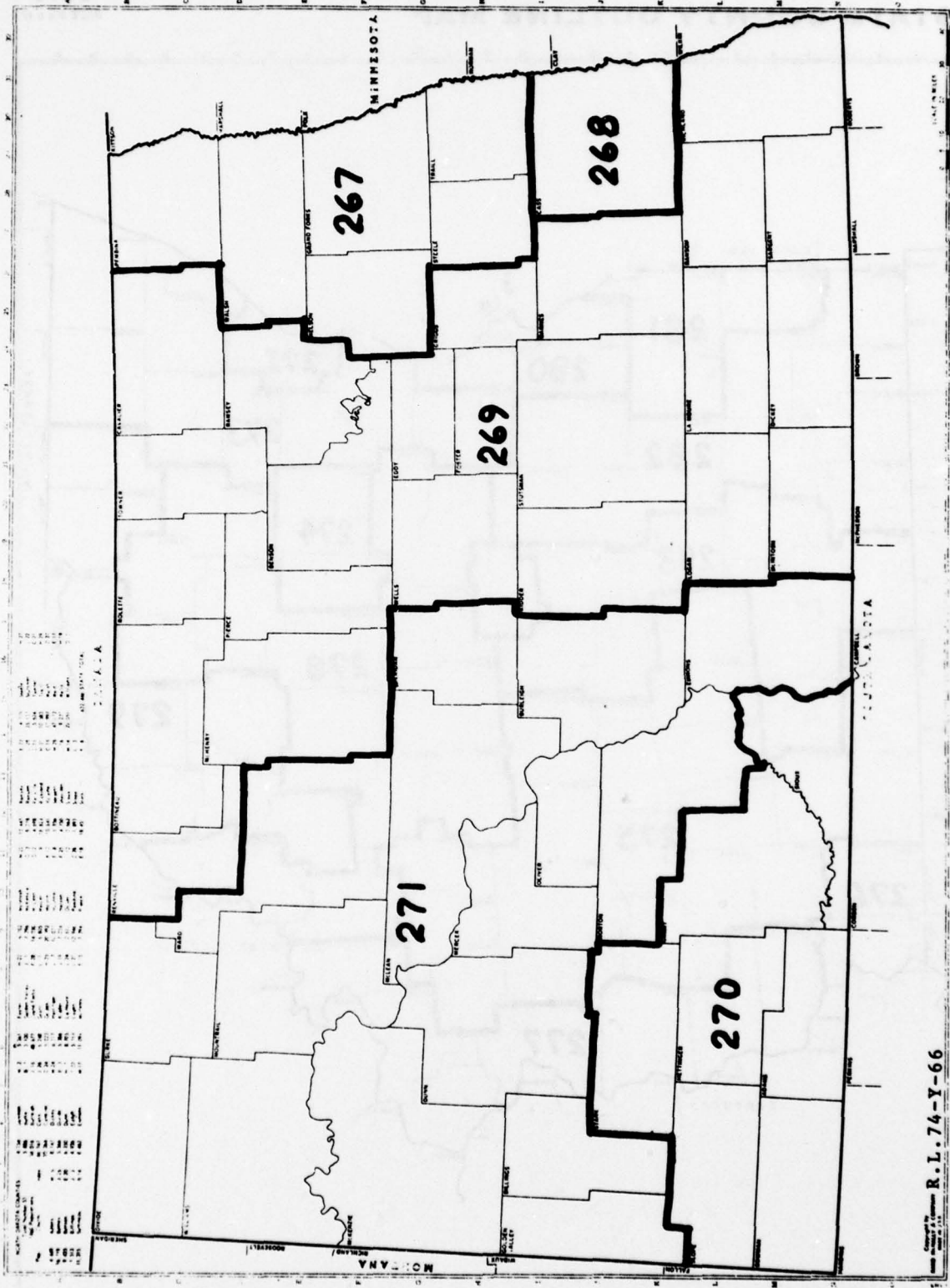


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STATE COUNTY OUTLINE MAP

NORTH DAKOTA  
SIZE 8 1/4 x 11

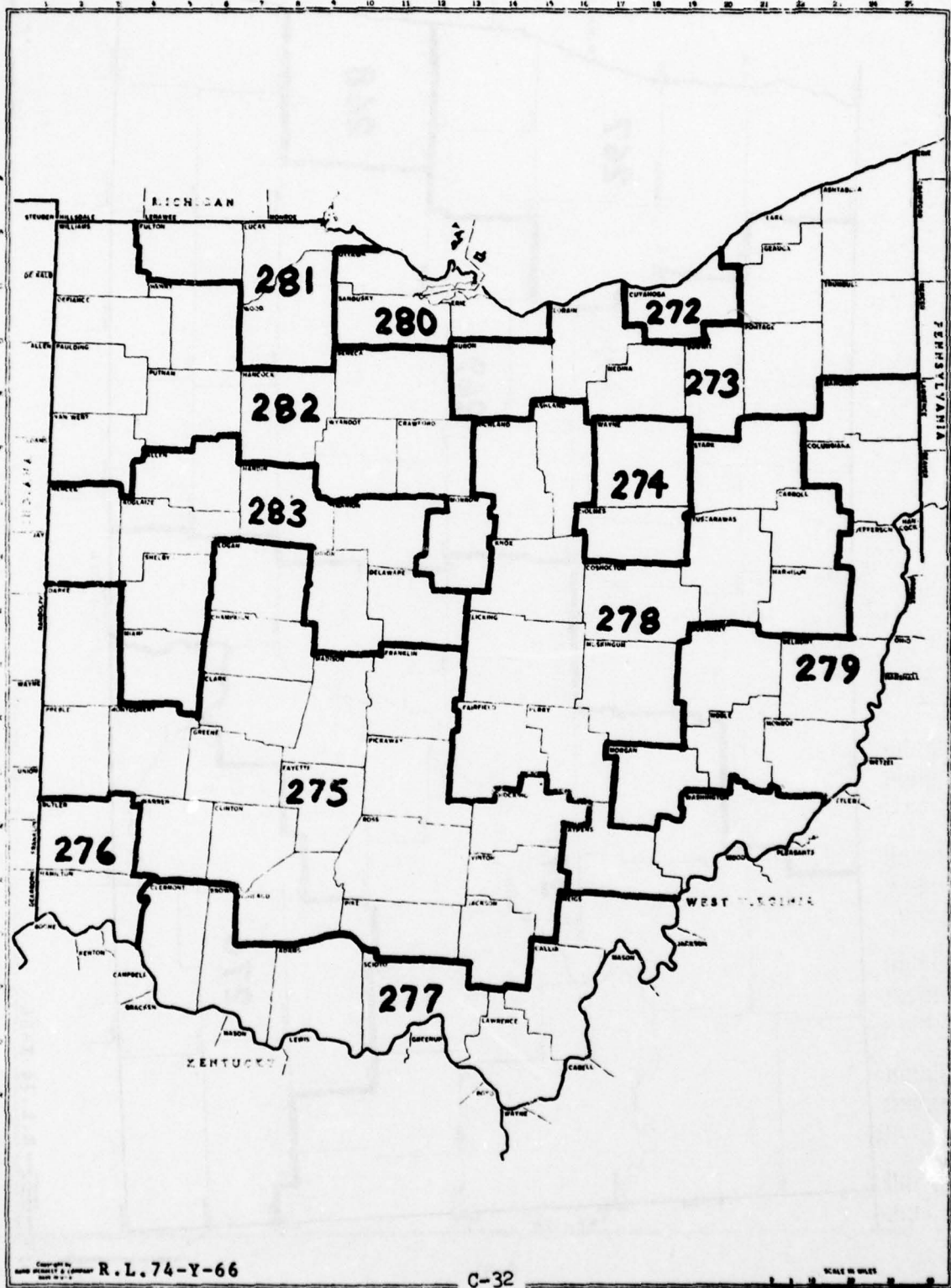


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32

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STATE COUNTY OUTLINE MAP**

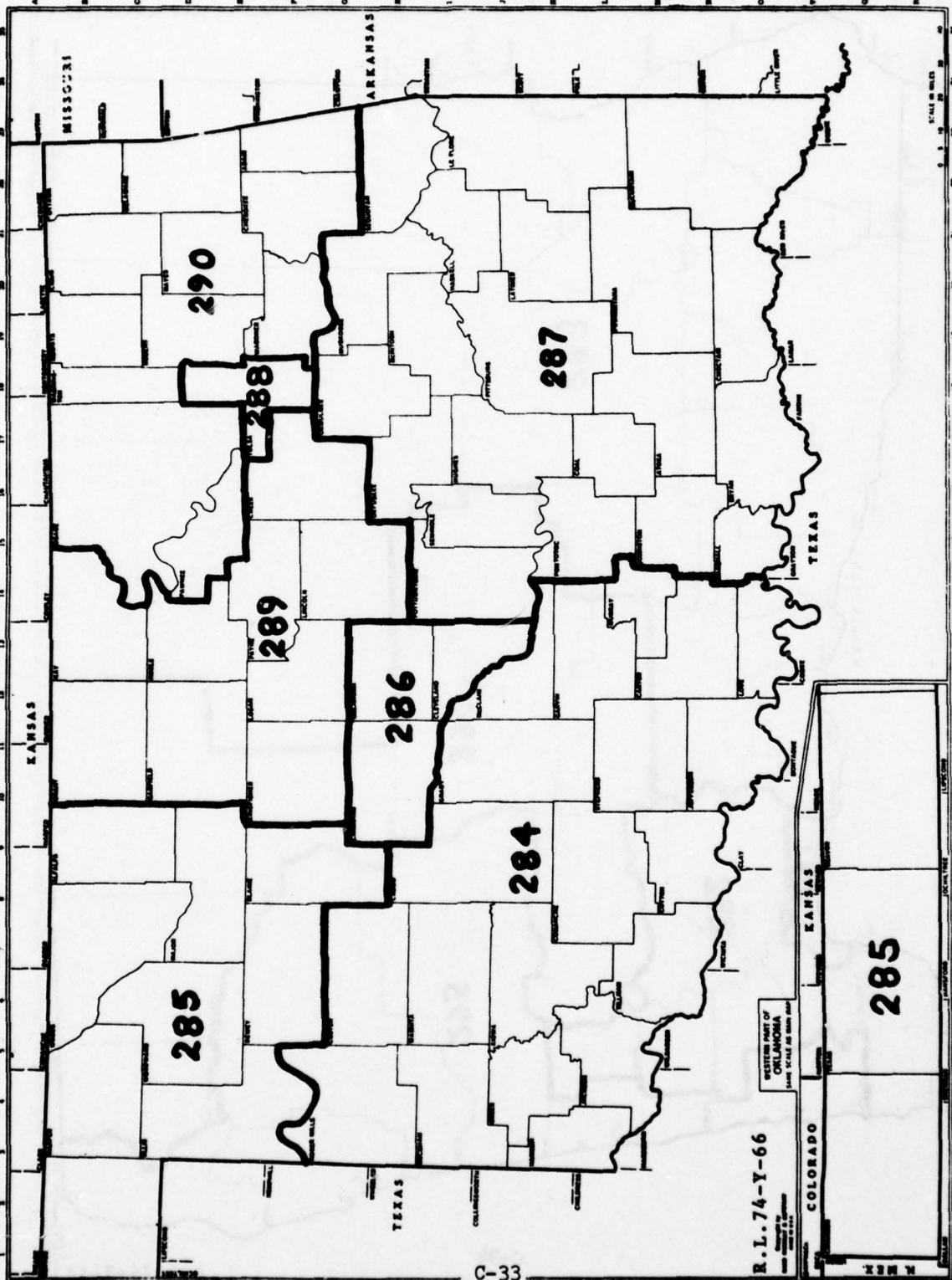
**OHIO**  
SIZE 8 1/2 x 11



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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**OKLAHOMA**  
SIZE 9 1/4 x 11



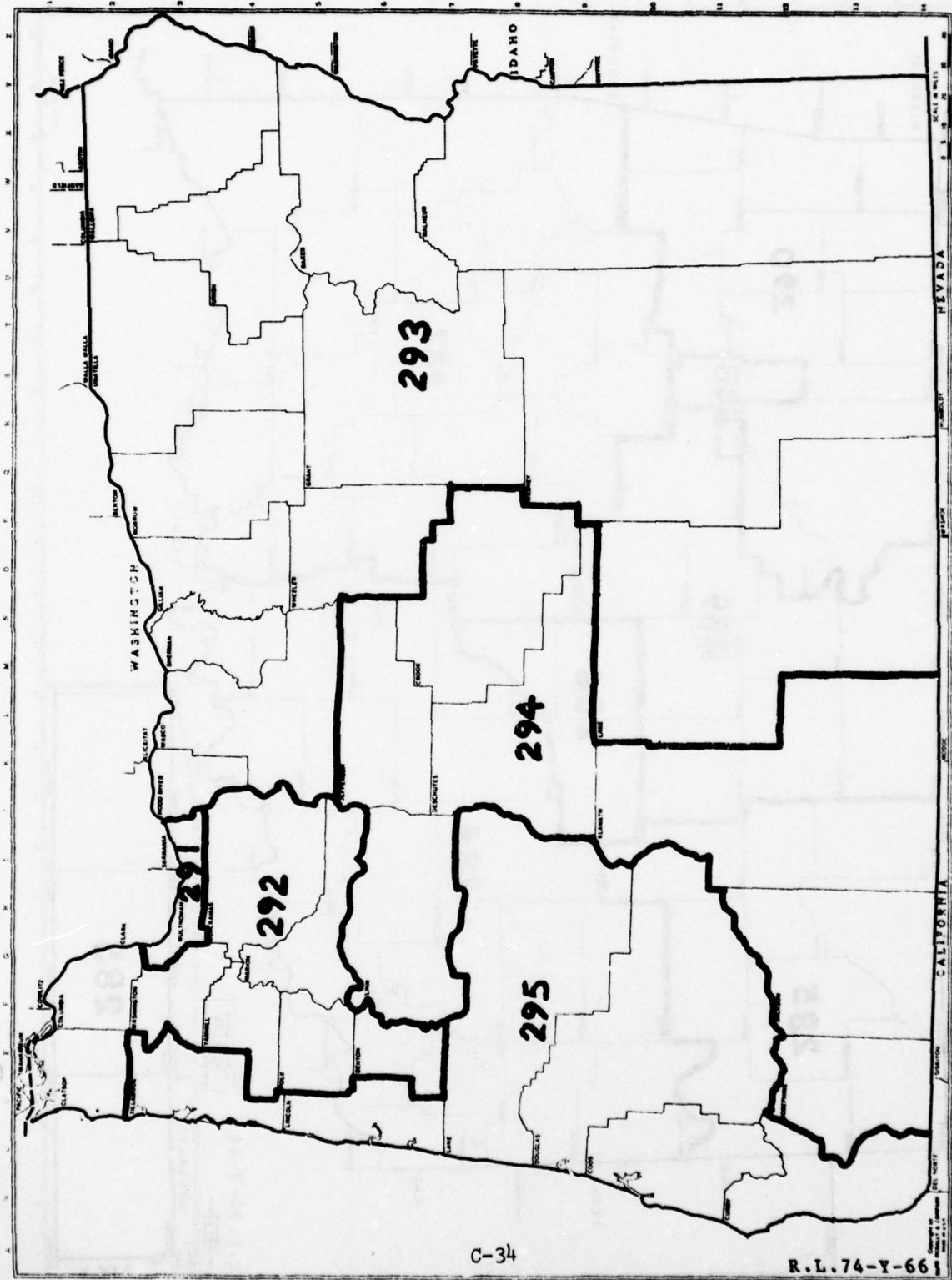
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STATE COUNTY OUTLINE MAP**

