# STUDY PERFORMANCE REPORT

**State:** <u>Michigan</u>                                **Project No.:** <u>F-53-R-14</u>

**Study No.:** <u>489</u>                                **Title:** <u>Comparison of mail and creel survey estimates for recreational fishing on the Great Lakes</u>

**Period Covered:** <u>April 1, 1997 to March 31, 1998</u>

**Study Objective:** To examine the feasibility of using a mail and/or telephone survey to provide estimates of: effort, targeted effort, targeted harvest, and harvest by month and Statistical Management District for selected species on all the Great Lakes.

**Summary:** There is a need for total, in-lake coverage of recreational fishing effort and harvest on the Great Lakes. The current method of gathering angler information and producing estimates is derived from charter boat records, counts (anglers, trailers, boats, etc.) from creel clerks or airplane flights, and contact creel clerks who gather angler interview data at access points (based on a stratified design). Unfortunately, the extensive Great Lake shoreline of the state of Michigan makes full coverage difficult and expensive and these constraints have occasionally compromised the scope and ability of the Great Lakes Creel Census Program (Study 427) to collect data necessary for recreational fish management. Mail surveys can have the potential to produce estimates that provide more complete coverage of Michigan's Great Lakes sport fishery and have some potential for increased efficiency and lower costs. Prior mail surveys were abandoned in Michigan after finding that the estimates were shown to be substantially higher than was reasonable by comparison with more direct measures of effort and harvest.

In 1995, the Michigan Department of Natural Resources (MDNR) initiated an electronic licensing system at the point of sale. Recent advances in database management and accessibility of fishing license holders, combined with improved survey methods, provide potential to avoid bias due to long recall periods. The Michigan point-of-sale license database is updated with each license purchase. With near real-time access to the Michigan fishing license population, reliability of the estimates may improve with the ability to have shorter recall periods and a targeted population. Given these advances, this project was initiated to examine the feasibility of using a mail and/or telephone survey to provide reliable and efficient estimates of: effort, targeted effort, targeted harvest, and harvest by month and statistical management district for selected species. The benchmark for this project is the ability to produce estimates comparable to the contact creel survey, with special emphasis on estimates for Lake Michigan where contact creel coverage is most complete.

In preparing this project, one issue that stood out clearly was accessibility to the target population (i.e., Great Lakes anglers). At the point of access, a creel clerk has firsthand knowledge of whether a person fished on a Great Lakes. This is not so with trying to conduct a mail