**OREGON**  
SIZE 8 1/2 x 11

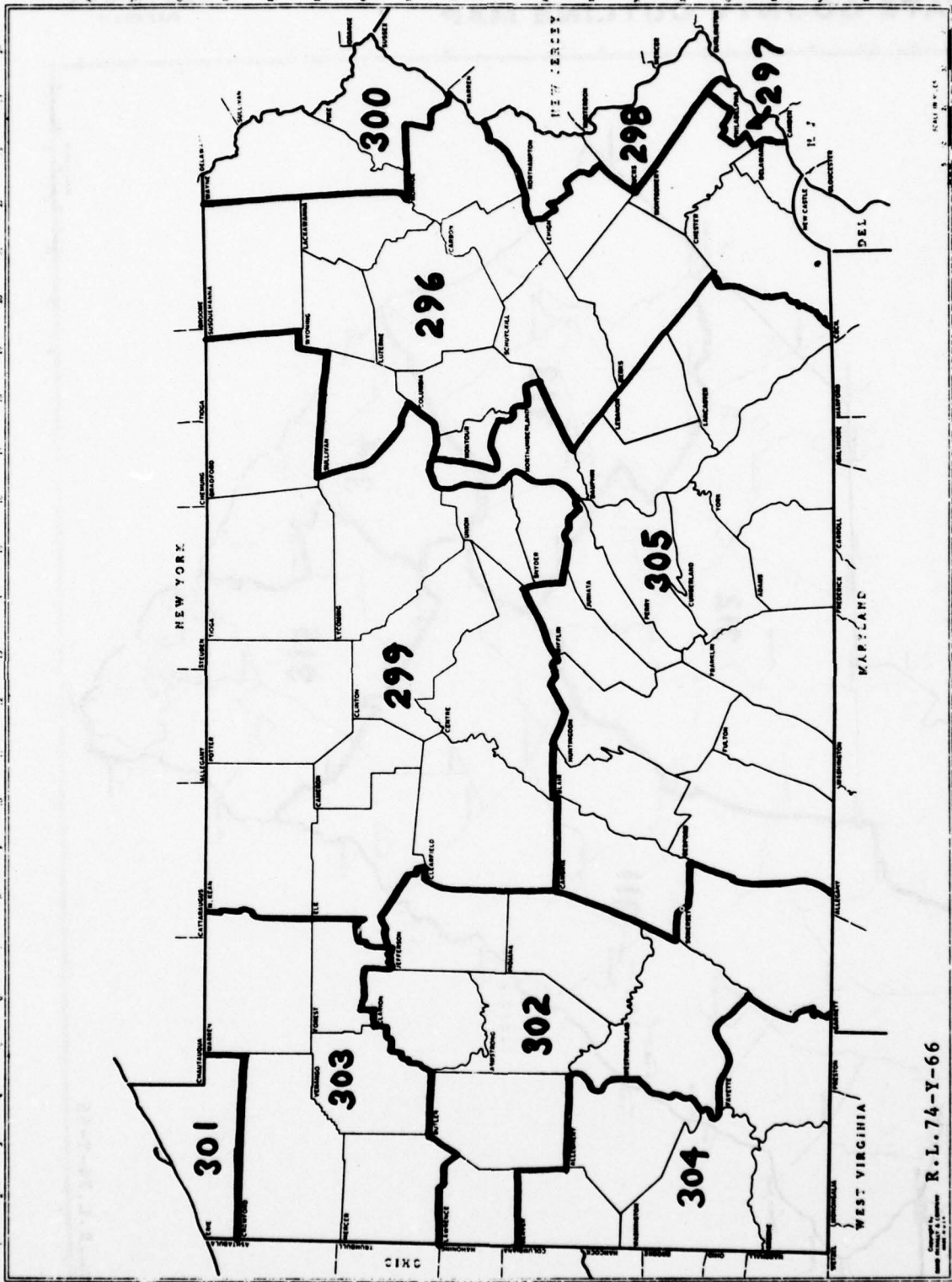


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STATE COUNTY OUTLINE MAP

PENNSYLVANIA  
SIZE 8 1/4 x 11



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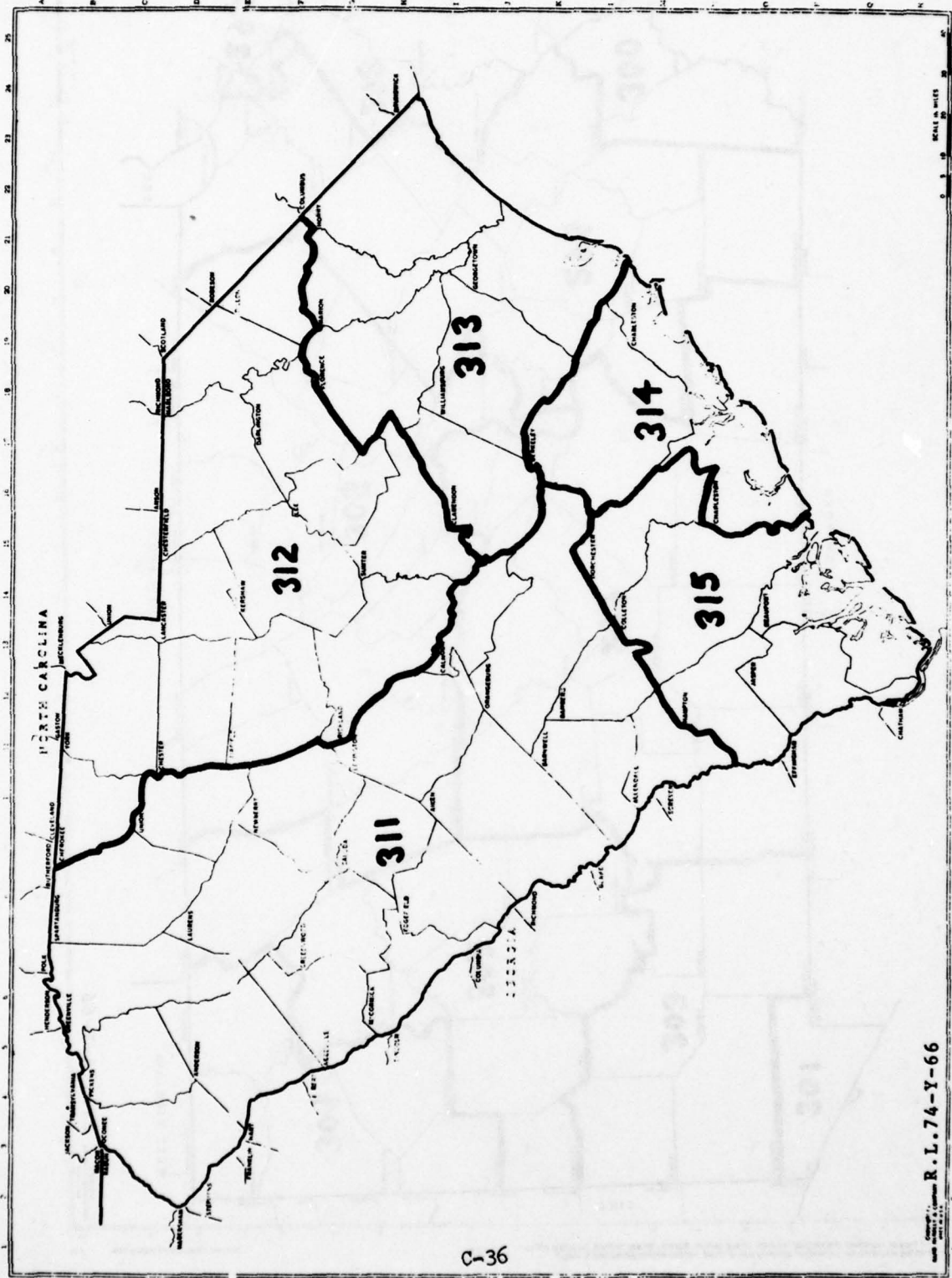
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STATE COUNTY OUTLINE MAP**

**SOUTH CAR.**  
SIZE 8 1/2 x 11

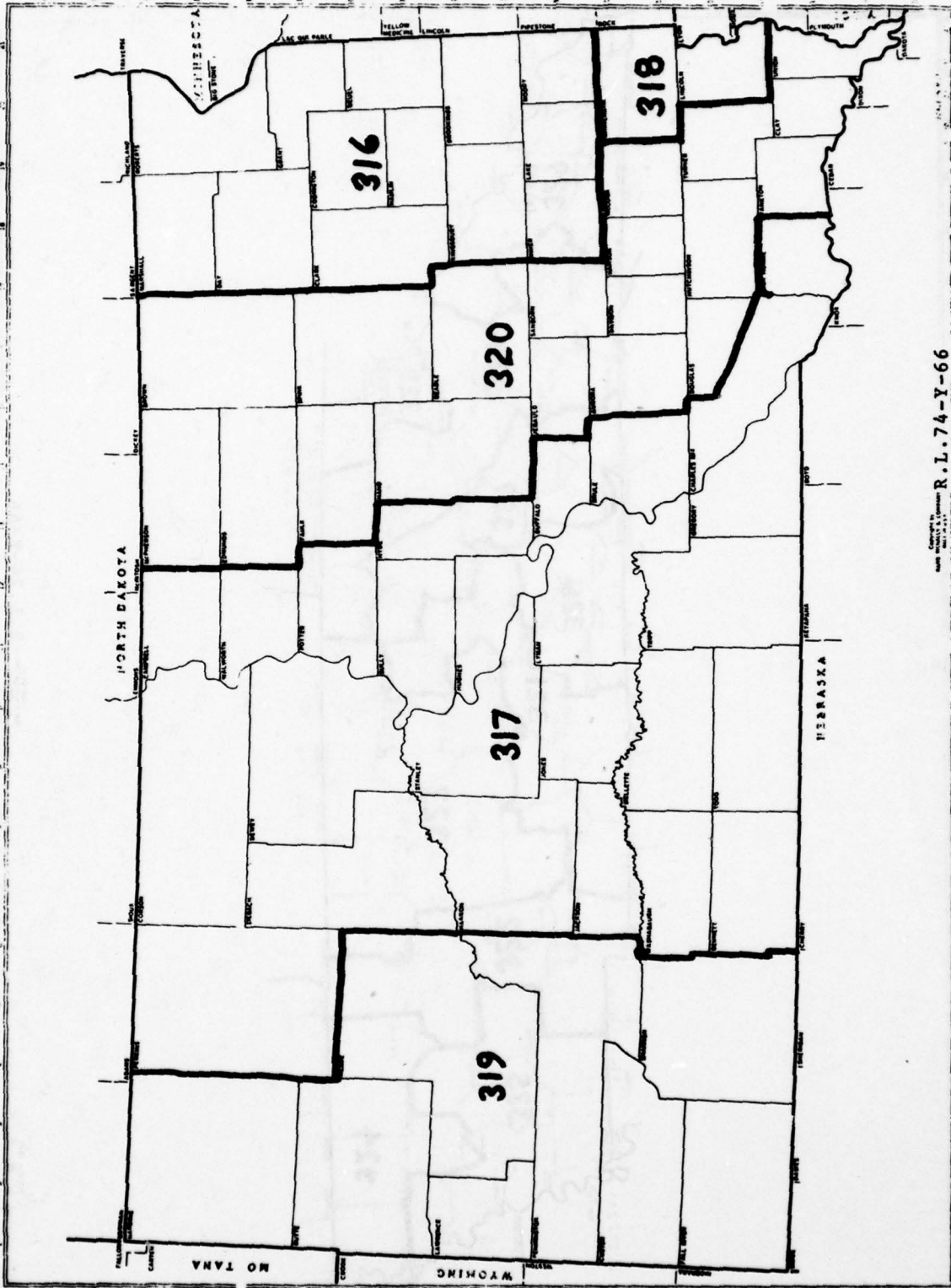


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STATE COUNTY OUTLINE MAP

SOUTH DAKOTA  
SIZE 8 1/2 x 11



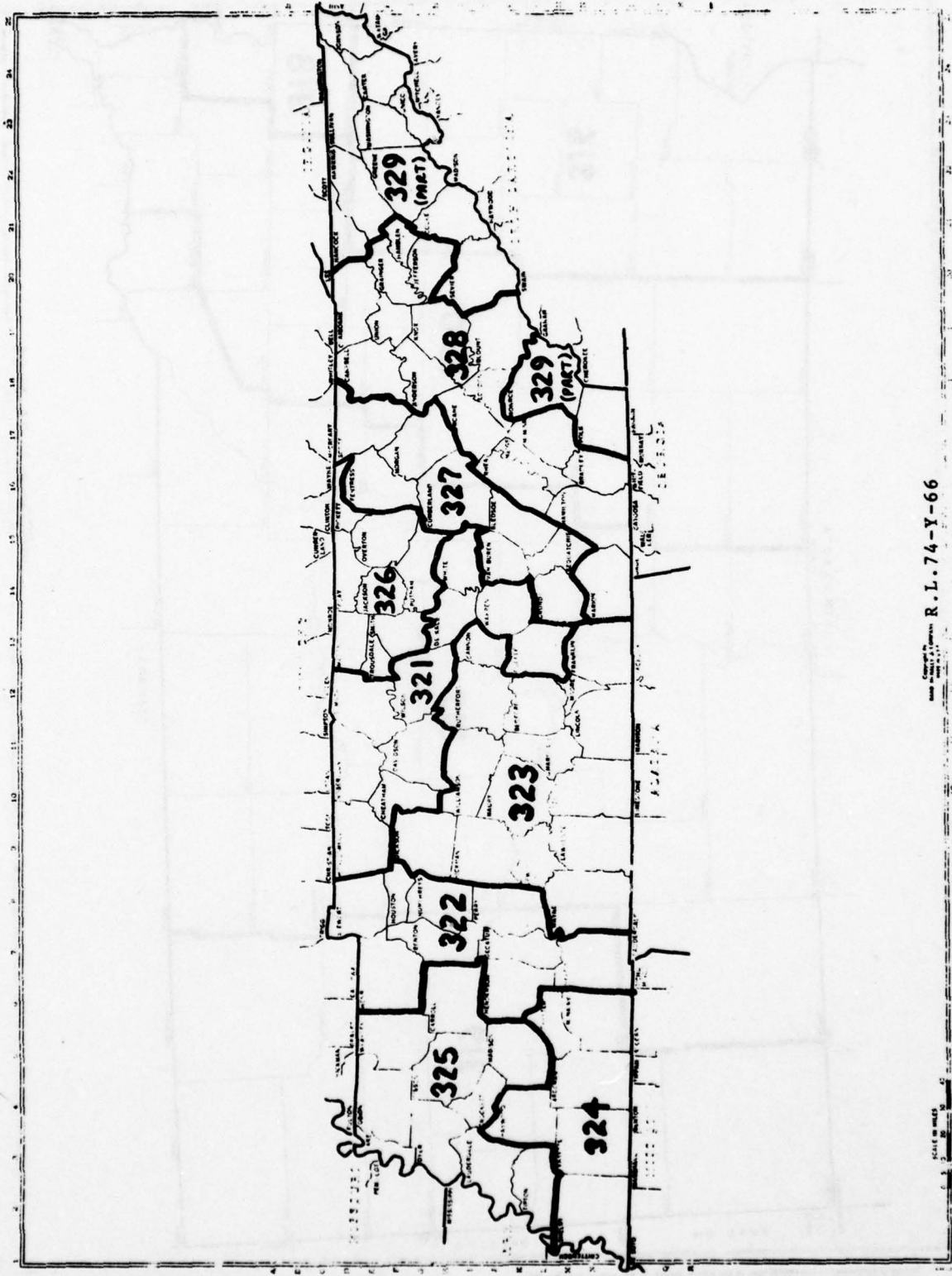
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STATE COUNTY OUTLINE MAP

TENNESSEE  
@ 1:250,000 N 11



R. L. 74-Y-66

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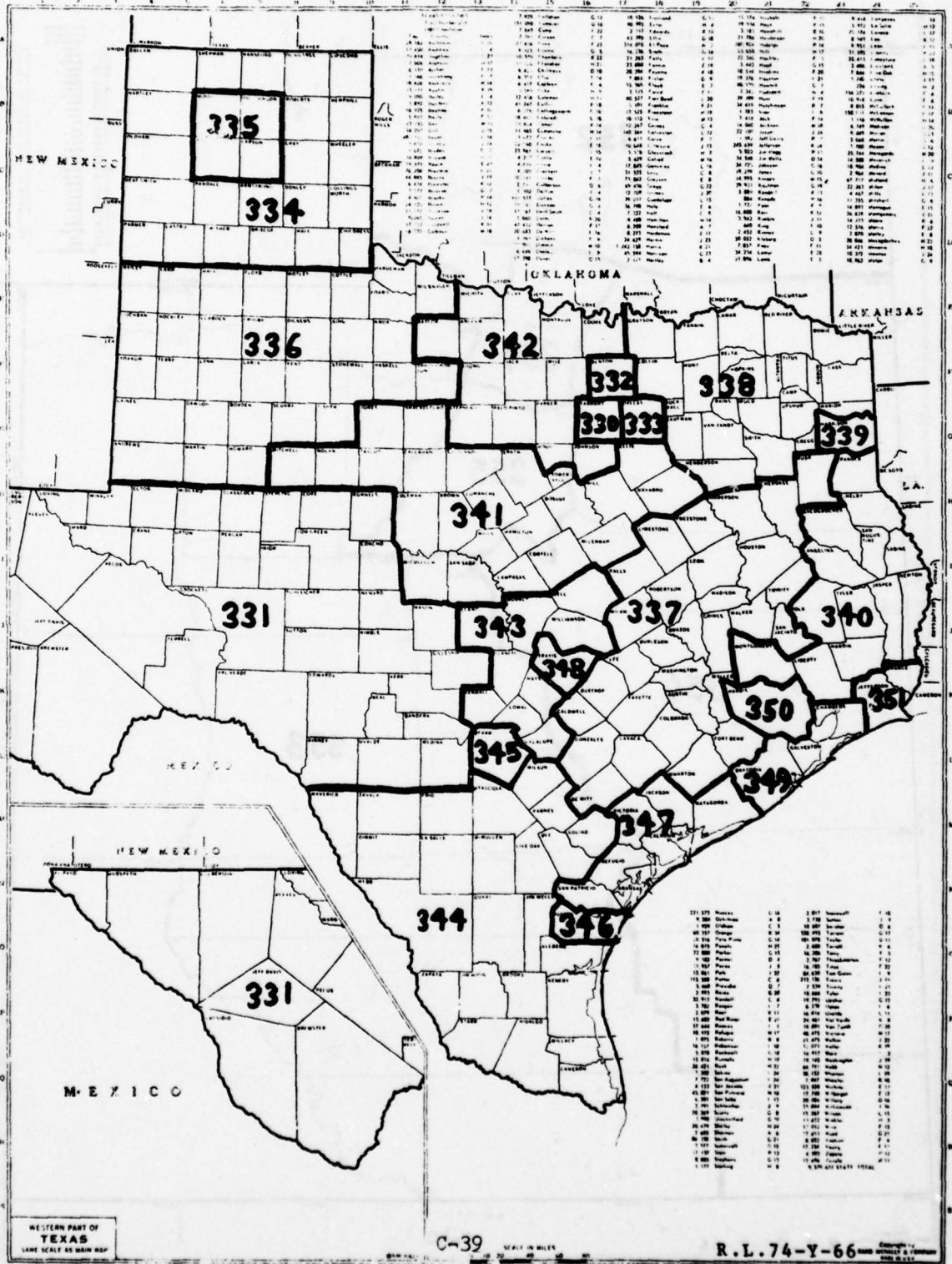
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STATE COUNTY OUTLINE MAP**

**TEXAS**  
SIZE 8 1/2 x 11



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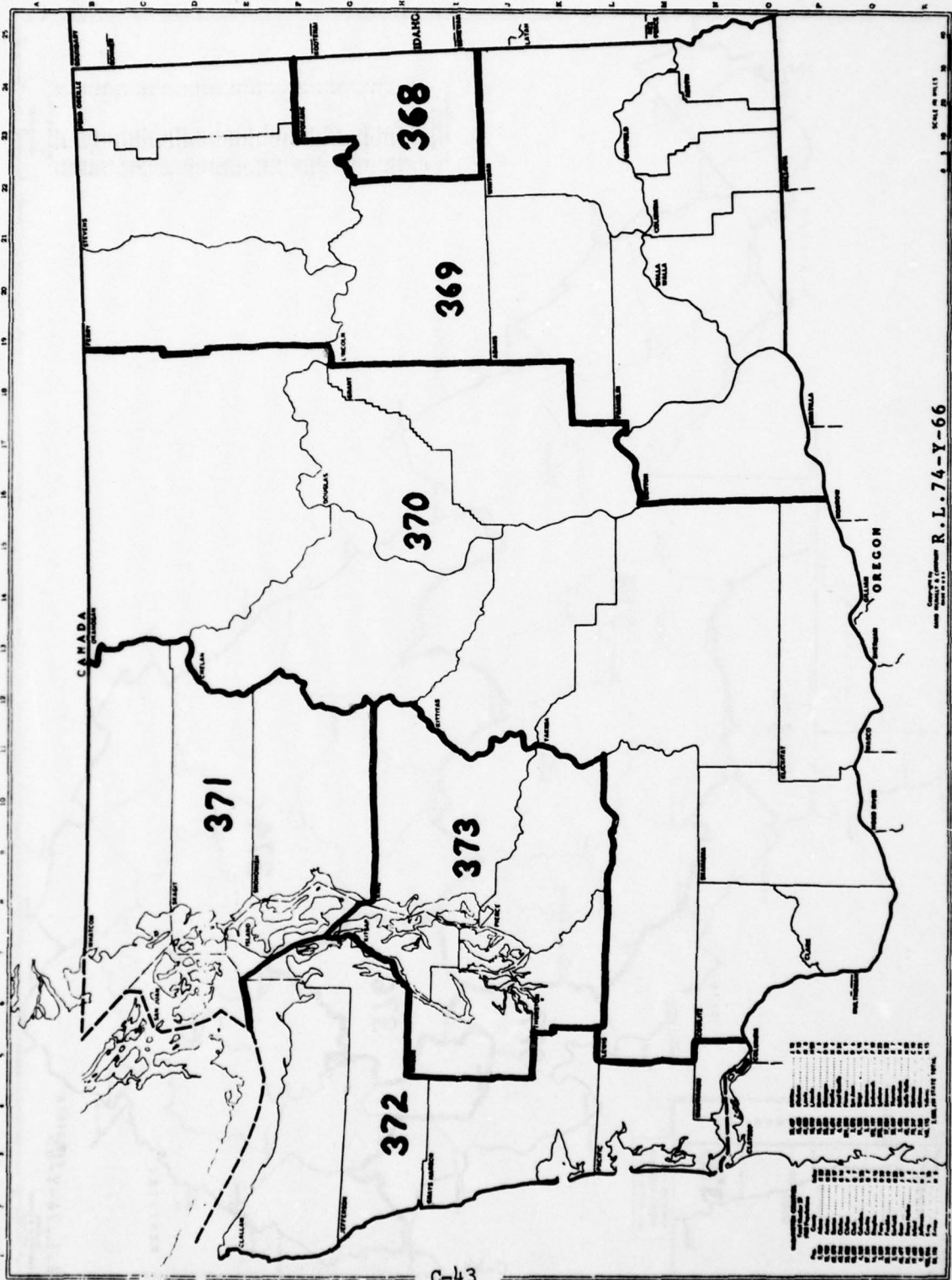






**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**WASHINGTON**  
SIZE 9 1/4 x 11



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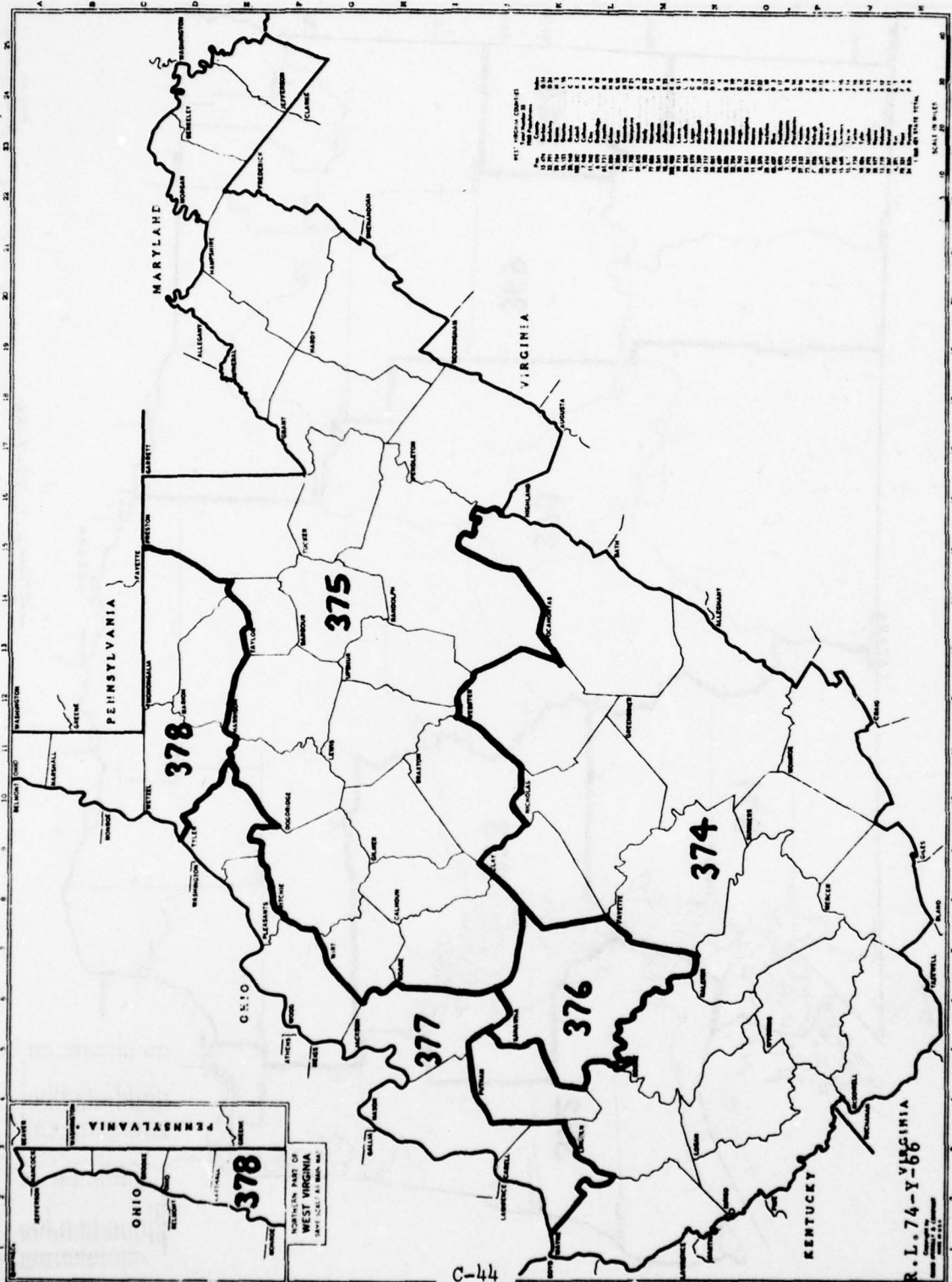
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STATE COUNTY OUTLINE MAP**

**WEST VA.**  
SIZE 8 1/2 x 11

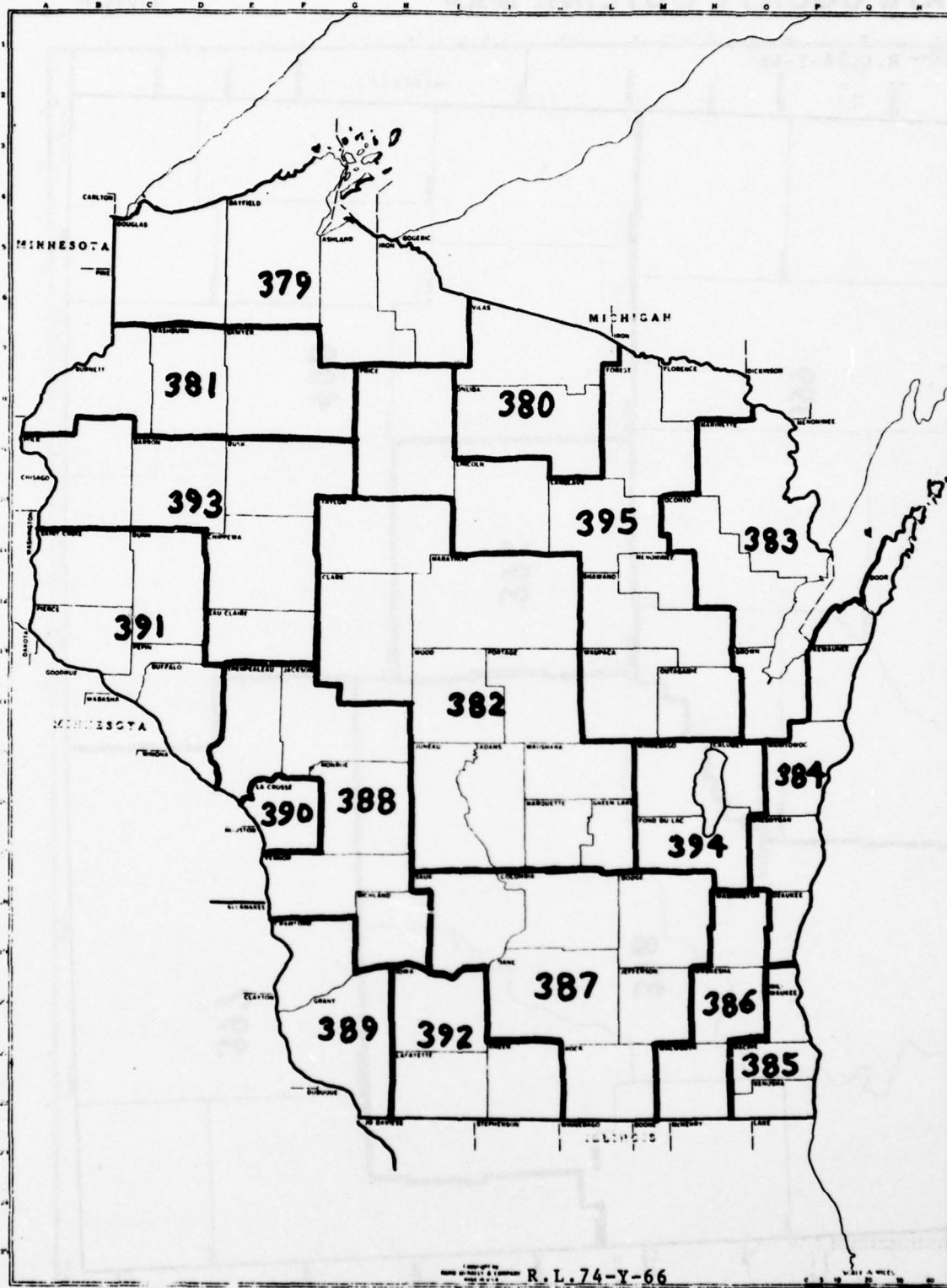


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STATE COUNTY OUTLINE MAP**

**WISCONSIN**  
SIZE 8 1/2 x 11



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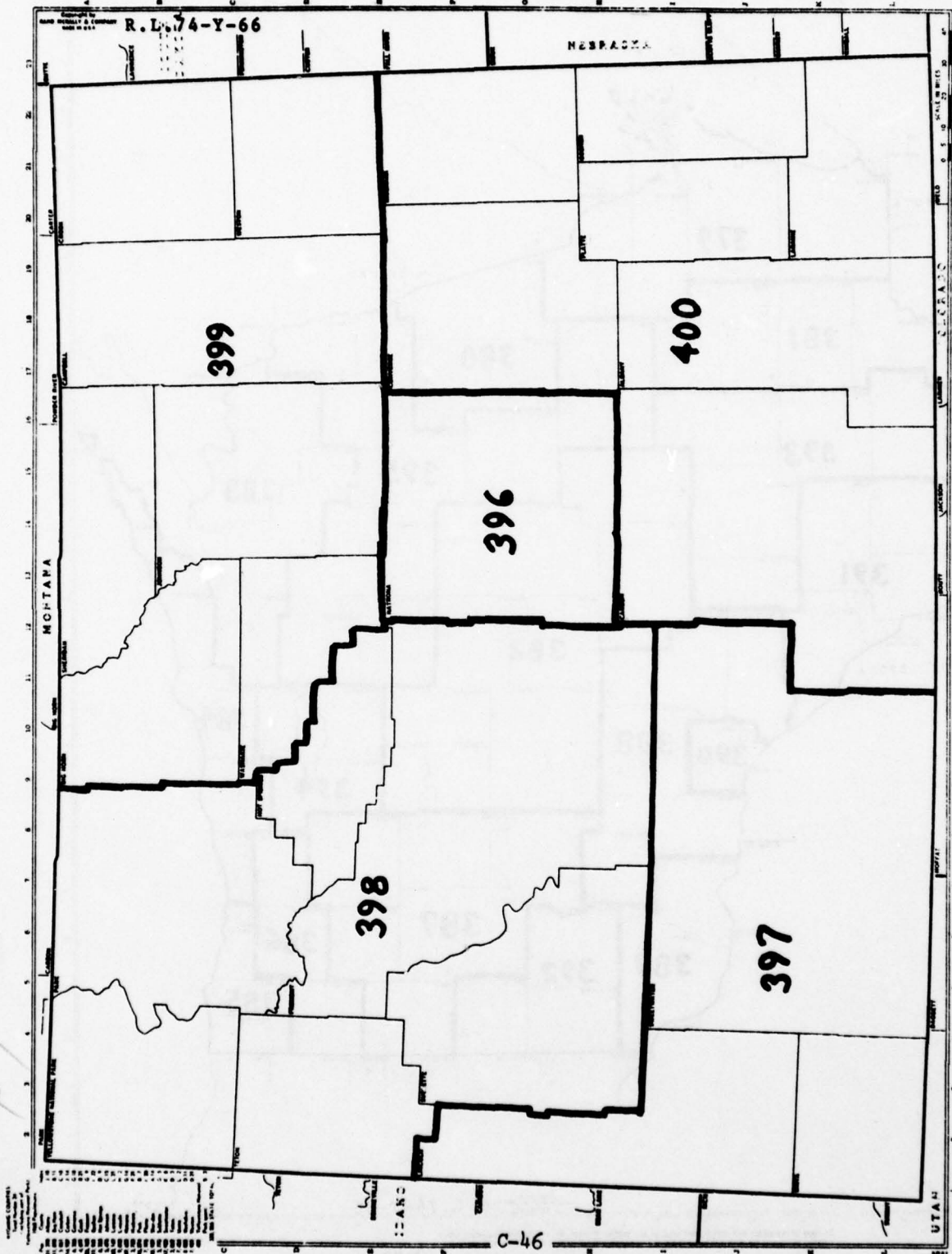
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**RAND McNALLY  
STATE COUNTY OUTLINE MAP**

**WYOMING**  
SIZE 8 1/2 x 11



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**APPENDIX D:**

**SAMPLING STRATIFICATION: 1973 AND 1976 OCCUPIED HOUSEHOLD  
COUNT AND COUNTY LISTINGS FOR EACH STRATUM**

APPENDIX D

SAMPLING STRATIFICATION: 1973 AND 1976 OCCUPIED HOUSEHOLD COUNT AND LISTINGS FOR EACH STRATUM

Each stratum of the Nationwide Boating Survey sampling plan is listed below. For each stratum, the state, the 1973 and 1976 numbers of occupied households, and list of counties is provided. The reader is referred to Appendix C for a geographical representation of the strata.

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS 1/</u>	<u>COUNTIES</u>
001	AL	291,493	311,879	Cherokee, Colbert, Cullman, DeKalb, Etowah, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, Marshall, Morgan, Saint Clair, Walker, Winston
002	AL	38,198	40,427	Fayette, Greene, Hale, Lamar, Marion, Pickens, Sumter
003	AL	30,864	33,121	Choctaw, Clarke, Marengo, Monroe, Washington
004	AL	204,717	224,805	Baldwin, Barbour, Coffee, Covington, Dale, Escambia, Geneva, Henry, Houston, Mobile
005	AL	67,372	69,504	Bibb, Bullock, Butler, Conecuh, Crenshaw, Dallas Lowndes, Macon, Perry, Pike, Wilcox
006	AL	290,775	310,205	Autauga, Blount, Chilton, Jefferson, Shelby, Tuscaloosa
007	AL	78,766	85,391	Elmore, Montgomery, Tallapoosa
008	AL	114,816	125,669	Calhoun, Chambers, Clay, Cleburne, Coosa, Lee, Randolph, Russell, Talladega
009	AZ	142,486	162,266	Pima, Santa Cruz
010	AZ	370,095	426,856	Maricopa
011	AZ	31,821	35,686	Mohave, Yuma

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
012	AZ	55,360	64,622	Apache, Conconino, Navajo, Yavapai
013	AZ	63,240	69,570	Cochise, Gila, Graham, Greenlee, Pinal
014	AR	84,457	87,929	Bradley, Calhoun, Cleveland, Dallas, Grant, Jefferson, Lonoke, Ouachita, Prairie, Union, Woodruff
015	AR	149,530	155,710	Arkansas, Ashley, Chicot, Clay, Craighead, Crittenden, Cross, Desha, Drew, Greene, Lee, Lincoln, Mississippi, Monroe, Phillips, Poinsett, St. Francis
016	AR	126,173	135,907	Faulkner, Pulaski, Saline
017	AR	106,140	111,933	Clark, Columbia, Garland, Hempstead, Hot Springs, Howard, Lafayette, Little River, Miller, Montgomery, Nevada, Perry, Pike, Polk, Scott, Sevier, Yell
018	AR	213,699	234,521	Baxter, Benton, Boone, Carroll, Cleburne, Conway, Crawford, Franklin, Fulton, Independence, IZard, Jackson, Johnson, Lawrence, Logan, Madison, Marion, Newton, Pope, Randolph, Searcy, Sebastian, Sharp, Stone, Van Buren, Washington, White
019	CA	482,143	563,514	San Diego
020	CA	520,785	599,559	Orange
021*	CA	2,540,700	2,692,167	Los Angeles (A)
022*	CA			Los Angeles (B)
023	CA	219,119	243,537	Santa Barbara, Ventura

\*Strata 021, 022 were combined to form one stratum with 4 PSU's.

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
024	CA	117,487	133,590	Monterey, San Luis Obispo
025	CA	254,484	278,958	San Mateo, Santa Cruz
026	CA	301,006	305,246	San Francisco
027	CA	372,001	404,389	Santa Clara
028	CA	393,529	415,405	Alameda
029	CA	191,300	207,060	Contra Costa
030	CA	101,326	107,745	San Joaquin
031	CA	228,806	250,236	Sacramento
032	CA	157,301	173,090	Marin, Sonoma
033	CA	60,035	65,324	Del Norte, Humboldt, Mendocino
034	CA	18,472	20,483	Modoc, Siskiyou, Trinity
035	CA	39,581	46,056	Lassen, Plumas, Shasta
036	CA	84,764	96,063	Napa, Solano
037	CA	339,400	367,826	Kern, San Bernadino
038	CA	196,174	225,050	Imperial, Riverside
039	CA	229,775	257,282	Fresno, Kings, San Benito, Tulare
040	CA	59,942	68,410	Inyo, Madera, Mariposa, Merced, Mono
041	CA	89,605	104,713	Alpine, Amador, Calaveras, Stanislaus, Tuolumne
042	CA	105,164	118,526	Butte, Colusa, Glenn, Lake, Tehama, Yolo
043	CA	88,101	104,770	El Dorado, Nevada, Placer, Sierra, Sutter, Yuba
044	CO	195,954	193,839	Denver
045	CO	258,751	303,891	Adams, Arapahoe, Boulder, Jefferson

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
046	CO	92,842	100,017	Douglas, Elbert, El Paso, Teller
047	CO	124,130	134,831	Baca, Bent, Cheyenne, Crowley, Huerfano, Kiowa, Kit Carson, Las Animas, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Pueblo, Sedgwick, Washington, Weld, Yuma
048	CO	138,322	161,422	Alamosa, Archuleta, Chaffee, Clear Creek, Conejos, Costilla, Custer, Delta, Dolores, Eagle, Fremont, Garfield, Gilpin, Grand, Gunnison, Hinsdale, Jackson, Lake, La Plata, Larimer, Mesa, Mineral, Moffat, Montezuma, Montrose, Ouray, Park, Pitkin, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Summit
049	CT	254,640	270,637	Fairfield
050	CT	112,388	120,485	Middlesex, New London
051	CT	270,335	281,493	Hartford
052	CT	110,027	119,748	Litchfield, Tolland, Windham
053	CT	247,609	260,637	New Haven
054	DE	28,451	31,179	Sussex
055	DE	26,555	28,768	Kent
056**	DE	124,994	132,054	New Castle (A)
057**	DE			New Castle (B)
058**	DE			New Castle (C)
059***	DC	272,000	274,000	District of Columbia (A)
060***	DC			District of Columbia (B)
061***	DC			District of Columbia (C)

\*\*Strata 056-058 were combined to form one stratum with 6 PSU's.

\*\*\*Strata 059-063 were combined to form one stratum with 10 PSU's.

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
062***	DC			District of Columbia (D)
063***	DC			District of Columbia (E)
064	FL	165,701	183,600	Bay, Calhoun, Escambia, Gulf, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, Washington
065	FL	19,594	21,865	Dixie, Franklin, Gilchrist, Levy, Liberty, Taylor, Wakulla
066	FL	76,799	85,107	Baker, Columbia, Gadsden, Hamilton, Jefferson, Lafayette, Leon, Madison, Suwanee, Union
067	FL	181,813	201,829	Duval, Nassau
068'	FL	88,137	101,853	Flagler, St. Johns, Volusia
069	FL	134,300	154,894	Alachua, Bradford, Clay, Lake, Marion, Putnam, Sumter
070	FL	69,423	82,782	Citrus, Hernando, Pasco
071	FL	277,174	313,575	DeSoto, Hardee, Highlands, Orange, Polk, Seminole
072	FL	305,699	344,825	Manatee, Pinellas
073	FL	187,516	209,613	Hillsborough
074	FL	165,869	193,238	Charlotte, Collier, Lee, Monroe, Sarasota
075	FL	485,835	536,551	Dade
076	FL	437,315	521,524	Broward, Palm Beach
077	FL	22,988	26,902	Glades, Hendry, Okeechobee, Osceola
078	FL	122,838	134,843	Brevard, Indian River, Martin, St. Lucie
079	GA	101,502	107,634	Brantley, Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, Wayne

\*\*\*Strata 059-063 were combined to form one stratum with 10 PSU's.

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
080	GA	312,392	332,037	Appling, Atkinson, Bacon, Baldwin, Ben Hill, Berrien, Bibb, Bleckley, Brooks, Bulloch, Burke, Candler, Clinch, Coffee, Colquitt, Cook, Crisp, Decatur, Dodge, Dooly, Echols, Emanuel, Evans, Glascock, Grady, Houston, Irwin, Jeff Davis, Jefferson, Jenkins, Johnson, Jones, Lanier, Laurens, Lowndes, Mitchell, Montgomery, Pierce, Pulaski, Screven, Tattnall, Telfair, Thomas, Tift, Toombs, Treutlen, Turner, Twiggs, Ware, Washington, Wheeler, Wilcox, Wilkinson, Worth
081	GA	117,724	122,970	Baker, Calhoun, Chattahoochee, Clay, Dougherty, Early, Harris, Lee, Marion, Miller, Muscogee, City of Columbus, Quitman, Randolph, Schley, Seminole, Stewart, Sumter, Terrell, Webster
082	GA	141,140	150,406	DeKalb
083	GA	354,370	388,638	Clayton, Cobb, Fulton, Gwinnett, Henry, Rockdale
084	GA	261,937	283,841	Bartow, Carroll, Catoosa, Chattooga, Cherokee, Coweta, Crawford, Dade, Douglas, Fannin, Fayette, Floyd, Gilmer, Gordon, Haralson, Heard, Lamar, Macon, Meriwether, Monroe, Murray, Paulding, Peach, Pickens, Pike, Polk, Spalding, Talbot, Taylor, Troup, Upson, Walker, Whitfield
085	GA	214,935	232,473	Banks, Barrow, Butts, Clarke, Columbia, Dawson, Elbert, Forsyth, Franklin, Greene, Habersham, Hall, Hancock, Hart, Jackson, Jasper, Lincoln, Lumpkin, Madison, McDuffie, Morgan, Newton, Oconee, Oglethorpe, Putnam, Rabun, Richmond, Stephens, Taliaferro, Towns, Union, Walton, Warren, White, Wilkes

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
086	ID	22,800	25,869	Bonner, Boundary, Kootenai
087	ID	32,594	33,599	Benewah, Clearwater, Latah, Lewis, Nez Perce, Shoshone
088	ID	78,989	87,890	Ada, Adams, Boise, Canyon, Gem, Payette, Valley, Washington
089	ID	59,692	66,912	Bannock, Bear Lake, Bingham, Bonneville, Caribou, Franklin, Fremont, Jefferson, Madison, Power, Teton
090	ID	53,924	58,730	Blaine, Butte, Camas, Cassia, Clark, Custer, Elmore, Gooding, Idaho, Jerome, Lemhi, Lincoln, Minidoka, Oneida, Owyhee, Twin Falls
091	IL	227,375	236,032	Adams, Carroll, Cass, Fulton, Hancock, Henderson, Henry, Jo Daviess, Knox, Mason, McDonough, Menard, Mercer, Pike, Rock Island, Schuyler, Warren, Whiteside
092	IL	341,906	391,240	Boone, Bureau, Grundy, LaSalle, Lee, Marshall, McHenry, Ogle, Peoria, Putnam, Stark, Stephenson, Tazewell, Winnebago
093	IL	109,261	115,296	Lake
094	IL	1,823,610	1,862,719	Cook
095	IL	449,908	475,464	DeKalb, DuPage, Ford, Iroquois, Kane, Kankakee, Kendall, Livingston, McLean, Will, Woodford
096	IL	180,348	187,907	Bond, Brown, Christian, Effingham, Fayette, Greene, Macon, Macoupin, Montgomery, Morgan, Sangamon, Scott

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
097	IL	184,986	189,636	Champaign, Clark, Clay, Coles, Cumberland, DeWitt, Douglas, Edgar, Edwards, Hamilton, Jasper, Logan, Moultrie, Piatt, Richland, Shelby, Vermillion, Wayne
098	IL	113,421	115,827	Calhoun, Clinton, Jersey, Madison, Marion
099	IL	123,044	125,829	Jefferson, Monroe, Randolph, Saint Clair, Washington
100	IL	95,484	98,464	Crawford, Franklin, Gallatin, Jackson, Lawrence, Perry, Saline, Wabash, White, Williamson
101	IL	24,656	25,586	Alexander, Hardin, Johnson, Massac, Pope, Pulaski, Union
102	IN	312,571	328,821	Jasper, Lake, LaPorte, Newton, Porter, Saint Joseph
103	IN	142,026	151,764	Carroll, DeKalb, Elkhart, Fulton, Kosciusko, Lagrange, Marshall, Noble, Pulaski, Starke, Steuben, White, Whitley
104	IN	356,668	340,032	Adams, Allen, Blackford, Cass, Delaware, Grant, Hamilton, Howard, Huntington, Madison, Miami, Wabash, Wells
105	IN	137,405	145,620	Dearborn, Decatur, Fayette, Franklin, Henry, Jay, Jefferson, Jennings, Ohio, Randolph, Ripley, Rush, Scott, Switzerland, Union, Washington, Wayne
106	IN	59,837	63,680	Brown, Daviess, Lawrence, Martin, Monroe, Pike

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
107	IN	709,492	752,082	Bartholomew, Benton, Boone, Clark, Clay, Clinton, Crawford, Dubois, Floyd, Fountain, Gibson, Greene, Hancock, Harrison, Hendricks, Jackson, Johnson, Knox, Marion, Montgomery, Morgan, Orange, Owen, Parke, Perry, Posey, Putnam, Shelby, Spencer, Sullivan, Tippecanoe, Tipton, Vanderburgh, Vermillion, Vigo, Warren, Warrick
108	IA	137,571	147,874	Buena Vista, Calhoun, Carroll, Cerro Gordo, Clay, Dickinson, Emmett, Floyd, Franklin, Greene, Hamilton, Hancock, Hardin, Humboldt, Kossuth, Mitchell, Palo Alto, Pocahontas, Sac, Webster, Winnebago, Worth, Wright
109	IA	185,921	194,722	Benton, Black Hawk, Bremer, Buchanan, Butler, Chickasaw, Grundy, Howard, Iowa, Jefferson, Johnson, Linn, Tama, Van Buren, Washington
110	IA	70,901	73,509	Allamakee, Clayton, Delaware, Dubuque, Fayette, Jackson, Jones, Winneshiek
111	IA	123,246	129,125	Cedar, Clinton, Des Moines, Henry, Lee, Louisa, Muscatine, Scott
112	IA	97,646	98,346	Adair, Adams, Appanoose, Audubon, Cass, Clarke, Davis, Decatur, Guthrie, Keokuk, Lucas, Mahaska, Marion, Monroe, Poweshiek, Ringgold, Taylor, Union, Wapello, Wayne
113	IA	200,685	209,867	Boone, Dallas, Jasper, Madison, Marshall, Polk, Story, Warren

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
114	IA	140,030	142,556	Cherokee, Crawford, Fremont, Harrison, Ida, Lyon, Mills, Monona, Montgomery, O'Brien, Osceola, Page, Plymouth, Pottawattomie, Shelby, Sioux, Woodbury
115	KS	102,120	109,506	Atchison, Brown, Clay, Cloud, Dickinson, Doniphan, Geary, Jackson, Marshall, Morris, Nemaha, Ottawa, Pottawatomie, Republic, Riley, Saline, Wabaunsee, Washington
116	KS	123,068	131,878	Barber, Barton, Cheyenne, Clark, Comanche, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Jewell, Kearney, Kiowa, Lane, Lincoln, Logan, Meade, Mitchell, Morton, Ness, Norton, Osborne, Pawnee, Phillips, Pratt, Rawlins, Rice, Rooks, Rush, Russell, Scott, Seward, Sheridan, Sherman, Smith, Stafford, Stanton, Stevens, Thomas, Trego, Wallace, Wichita
117	KS	218,058	234,016	Butler, Chase, Chautauqua, Cowley, Elk, Greenwood, Harper, Harvey, Kingman, Lyon, Marion, McPherson, Reno, Sedgwick, Sumner
118	KS	99,702	104,954	Allen, Anderson, Bourbon, Cherokee, Coffey, Crawford, Franklin, Labette, Linn, Miami, Montgomery, Neosho, Osage, Wilson, Woodson
119	KS	228,051	239,646	Douglas, Jefferson, Johnson, Leavenworth, Shawnee, Wyandotte

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
120	KY	227,243	249,037	Bath, Bell, Bourbon, Bracken, Breathitt, Casey, Clay, Estill, Fleming, Floyd, Harlan, Harrison, Jackson, Johnson, Knott, Knox, Lawrence, Lee, Leslie, Letcher, Lewis, Lincoln, Magoffin, Marion, Martin, Mason, McCreary, Menifee, Montgomery, Morgan, Nelson, Nicholas, Owsley, Pendleton, Perry, Pike, Powell, Robertson, Rockcastle, Rowan, Scott, Spencer, Washington, Whitley, Wolfe
121	KY	35,623	38,384	Boyd, Carter, Elliott, Greenup
122	KY	539,663	566,823	Adair, Allen, Barren, Boone, Bullitt, Butler, Caldwell, Campbell, Carroll, Christian, Crittenden, Cumberland, Daviess, Gallatin, Grant, Green, Hancock, Hardin, Hart, Henderson, Henry, Hopkins, Jefferson, Kenton, Larue, Logan, McLean, Meade, Metcalfe, Monroe, Muhlenberg, Ohio, Oldham, Owen, Shelby, Simpson, Taylor, Todd, Trimble, Union, Webster
123	KY	124,648	133,866	Anderson, Boyle, Clark, Fayette, Franklin, Garrard, Jessamine, Madison, Mercer, Woodford
124	KY	66,463	73,342	Breckinridge, Clinton, Edmonson, Grayson, Laurel, Pulaski, Russell, Warren, Wayne
125	KY	49,065	52,319	Ballard, Calloway, Livingston, Lyon, Marshall, McCracken, Trigg

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
126	KY	19,292	20,228	Carlisle, Fulton, Graves, Hickman
127	LA	243,730	269,251	Assumption, Cameron, Iberia, Jefferson, Lafourche, Plaquemines, Saint Bernard, Saint Charles, Saint Martin (part), Saint Mary, Saint Tammany, Terrebonne, Vermilion
128	LA	202,090	205,056	Orleans
129	LA	219,242	239,558	Ascension, East Baton Rouge, Iberville, Lafayette, Livingston, Saint James, Saint John the Baptist, Saint Martin (part), Tangipahoa, Washington, West Baton Rouge
130	LA	282,544	299,364	Acadia, Allen, Avoyelles, Bienville, Caldwell, Catahoula, Claiborne, Concordia, East Carroll, East Feliciana, Evangeline, Franklin, Grant, Jackson, Jefferson Davis, LaSalle, Lincoln, Madison, Morehouse, Natchitoches, Ouachita, Pointe Coupee, Rapides, Richland, Saint Helena, Saint Landry, Tensas, Union, West Carroll, West Feliciana, Winn
131	LA	193,394	205,770	Beauregarde, Bossier, Caddo, Calcasieu, DeSoto, Red River, Sabine, Vernon, Webster
132	ME	78,119	82,987	Androscoggin, Kennebec, Lincoln, Sagadahoc
133	ME	104,060	110,859	Cumberland, York
134	ME	42,283	46,553	Hancock, Knox, Waldo, Washington
135	ME	39,615	42,757	Penobscot
136	ME	67,923	72,844	Aroostook, Franklin, Oxford, Piscataquis, Somerset

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
137	MD	374,572	407,552	Allegany, Baltimore, Carroll, Cecil, Frederick, Garrett, Harford, Washington
138	MD	426,251	458,822	Charles, Howard, Montgomery, Prince Georges
139	MD	295,169	293,109	Baltimore City
140	MD	121,470	136,178	Anne Arundel, Calvert, Kent, Queen Anne's, Talbot
141	MD	64,536	71,339	Caroline, Dorchester, St. Mary's, Somerset, Wicomico, Worcester
142	MA	260,875	273,940	Berkshire, Franklin, Hampden, Hampshire
143	MA	651,109	675,529	Middlesex, Worcester
144	MA	341,936	360,403	Bristol, Norfolk
145	MA	326,028	340,346	Essex, Plymouth
146	MA	43,899	53,847	Barnstable, Dukes, Nantucket
147	MA	255,154	266,935	Suffolk
148	MI	1,072,232	1,089,715	Macomb, Monroe, Wayne
149	MI	16,841	18,104	Alcona, Alpena, Presque Isle
150	MI	18,034	19,808	Charlevoix, Cheboygan, Emmet
151	MI	22,011	24,157	Antrim, Grand Traverse, Leelanau
152	MI	18,670	20,096	Benzie, Manistee, Mason
153	MI	191,295	204,875	Allegan, Berrien, Muskegon, Oceana, Ottawa, Van Buren
154	MI	82,639	87,657	Branch, Cass, Hillsdale, Lenawee, Saint Joseph
155	MI	108,693	113,679	Calhoun, Kalamazoo

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
156	MI	158,897	169,610	Barry, Ionia, Kent
157	MI	186,408	201,194	Clinton, Eaton, Ingham, Jackson, Livingston
158	MI	251,755	262,935	Genesee, Gratiot, Isabella, Saginaw, Shiawassee
159	MI	24,546	26,691	Gladwin, Midland
160	MI	12,360	15,680	Crawford, Kalkaska, Missaukee, Roscommon
161	MI	12,867	14,875	Montmorency, Ogemaw, Oscoda, Otsego
162	MI	35,596	39,689	Clare, Mecosta, Montcalm, Osceola
163	MI	18,939	20,563	Lake, Newaygo, Wexford
164	MI	6,095	6,491	Mackinac, Schoolcraft
165	MI	15,243	16,861	Alger, Chippewa, Luce
166	MI	20,114	21,604	Delta, Menominee
167	MI	383,571	407,597	Lapeer, Oakland, Washtenaw
168	MI	63,910	68,429	Huron, Saint Clair, Sanilac
169	MI	65,081	69,181	Arenac, Bay, Iosco, Tuscola
170	MI	13,493	14,944	Dickinson, Iron
171	MI	45,708	48,563	Baraga, Gogebic, Houghton, Keweenaw, Marquette, Ontonagon
172	MN	28,124	29,867	Kittson, Marshall, Pennington, Polk, Red Lake, Roseau
173	MN	30,379	33,572	Beltrami, Clearwater, Itasca, Koochiching, Lake of the Woods
174	MN	53,505	56,959	Carlton, Cook, Lake, St. Louis (except Duluth)
175	MN	34,108	34,648	Duluth City

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
176	MN	17,960	20,103	Chisago, Isanti, Pine
177	MN	13,656	14,994	Aitkin, Kanabec, Mille Lacs
178	MN	26,945	29,655	Benton, Crow Wing, Morrison
179	MN	14,380	16,129	Cass, Hubbard, Wadena
180	MN	31,992	34,290	Becker, Mahnommen, Norman, Otter Tail, Wilkin
181	MN	13,766	14,535	Clay
182	MN	27,101	28,796	Big Stone, Douglas, Grant, Pope, Stevens, Swift, Traverse
183	MN	49,836	54,676	Kandiyohi, Meeker, Stearns, Todd
184	MN	26,515	28,421	Chippewa, McLeod, Renville, Sibley
185	MN	39,346	46,428	Carver, Scott, Sherburne, Wright
186	MN	25,479	26,708	Lac Qui Parle, Lincoln, Lyon, Redwood, Yellow Medicine
187	MN	51,768	54,716	Brown, Cottonwood, Jackson, Martin, Murray, Nobles, Pipestone, Rock, Watonwan
188	MN	94,425	99,549	Blue Earth, Dodge, Faribault, Freeborn, LeSueur, Mower, Nicollet, Rice, Steele, Waseca
189	MN	72,635	78,475	Fillmore, Goodhue, Houston, Olmstead, Wabasha, Winona
190	MN	119,118	137,630	Anoka, Dakota, Washington
191	MN	318,207	329,641	Hennepin
192	MN	154,754	159,208	Ramsey

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
193	MS	128,179	133,194	Adams, Amite, Bolivar, Claiborne, Coahoma, DeSoto, Franklin, Humphreys, Issaquena, Jefferson, Quitman, Sharkey, Sunflower, Tate, Tunica, Warren, Washington, Wilkinson
194	MS	27,594	29,026	Alcorn, Itawamba, Prentiss, Tishomingo
195	MS	93,133	98,560	George, Hancock, Harrison, Jackson, Pearl River, Stone
196	MS	97,696	106,626	Hinds, Madison, Rankin, Scott
197	MS	350,396	368,593	Attala, Benton, Calhoun, Carroll, Chickasaw, Choctaw, Clarke, Clay, Copiah, Covington, Forrest, Greene, Grenada, Holmes, Jasper, Jefferson Davis, Jones, Kemper, Lafayette, Lamar, Lauderdale, Lawrence, Leake, Lee, Leflore, Lincoln, Lowndes, Marion, Marshall, Monroe, Montgomery, Neshoba, Newton, Noxubee, Oktibbeha, Panola, Perry, Pike, Pontotoc, Simpson, Smith, Tallahatchie, Tippah, Union, Walthall, Wayne, Webster, Winston, Yalobusha, Yazoo
198	MO	302,413	311,504	Cass, Clay, Jackson, Platte
199	MO	57,740	61,133	Greene
200	MO	166,036	176,669	Barry, Barton, Bates, Benton, Camden, Cedar, Christian, Dade, Dallas, Douglas, Henry, Hickory, Jasper, Laclede, Lawrence, McDonald, Newton, Ozark, Polk, St. Clair, Stone, Taney, Vernon, Webster, Wright
201	MO	366,782	383,565	Jefferson, St. Charles, St. Louis

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
202	MO	98,184	102,187	Bollinger, Cape Girardeau, Dunklin, Mississippi, New Madrid, Pemiscot, Perry, St. Francois, Ste. Genevieve, Scott, Stoddard
203	MO	143,732	152,598	Butler, Carter, Cole, Crawford, Dent, Franklin, Gasconade, Howell, Iron, Madison, Maries, Miller, Moniteau, Morgan, Oregon, Osage, Phelps, Pulaski, Reynolds, Ripley, Shannon, Texas, Washington, Wayne
204	MO	200,346	201,094	St. Louis City
205	MO	104,092	109,114	Adair, Audrain, Callaway, Clark, Knox, Lewis, Lincoln, Linn, Macon, Marion, Monroe, Montgomery, Pike, Putnam, Ralls, Randolph, Schuyler, Scotland, Shelby, Sullivan, Warren
206	MO	177,674	183,136	Andrew, Atchison, Boone, Buchanan, Caldwell, Carroll, Chariton, Clinton, Cooper, Daviess, DeKalb, Gentry, Grundy, Harrison, Holt, Howard, Johnson, Lafayette, Livingston, Mercer, Nodaway, Pettis, Ray, Saline, Worth
207	MT	42,144	45,063	Flathead, Glacier, Hill, Lake, Liberty, Lincoln, Mineral, Pondera, Sanders, Toole
208	MT	51,806	55,250	Broadwater, Cascade, Chouteau, Jefferson, Judith Basin, Lewis and Clark, Meagher, Powell, Teton, Wheatland
209	MT	69,600	75,868	Beaverhead, Deer Lodge, Gallatin, Granite, Madison, Missoula, Park, Ravalli, Silver Bow, Sweet Grass

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
210	MT	29,681	30,962	Blaine, Daniels, Dawson, Fergus, Garfield, Golden Valley, McCone, Musselshell, Petroleum, Phillips, Prairie, Richland, Roosevelt, Sheridan, Valley, Wibaux
211	MT	47,770	52,857	Big Horn, Carbon, Carter, Custer, Fallon, Powder River, Rosebud, Stillwater, Treasure, Yellowstone
212	NE	47,146	49,980	Antelope, Banner, Blaine, Box Butte, Brown, Cherry, Cheyenne, Dawes, Garfield, Grant, Holt, Hooker, Keya Paha, Kimball, Loup, Morrill, Pierce, Rock, Scott's Bluff, Sheridan, Sioux, Thomas, Wheeler
213	NE	28,524	31,076	Arthur, Chase, Deuel, Dundy, Frontier, Garden, Hayes, Hitchcock, Keith, Lincoln, Logan, McPherson, Perkins, Red Willow
214	NE	207,399	217,769	Adams, Boone, Buffalo, Butler, Clay, Colfax, Custer, Dawson, Fillmore, Franklin, Furnas, Gage, Gosper, Greeley, Hall, Hamilton, Harlan, Howard, Jefferson, Kearney, Lancaster, Madison, Merrick, Nance, Nuckolls, Phelps, Platte, Polk, Saline, Seward, Sherman, Stanton, Thayer, Valley, Webster, York
215	NE	73,943	76,989	Boyd, Burt, Cass, Cedar, Cuming, Dakota, Dixon, Dodge, Johnson, Knox, Nemaha, Otoe, Pawnee, Richardson, Saunders, Thurston, Washington, Wayne
216	NE	154,987	164,186	Douglas, Sarpy

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
217	NV	19,500	21,505	Churchill, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Nye, Pershing, White Pine
218	NV	49,434	56,299	Storey, Washoe
219	NV	10,641	13,560	Douglas, Ormsby
220	NV	5,686	5,862	Lyon, Mineral
221	NV	102,739	119,774	Clark
222	NH	87,671	96,465	Rockingham, Strafford
223	NH	69,203	74,758	Hillsborough
224	NH	25,445	26,845	Merrimack
225	NH	43,920	46,725	Cheshire, Grafton, Sullivan
226	NH	27,762	30,206	Belknap, Carroll, Coos
227	NJ	133,742	144,267	Atlantic, Cape May, Cumberland
228	NJ	224,966	237,587	Camden, Gloucester, Salem
229	NJ	195,748	206,852	Burlington, Mercer
230	NJ	238,147	263,938	Monmouth, Ocean
231	NJ	109,583	117,349	Hunterdon, Somerset, Warren
232	NJ	300,707	311,439	Morris, Passaic, Sussex
233	NJ	1,162,106	1,176,567	Bergen, Essex, Hudson, Middlesex, Union
234	NM	53,096	58,485	Curry, DeBaca, Eddy, Lea, Quay, Roosevelt
235	NM	67,495	74,680	Catron, Chaves, Dona Ana, Grant, Hidalgo, Lincoln, Luna, Otero, Socorro
236	NM	3,484	3,957	Sierra

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
237	NM	23,212	26,933	Rio Arriba, San Juan
238	NM	185,715	205,945	Bernalillo, Colfax, Guadalupe, Harding, Los Alamos, McKinley, Mora, Sandoval, San Miguel, Santa Fe, Taos, Torraine, Union, Valencia
239	NY	2,885,093	2,923,279	Bronx, Kings, New York, Queens, Richmond
240	NY	417,004	428,637	Nassau
241	NY	330,423	365,134	Suffolk
242	NY	363,473	378,260	Rockland, Westchester
243	NY	229,226	248,634	Dutchess, Orange, Putnam, Sullivan, Ulster
244	NY	15,237	16,081	Delaware
245	NY	210,642	216,926	Albany, Columbia, Greene, Montgomery, Rensselaer, Schoharie
246	NY	135,276	141,562	Fulton, Saratoga, Schenectady, Washington
247	NY	28,253	29,946	Essex, Warren
248	NY	35,968	38,559	Clinton, Franklin
249	NY	24,472	25,183	Hamilton, Herkimer
250	NY	93,375	95,152	Lewis, Oneida
251	NY	62,511	66,360	Jefferson, St. Lawrence
252	NY	82,200	87,093	Cayuga, Oswego, Wayne
253	NY	22,084	23,034	Schuyler, Seneca, Yates
254	NY	320,307	333,485	Monroe, Niagara, Orleans
255	NY	413,910	422,015	Chautauqua, Erie
256	NY	72,213	76,927	Allegany, Cattaraugus, Genesee, Wyoming

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
257	NY	75,599	80,473	Livingston, Ontario, Steuben
258	NY	72,255	76,953	Chemung, Tioga, Tompkins
259	NY	292,478	307,308	Broome, Chenango, Cortland, Madison, Onondaga, Otsego
260	NC	5,823	7,294	Currituck, Dare
261	NC	35,656	38,690	Bertie, Camden, Gates, Hertford, Martin, Pasquotank, Perquimans
262	NC	56,106	61,985	Beaufort, Carteret, Chowan, Craven, Hyde, Pamlico, Tyrrell, Washington
263	NC	66,728	77,070	Brunswick, New Hanover, Onslow, Pender
264	NC	270,896	298,472	Durham, Edgecombe, Greene, Halifax, Jones, Lenoir, Nash, Northampton, Pitt, Wake, Wayne, Wilson
265	NC	654,091	697,730	Alamance, Alleghany, Anson, Ashe, Avery, Bladen, Caswell, Chatham, Columbus, Cumberland, Davie, Duplin, Forsyth, Franklin, Granville, Guilford, Harnett, Hoke, Johnston, Lee, Mitchell, Moore, Orange, Person, Randolph, Richmond, Robeson, Rockingham, Sampson, Scotland, Stokes, Surry, Union, Vance, Warren, Watauga, Wilkes, Yadkin
266	NC	569,700	613,758	Alexander, Buncombe, Burke, Cabarrus, Caldwell, Catawba, Cherokee, Clay, Cleveland, Davidson, Gaston, Graham, Haywood, Henderson, Iredell, Jackson, Lincoln, Macon, Madison, McDowell, Mecklenburg, Montgomery, Polk, Rowan, Rutherford, Stanly, Swain, Transylvania, Yancey

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
267	ND	34,224	35,501	Grand Forks, Nelson, Pembina, Steele, Traill, Walsh
268	ND	25,441	27,889	Cass
269	ND	61,479	64,157	Barnes, Benson, Bottineau, Cavalier, Dickey, Eddy, Foster, Griggs, Kidder, La Moure, Logan, McHenry, McIntosh, Pierce, Ramsey, Ransom, Renville, Richland, Rolette, Sargent, Stutsman, Towner, Wells
270	ND	12,502	13,105	Adams, Bowman, Grant, Hettinger, Sioux, Slope, Stark
271	ND	63,354	69,348	Billings, Burke, Burleigh, Divide, Dunn, Emmons, Golden Valley, McKenzie, McLean, Mercer, Morton, Mountrail, Oliver, Sheridan, Ward, Williams
272	OH	555,669	559,640	Cuyahoga
273	OH	521,497	544,630	Ashtabula, Geauga, Huron, Lake, Lorain, Medina, Portage, Summit, Trumbull
274	OH	33,964	35,487	Holmes, Wayne
275	OH	736,292	764,196	Champaign, Clark, Clinton, Darke, Fayette, Franklin, Greene, Highland, Hocking, Jackson, Logan, Madison, Montgomery, Pickaway, Pike, Preble, Ross, Vinton, Warren
276	OH	380,044	392,265	Butler, Hamilton
277	OH	108,336	115,717	Adams, Brown, Clermont, Gallia, Lawrence, Meigs, Scioto
278	OH	377,634	393,964	Ashland, Athens, Carroll, Coshocton, Fairfield, Harrison, Knox, Licking, Muskingum, Perry, Richland, Stark, Tuscarawas, Washington

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
279	OH	220,407	228,524	Belmont, Columbiana, Guernsey, Jefferson, Mahoning, Monroe, Morgan, Noble
280	OH	57,056	58,881	Erie, Ottawa, Sandusky
281	OH	202,478	208,612	Fulton, Lucas, Wood
282	OH	125,224	128,347	Crawford, Defiance, Hancock, Henry, Morrow, Pauling, Putnam, Seneca, Van Wert, Williams, Wyandot
283	OH	154,400	162,738	Allen, Auglaize, Delaware, Hardin, Marion, Mercer, Miami, Shelby, Union
284	OK	150,277	162,944	Beckham, Caddo, Carter, Comanche, Cotton, Custer, Garvin, Grady, Greer, Harmon, Jackson, Jefferson, Kiowa, Love, McClain, Murray, Roger Mills, Stephens, Tillman, Washita
285	OK	34,683	37,724	Alfalfa, Beaver, Blaine, Cimarron, Dewey, Ellis, Harper, Major, Texas, Woods, Woodward
286	OK	233,188	243,619	Canadian, Cleveland, Oklahoma
287	OK	167,565	179,905	Atoka, Bryan, Choctaw, Coal, Haskell, Hughes, Johnston, Latimer, Le Flore, Marshall, McCurtain, McIntosh, Muskogee, Okfuskee, Okmulgee, Pittsburg, Pontotoc, Pottawatomie, Pushmataha, Seminole, Sequoyah
288	OK	143,783	152,427	Tulsa
289	OK	98,535	107,227	Creek, Garfield, Grant, Kay, Kingfisher, Lincoln, Logan, Noble, Payne
290	OK	97,969	107,154	Adair, Cherokee, Craig, Delaware, Mayes, Nowata, Osage, Ottawa, Pawnee, Rogers, Wagoner, Washington

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
291	OR	206,604	215,837	Multnomah
292	OR	242,721	270,376	Benton, Clackamas, Clatsop, Columbia, Marion, Polk, Washington, Yamhill
293	OR	61,442	67,164	Baker, Gilliam, Grant, Harney, Hood River, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, Wheeler
294	OR	116,775	130,920	Crook, Deschutes, Jackson, Jefferson, Josephine, Klamath, Linn
295	OR	145,458	159,703	Coos, Curry, Douglas, Lane, Lincoln, Tillamook
296	PA	1,000,403	1,046,056	Berks, Carbon, Chester, Columbia, Delaware, Lackawanna, Lehigh, Luzerne, Monroe, Montgomery, Montour, Schuylkill, Sullivan, Susquehanna, Wyoming
297	PA	646,090	657,903	Philadelphia
298	PA	206,524	220,115	Bucks, Northampton
299	PA	192,368	201,992	Bradford, Cameron, Centre, Clearfield, Clinton, Elk, Lycoming, McKean, Potter, Snyder, Tioga, Union
300	PA	15,146	16,422	Pike, Wayne
301	PA	85,685	89,407	Erie
302	PA	304,712	317,109	Armstrong, Butler, Clarion, Indiana, Jefferson, Lawrence, Somerset, Westmoreland
303	PA	104,785	108,590	Crawford, Forest, Mercer, Venango, Warren
304	PA	724,701	741,543	Allegheny, Beaver, Fayette, Greene, Washington

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
305	PA	627,586	662,865	Adams, Bedford, Blair, Cambria, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Northumberland, Perry, York
306	RI	199,364	204,942	Providence
307	RI	13,899	14,453	Bristol
308	RI	46,458	49,150	Kent
309	RI	25,741	24,612	Washington
310	RI	26,538	22,842	Newport
311	SC	383,879	420,934	Abbeville, Aiken, Allendale, Anderson, Bamberg, Barnwell, Calhoun, Edgefield, Greenville, Greenwood, Laurens, Lexington, McCormick, Newberry, Oconee, Orangeberg, Pickens, Saluda, Spartanburg, Union
312	SC	213,567	231,502	Cherokee, Chester, Chesterfield, Darlington, Dillon, Fairfield, Kershaw, Lancaster, Lee, Marlboro, Richland, Sumter, York
313	SC	87,202	96,720	Clarendon, Florence, Georgetown, Horry, Marion, Williamsburg
314	SC	89,758	99,867	Berkeley, Charleston
315	SC	41,594	47,977	Beaufort, Colleton, Dorchester, Hampton, Jasper
316	SD	40,457	42,175	Brookings, Clark, Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Lake, Marshall, Miner, Moody, Roberts

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
317	SD	36,558	38,189	Bennett, Bon Homme, Brule, Buffalo, Campbell, Charles Mix, Corson, Dewey, Gregory, Haakon, Hughes, Hyde, Jackson, Jones, Lyman, Mellette, Perkins, Potter, Stanley, Sully, Todd, Tripp, Walworth, Washabaugh, Ziebach
318	SD	35,541	38,331	Lincoln, Minnehaha
319	SD	40,681	44,755	Butte, Custer, Fall River, Harding, Lawrence, Meade, Pennington, Shannon
320	SD	62,764	64,550	Aurora, Beadle, Brown, Clay, Davison, Douglas, Edmunds, Faulk, Hand, Hanson, Hutchinson, Jerauld, McCook, McPherson, Sanborn, Spink, Turner, Union, Yankton
321	TN	234,301	264,122	Cheatham, Coffee, Davidson, DeKalb, Montgomery, Robertson, Sumner, Warren, White, Wilson
322	TN	41,600	43,528	Benton, Decatur, Hardin, Henderson, Henry, Houston, Humphries, Perry, Stewart
323	TN	121,695	130,466	Bedford, Cannon, Dickson, Franklin, Giles, Hickman, Lawrence, Lewis, Lincoln, Marshall, Maury, Moore, Rutherford, Wayne, Williamson
324	TN	257,000	270,155	Chester, Fayette, Hardeman, Haywood, McNairy, Shelby
325	TN	105,342	109,447	Carroll, Crockett, Dyer, Gibson, Lake, Lauderdale, Madison, Obion, Tipton, Weakley
326	TN	35,299	37,380	Clay, Jackson, Macon, Overton, Pickett, Putnam, Smith, Trousdale
327	TN	35,435	38,479	Bledsoe, Cumberland, Fentress, Grundy, Morgan, Scott, Sequatchie, Van Buren

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
328	TN	342,976	362,352	Anderson, Blount, Bradley, Campbell, Claiborne, Grainger, Hamblen, Hamilton, Jefferson, Knox, Loudon, Marion, McMinn, Meigs, Rhea, Roane, Union
329	TN	153,352	162,071	Carter, Cocke, Greene, Hancock, Hawkins, Johnson, Monroe, Polk, Sevier, Sullivan, Unicoi, Washington
330	TX	237,419	258,608	Tarrant
331	TX	260,272	289,712	Bandera, Brewster, Coke, Concho, Crane, Crockett, Culberson, Ector, Edwards, El Paso, Gillespie, Glasscock, Hudspeth, Irion, Jeff Davis, Kerr, Kimble, Kinney, Loving, Mason, Medina, Menard, Midland, Pecos, Presidio, Reagan, Real, Reeves, Runnels, Schleicher, Sterling, Sutton, Terrell, Tom Green, Upton, Uvalde, Val Verde, Ward, Winkler
332	TX	29,505	33,693	Denton
333	TX	453,470	493,453	Dallas
334	TX	66,670	73,042	Armstrong, Briscoe, Castro, Childress, Collingsworth, Dallam, Deaf Smith, Donley, Gray, Hall, Hansford, Hartley, Hemphill, Lipscomb, Ochiltree, Oldham, Parmer, Randall, Roberts, Sherman, Swisher, Wheeler
335	TX	47,440	49,662	Carson, Hutchinson, Moore, Potter
336	TX	157,161	167,972	Andrews, Bailey, Borden, Cochran, Cottle, Crosby, Dawson, Dickens, Fisher, Floyd, Foard, Gaines, Garza, Hale, Hardeman, Haskell, Hockley, Howard, Kent, King, Knox, Lamb, Lubbock, Lynn, Martin, Motley, Scurry, Stonewall, Terry, Throckmorton, Wilbarger, Yoakum

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
337	TX	212,896	232,039	Anderson, Austin, Bastrop, Brazos, Burleson, Caldwell, Cherokee, Colorado, DeWitt, Falls, Fayette, Fort Bend, Freestone, Gonzales, Grimes, Houston, Lavaca, Lee, Leon, Limestone, Madison, Milam, Robertson, Rusk, San Jacinto, Trinity, Walker, Waller, Washington, Wharton
338	TX	270,815	297,457	Bowie, Camp, Cass, Collin, Delta, Fannin, Franklin, Grayson, Gregg, Henderson, Hopkins, Hunt, Kaufman, Lamar, Marion, Morris, Rains, Red River, Rockwall, Smith, Titus, Upshur, Van Zandt, Wood
339	TX	14,441	15,439	Harrison
340	TX	117,383	130,542	Angelina, Hardin, Jasper, Liberty, Montgomery, Nacogdoches, Newton, Panola, Polk, Sabine, San Augustine, Shelby, Tyler
341	TX	207,377	225,956	Bosque, Brown, Callahan, Coleman, Comanche, Coryell, Eastland, Ellis, Erath, Hamilton, Hill, Jones, Lampasas, McLennan, McCullouch, Mills, Mitchell, Navarro, Nolan, San Saba, Shackelford, Somervell, Taylor
342	TX	119,512	131,469	Archer, Baylor, Clay, Cooke, Hood, Jack, Johnson, Montague, Palo Pinto, Parker, Stephens, Wichita, Wise, Young
343	TX	104,814	116,347	Bell, Blanco, Burnet, Comal, Guadalupe, Hays, Kendall, Llano, Williamson

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
344	TX	191,849	209,639	Atascosa, Bee, Brooks, Cameron, Dimmit, Duval, Frio, Goliad, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak, Maverick, McMullen, Starr, Webb, Willacy, Wilson, Zapata, Zavala
345	TX	264,166	284,122	Bexar
346	TX	72,617	77,531	Nueces
347	TX	55,496	59,246	Aransas, Calhoun, Jackson, Matagorda, Refugio, San Patricio, Victoria
348	TX	110,067	122,332	Travis
349	TX	96,266	106,203	Brazoria, Chambers, Galveston
350	TX	602,943	676,531	Harris
351	TX	100,421	107,006	Jefferson, Orange
352	UT	63,084	68,028	Box Elder, Cache, Morgan, Rich, Weber
353	UT	33,500	37,746	Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, Piute, San Juan, Sanpete, Sevier, Summit, Uintah, Wasatch, Wayne
354	UT	177,070	194,502	Davis, Salt Lake
355	UT	40,980	46,145	Utah
356	UT	22,365	22,579	Beaver, Iron, Juab, Millar, Tooele, Washington,
357	VT	34,687	37,552	Addison, Bennington, Rutland
358	VT	26,916	28,671	Windham, Windsor
359	VT	31,027	33,212	Caledonia, Essex, Orange, Washington

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
360	VT	22,652	24,193	Franklin, Grand Isle, Lamoille, Orleans
361	VT	30,719	33,371	Chittenden
362	VA	319,070	349,308	Alexandria, Arlington, Fairfax, Fairfax City, Falls Church, Loudon, Prince William
363	VA	172,069	194,697	Albemarle, Augusta, Bath, Buckingham, Buena Vista, Caroline, Clarke, Culpepper, Cumberland, Fauquier, Fluvanna, Frederick, Fredericksburg, Goochland, Greene, Harrisonburg, Highland, Lexington, Louisa, Madison, Nelson, Orange, Page, Powhatan, Rappahannock, Rockbridge, Rockingham, Shenandoah, Spotsylvania, Staunton, Warren, Waynesboro, Winchester,
364	VA	52,995	57,104	Accomack, Essex, Gloucester, King and Queen, King George, Lancaster, Mathews, Middlesex, Northampton, Northumberland, Richmond, Stafford, Westmoreland
365	VA	219,018	239,013	Brunswick, Chesterfield, Colonial Heights, Dinwiddle, Emporia, Franklin City, Greensville, Hanover, Henrico, Petersburg, Richmond City, Southampton, Sussex
366	VA	413,119	449,032	Alleghany, Amelia, Amherst, Appomattox, Bedford, Bedford City, Bland, Botetourt, Bristol, Buchanan, Campbell, Carroll, Charlotte, Charlottesville, Clifton Forge, Covington, Craig, Danville, Dickenson, Floyd, Franklin, Galax, Giles, Grayson, Halifax, Henry, Lee, Lunenburg, Lynchburg, Martinsville, Mecklenburg, Montgomery, Norton, Nottoway, Patrick, Pittsylvania, Prince Edward, Pulaski, Radford, Roanoke, Roanoke City, Russell, Salem, Scott, Smyth, South Boston, Tazewell, Washington, Wise, Wythe

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
367	VA	341,729	369,847	Charles City, Chesapeake, Hampton, Hopewell, Isle of Wight, James City, King William, New Kent, Newport News, Norfolk City, Portsmouth, Prince George, Suffolk City, Surry, Virginia Beach, Williamsburg, York
368	WA	103,344	111,931	Spokane
369	WA	82,218	92,754	Adams, Asotin, Benton, Columbia, Ferry, Franklin, Garfield, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman
370	WA	198,947	219,344	Chelan, Clark, Cowlitz, Douglas, Grant, Kittitas, Klickitat, Lewis, Okanogan, Skamania, Yakima
371	WA	145,547	158,039	Island, San Juan, Skagit, Snohomish, Whatcom
372	WA	45,864	50,731	Clallam, Grays Harbor, Jefferson, Pacific, Wahkiakum
373	WA	597,081	661,201	King, Kitsap, Mason, Pierce, Thurston
374	WV	184,446	194,397	Boone, Clay, Fayette, Greenbrier, Lincoln, Logan, McDowell, Mercer, Mingo, Monroe, Nicholas, Pocahontas, Putnam, Raleigh, Summers, Wayne, Webster, Wyoming
375	WV	132,548	140,344	Barbour, Berkeley, Braxton, Calhoun, Doddridge, Gilmer, Grant, Hampshire, Hardy, Harrison, Jefferson, Lewis, Mineral, Morgan, Pendleton, Preston, Randolph, Ritchie, Roane, Taylor, Tucker, Upshur, Wirt
376	WV	77,067	80,659	Kanawha

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
377	WV	86,776	90,565	Cabell, Jackson, Mason, Pleasants, Tyler, Wood
378	WV	108,164	113,035	Brooke, Hancock, Marion, Marshall, Monongalia, Ohio, Wetzel
379	WI	27,381	28,884	Ashland, Bayfield, Douglas, Iron
380	WI	13,492	15,549	Oneida, Vilas
381	WI	11,665	13,522	Burnett, Sawyer, Washburn
382	WI	105,800	115,139	Adams, Clark, Green Lake, Juneau, Marathon, Marquette, Portage, Taylor, Waushara, Wood
383	WI	69,026	76,108	Brown, Marinette, Oconto
384	WI	89,142	96,404	Door, Kewaunee, Manitowoc, Ozaukee, Sheboygan
385	WI	445,974	458,454	Kenosha, Milwaukee, Racine
386	WI	109,306	122,373	Walworth, Washington, Waukesha
387	WI	206,117	222,952	Columbia, Dane, Dodge, Jefferson, Rock, Sauk
388	WI	36,648	39,523	Jackson, Monroe, Richland, Trempealeau, Vernon
389	WI	19,304	20,953	Crawford, Grant
390	WI	26,220	29,471	La Crosse
391	WI	35,481	39,122	Buffalo, Dunn, Pepin, Pierce, Saint Croix
392	WI	20,597	22,318	Green, Iowa, Lafayette
393	WI	63,293	57,550	Barron, Chippewa, Eau Claire, Polk, Rusk
394	WI	75,192	79,930	Calumet, Fond du Lac, Winnebago

<u>STRATUM NUMBER</u>	<u>STATE</u>	<u>1973 OCC. HOUSEHOLDS</u>	<u>1976 OCC. HOUSEHOLDS</u>	<u>COUNTIES</u>
395	WI	83,363	90,748	Florence, Forest, Langlade, Lincoln, Menominee, Outagamie, Price, Shawano, Waupaca
396	WY	17,299	19,506	Natrona
397	WY	12,521	17,316	Lincoln, Sweetwater, Uinta
398	WY	19,921	22,057	Fremont, Hot Springs, Park, Sublette, Teton, Yellowstone National Park
399	WY	22,124	25,397	Big Horn, Campbell, Crook, Johnson, Sheridan, Washakie, Weston
400	WY	44,135	48,724	Albany, Carbon, Converse, Goshen, Laramie, Niobrara, Platte

1/ 1976 figures were taken from provisional census estimates of 1976 county populations and 1976 state household estimates, except for the following states, where the 1975 count and 1976 state household estimates were used: Florida, Georgia, Illinois, Indiana, Kansas, Massachusetts, Mississippi, Missouri, Montana, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Washington, and West Virginia.

**APPENDIX E:**

**STATE NUMBERING LAWS (AS OF 31 DECEMBER 1973)**

## APPENDIX E

STATE NUMBERING LAWS  
(As of 31 December 1973)

<u>State</u>	<u>Numbering Requirements</u>
Alabama	All motorboats, sailboats, and and rental boats
Alaska	All motorboats
Arizona	All watercraft
Arkansas	All motorboats of more than 10 horsepower
California	All motorboats and sailboats over 8 feet in length
Colorado	All motorboats and sailboats
Connecticut	All motorboats
Delaware	All motorboats
District of Columbia	All motorboats
Florida	All motorboats of more than 10 horsepower
Georgia	All motorboats of more than 10 horsepower
Hawaii	All motorboats and sailboats over 8 feet in length
Idaho	All motorboats
Illinois	All motorboats and sailboats over 12 feet in length
Indiana	All motorboats
Iowa	All motorboats
Kansas	All motorboats and sailboats
Kentucky	All motorboats
Louisiana	All motorboats of more than 10 horsepower
Maine	All motorboats of more than 10 horsepower
Maryland	Motorboats of more than 7 1/2 hp; and sailboats over 25 feet
Massachusetts	All motorboats
Michigan	All motorboats
Minnesota	All watercraft (with exceptions) <u>2/</u>
Mississippi	All motorboats of more than 10 horsepower
Missouri	Motorboats of more than 7 1/2 horsepower
Montana	Motorboats of more than 8 horsepower
Nebraska	All motorboats
Nevada	All motorboats
New Hampshire	All motorboats
New Jersey	All motorboats
New Mexico	All motorboats and sailboats

STATE NUMBERING LAWS (Cont'd.)  
(As of 31 December 1973)

<u>State</u>	<u>Numbering Requirements</u>
New York	All motorboats
North Carolina	All motorboats of more than 10 horsepower
North Dakota	All motorboats of more than 10 horsepower
Ohio	All watercraft
Oklahoma	All watercraft
Oregon	All motorboats and sailboats 12 feet in length or greater
Pennsylvania	All motorboats
Rhode Island	All motorboats
South Carolina	All motorboats
South Dakota	All motorboats
Tennessee	All motorboats of 5 horsepower or more
Texas	All motorboats
Utah	All motorboats and sailboats
Vermont	All motorboats
Virginia	All motorboats
Washington	All motorboats
West Virginia	Motorboats of more than 5 horsepower
Wisconsin	All motorboats and sailboats over 12 feet in length
Wyoming	Motorboats of more than 5 horsepower
Guam	All motorboats
Puerto Rico	All motorboats
Virgin Islands	All motorboats
American Samoa <sup>1/</sup>	All motorboats

1/ 1973 was the first year American Samoa was required to number vessels.

2/ Minnesota excludes (a) duckboats during duckhunting season, (b) sailboats, (c) canoes, (d) rice boats during harvest season, and (e) seaplanes.

APPENDIX F:

STATE NUMBERING LAWS (AS OF 31 DECEMBER 1976)

APPENDIX F

STATE NUMBERING LAWS  
(As of 31 December 1976)

<u>State</u>	<u>Numbering Requirements</u>
Alabama	All motorboats, sailboats, and rental boats
Alaska	All motorboats
Arizona	All watercraft
Arkansas	All motorboats
California	All motorboats and sailboats over 8 feet in length
Colorado	All motorboats and sailboats
Connecticut	All motorboats
Delaware	All motorboats
District of Columbia	All motorboats and sailboats
Florida	All motorboats
Georgia	All motorboats and sailboats over 12 feet in length
Hawaii	All motorboats and sailboats over 8 feet in length
Idaho	All motorboats
Illinois	All motorboats and sailboats over 12 feet in length
Indiana	All motorboats
Iowa	All motorboats
Kansas	All motorboats and sailboats
Kentucky	All motorboats
Louisiana	All motorboats
Maine	All motorboats
Maryland	All motorboats
Massachusetts	All motorboats
Michigan	All motorboats
Minnesota	All watercraft (with exceptions) <u>1/</u>
Mississippi	All motorboats
Missouri	All motorboats and sailboats over 12 feet in length
Montana	All motorboats
Nebraska	All motorboats
Nevada	All motorboats
New Hampshire	All motorboats
New Jersey	All motorboats
New Mexico	All motorboats and sailboats
New York	All motorboats
North Carolina	All motorboats except boat with electric motors
North Dakota	All motorboats
Ohio	All watercraft
Oklahoma	All watercraft
Oregon	All motorboats and sailboats 12 feet in length or greater

STATE NUMBERING LAWS (Cont'd)  
(As of 31 December 1976)

<u>State</u>	<u>Numbering Requirements</u>
Pennsylvania	All motorboats
Rhode Island	All motorboats
South Carolina	All motorboats
South Dakota	All motorboats
Tennessee	All motorboats and sailboats
Texas	All motorboats
Utah	All motorboats and sailboats
Vermont	All motorboats
Virginia	All motorboats
Washington	All motorboats
West Virginia	All motorboats
Wisconsin	All motorboats and sailboats over 12 feet in length
Wyoming	All motorboats
Guam	All motorboats
Puerto Rico	All motorboats
Virgin Islands	All motorboats
American Samoa	All motorboats

1/ Minnesota excludes (a) duckboats during duckhunting season, (b) sailboats, (c) canoes, (d) rice boats during harvest season, and (e) seaplanes.

**APPENDIX G:**

**CONFIDENCE INTERVALS**

APPENDIX G:  
CONFIDENCE INTERVALS

The estimates derived in the third chapter are known as point estimates. As such, for all continuous distributions and many discrete distributions, the probability that the resulting estimate will be exactly correct is zero. For this reason, estimates of parameters are typically given in the context of a confidence interval. Associated with each confidence interval is a confidence coefficient, usually stated as a percentage. That is, one might state the estimate in terms of a 95% confidence interval. Strictly speaking, this means that if the sampling procedure were repeated many times, one would expect the resulting interval estimate to contain the true parameter value 95 percent of the time.

The formula for a C% confidence interval is given by

$$\bar{Y} + t \times v(\bar{Y}),$$

where  $\bar{Y}$  is the point estimate of the parameter,  $v(\bar{Y})$  is the mean square error associated with  $\bar{Y}$ , and  $t_c$  is the appropriate coefficient derived from the standard normal density. The table below shows selected values of  $t_c$  and the corresponding levels of confidence that result.

COEFFICIENTS ASSOCIATED WITH SELECTED CONFIDENCE LEVELS

<u>C(%)</u>	<u><math>t_c</math></u>
68	1.000
80	1.282
90	1.645
95	1.960
99	2.576

While 90% and 95% are confidence levels used frequently in hypothesis testing, there is no "best" level. The above table shows that as the level of confidence increases, the length of the confidence interval also increases. Hence, any decision on what level of confidence to use should be made with this fact in mind. A confidence estimate of total boats in the continental United States is presented in the fourth chapter.

**APPENDIX H:**  
**DEFINITIONS**

1976 NATIONWIDE BOATING SURVEY  
Definitions of Boat Types (Q. 10)

**Rowboat -**

Small lightweight open boat with a flat, round or semi-V bottom shape. Construction may be wood, metal, plastic, or fiberglass. Propelled by oars although some still consider this type a rowboat even when fitted with an outboard motor. It may also have provisions for rigging a portable mast and sail. The hull may be double-ended or have a transom stern. Specific types are known by the following names: peapod, dory, pulling boat, punt, wherry, whaleboat, duckboat, whitehall and many others. Although, in the vernacular, it usually refers to a boat less than 16 feet long, it may be 30 feet or longer.

**Skiff -**

A flat-bottom shallow draft open boat of simple construction with sharp bows and square stern. Some types notable the St. Lawrence skiff have been highly developed with rounded sections and construction features which require a high degree of boat building skill. Originally designed for propulsion by oars, but may be fitted with an inboard motor, an outboard motor or sails. Construction is usually wood or aluminum but may be fiberglass.

**Dinghy -**

Typically, a small boat used as a tender or auxiliary to a larger vessel. Most dinghys are 7 to 12 feet in length, beamy and round bilge. They are usually fitted as rowing boats, but may also use a small outboard engine or sails. Materials are usually plywood, aluminum or fiberglass, occasionally made of plastic or wood and canvas. This boat type includes boats that are occasionally called prams.

**1976 NATIONWIDE BOATING SURVEY**  
**Definitions of Boat Types (Q. 10)**

- Johnboat -** A small rowboat adaptable for use with an outboard motor having square bow and stern. Usually with a flat bottom and hard chines. Usually a lightweight open boat with bench seats but may have a very short forward deck. Most commonly constructed of aluminum, but may also be built of wood planks or fiberglass. (Sometimes spelled jonboat.)
- Other Open Lightweight boats -** Any small open boat weighing less than 200 pounds. Usually outboard propelled but may be manually propelled.
- Sailboat -** Any boat built primarily to be propelled by sails.
- Canoe -** Small lightweight craft which is relatively long and narrow, usually propelled by paddles, although may be fitted for sail or a motor. Typically 13 feet to 17 feet long with a maximum beam of less than 3 feet. Some versions are as long as 30 feet with the same proportions. Usually open but may be fitted with a lightweight deck or spray covers. Bottom shape is usually symmetrical fore and aft with rounded sections. Other names are piroque, dugout, skinboat, Canadienne and duckboat. Construction material is aluminum, plastic, fiberglass, wood or wood and canvas.
- Kayak -** A very lightweight double-ended boat with a watertight deck. Usually fitted for flanges in which spray skirts can be attached so that the boat can be rolled completely over without taking water. Propelled by double bladed paddles.

**1976 NATIONWIDE BOATING SURVEY**  
**Definitions of Boat Types (Q. 10)**

**Bowrider Runabout -**

Any boat of the runabout type having a cockpit or seating inset in the forward deck, usually forward of the windshield provided for the operator. This type includes some bass boats, console fishing boats, jersey speed skiffs, etc.

**Non-Bowrider Runabout -**

An open power boat partially decked over with seats, automotive type steering wheel and usually a windshield for the operator. May have a portable shelter top of canvas or plastic. Powered by inboards, outboards, inboard/outboard or water jet. Size range is typically between 15 feet and 26 feet, but there are extreme designs ranging from 10 feet to 40 feet. Bottom shape is usually a planing hull having a straight run of buttocks. This can include round bilge, V-bottom tunnel hull and tri-hull. This type includes some bass boats.

**Cabin Cruiser -**

Typically a craft of more than 18 feet in length having an enclosed cabin or accommodation spaces providing for one or more of the following: berths, galley, toilet, salon. Usually powered by one or more outboard engines or inboard/outboard. May have any hull shape including catamarans. May have a steadying sail but not a sail for propulsion. Other names are express cruiser, day cruiser, motor yacht, sedan, trawler yacht.

1976 NATIONWIDE BOATING SURVEY  
Definitions of Boat Types (Q. 10)

**Houseboat -**

A boat designed for use in sheltered water having barge or pontoon type displacement or semi-planing hulls. Characterised by a relatively low freeboard main hull in combination with a relatively high flat sided deck house. Usually has complete living accommodations on the inside of the deckhouse. May be powered by outboard, inboard/outboards or inboard engines. Usually over 24 feet in length. The hull construction may be aluminum, steel or fiberglass or occasionally plywood.

**Inflatable raft -**

A flat platform supported by inflated tubes or truck tire innertubes. Usually unpowered but may have a small portable outboard motor.

**Inflatable boat -**

A boat which gets its shape and buoyancy from inflation of flexible rubber or plastic tubes. Usually in the shape of an ellipse, occasionally in the shape of a canoe or horse-shoe. May be powered by paddles, oars or outboard. May have a wood transom for mounting outboard motor.

**Pontoon boat -**

Any of various boat types similar to rafts or houseboats. The hull can consist of a platform supported by two pontoons which are usually made of aluminum or steel and are usually cylindrical in shape. May have a roof structure which is usually canvas or lightweight aluminum. Usually propelled by an outboard motor. Distinguished from a houseboat by the absence of enclosed deckhouse.

**Thrillcraft -**

Usually a lightweight single engine boat of unusual design which will accommodate one or two people for joyriding or pulling a skier. Some persons include any high performance boat in this category.

1976 NATIONWIDE BOATING SURVEY

Occupational Categories (Q. 114)

- Professional, technical or similar** - Engineers; physicians and dentists, registered nurses; religious workers; social scientists; teachers; writers, artists and entertainers; lawyers; math and computer specialists; personnel and labor relations workers.
- Manager or administrator (except farm)** - Bank officers; financial managers; buyers for wholesale and retail trade; self-employed managers and administrators.
- Operator of transport equipment** - Bus, truck and taxi cab drivers; deliverymen; fork lift and tow motor operators; chauffeurs; railroad brakemen and switchmen.
- Craftsman or kindred worker** - Carpenters; electricians; plumbers and pipe fitters; foremen; automobile and heavy equipment mechanics; machinists; printing craftsmen; telephone installers and repairmen; tool and dye makers; painters; maintenance workers.
- Operator (except transport)** - Assemblers; checkers, examiners and inspectors in manufacturing; garage workers and gas station attendants; meat cutters and butchers; welders and flame cutters; mine operatives; packers and wrappers; precision machine operators; textile operatives.

1976 NATIONWIDE BOATING SURVEY

Occupational Categories (Q. 114)

- Service worker** - Cleaners; janitors; bartenders; cooks; waiters; nursing aides, orderlies and attendants; barbers; firemen; guards and watchmen; policemen and detectives; (also group in this category housekeepers, maids, servants and private household cooks)
- Farmer or farm manager** - Includes farm owners and tenants
- Sales worker** - Insurance agents, brokers and underwriters; real estate agents and brokers; stock and bond salesmen; sales clerks in retail trade; motor vehicle and accessories dealers; sales representatives for wholesale trade; advertising agents and salesmen; newsboy.
- Clerical or kindred worker** - Bookkeepers; mail carriers for the Post Office; shipping and receiving clerks; stock clerks and storekeepers; secretaries; cashiers; office machine operators; receptionists; telephone operators and typists.
- Laborer (except farm)** - Construction laborers; freight and material handlers; garbage collectors; gardeners and groundskeepers (except farm); stock handlers; warehousemen; vehicle washers and equipment cleaners; lumbermen, longshoremen.
- Farm laborer or foreman** - Farm wage workers; unpaid family workers, self-employed farmers.
- Armed Services** - Self-explanatory

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# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

Symbol When You Know Multiply by To Find

### LENGTH

in inches  
ft feet  
yd yards  
mi miles

\*2.5  
30  
0.9  
1.6

centimeters  
centimeters  
meters  
kilometers

### AREA

in<sup>2</sup> square inches  
ft<sup>2</sup> square feet  
yd<sup>2</sup> square yards  
mi<sup>2</sup> square miles  
acres

6.5  
0.09  
0.8  
2.6  
0.4

square centimeters  
square meters  
square meters  
square kilometers  
hectares

Symbol

cm  
cm  
m  
km

cm<sup>2</sup>  
m<sup>2</sup>  
m<sup>2</sup>  
km<sup>2</sup>  
ha

Symbol

mm  
cm  
m  
m  
km

cm<sup>2</sup>  
m<sup>2</sup>  
km<sup>2</sup>  
ha

## Approximate Conversions from Metric Measures

When You Know Multiply by To Find Symbol

### LENGTH

millimeters  
centimeters  
meters  
kilometers

0.04  
0.4  
3.3  
1.1  
0.6

inches  
inches  
feet  
yards  
miles

### AREA

square centimeters  
square meters  
square kilometers  
hectares (10,000 m<sup>2</sup>)

0.16  
1.2  
0.4  
2.5

square inches  
square yards  
square miles  
acres

### MASS (weight)

oz ounces  
lb pounds  
short tons (2000 lb)

28  
0.45  
0.9

grams  
kilograms  
tonnes

### MASS (weight)

grams  
kilograms  
tonnes (1000 kg)

0.035  
2.2  
1.1

ounces  
pounds  
short tons

### VOLUME

tsp teaspoons  
 Tbsp tablespoons  
 fl oz fluid ounces  
 c cups  
 pt pints  
 qt quarts  
 gal gallons  
 ft<sup>3</sup> cubic feet  
 yd<sup>3</sup> cubic yards

5  
15  
30  
0.24  
0.47  
0.95  
3.8  
0.03  
0.76

milliliters  
milliliters  
milliliters  
liters  
liters  
liters  
liters  
cubic meters  
cubic meters

### VOLUME

milliliters  
liters  
liters  
liters  
cubic meters  
cubic meters

0.03  
2.1  
1.06  
0.26  
35  
1.3

fluid ounces  
pints  
quarts  
gallons  
cubic feet  
cubic yards

### TEMPERATURE (exact)

°F Fahrenheit temperature

5/9 (after subtracting 32)

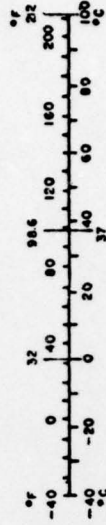
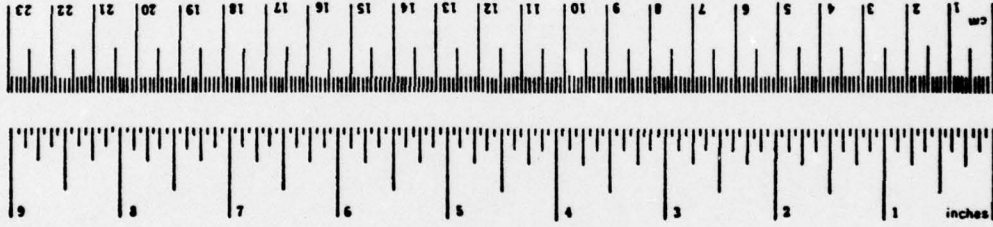
Celsius Temperature

### TEMPERATURE (exact)

Celsius temperature

9/5 (then add 32)

Fahrenheit temperature



\*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.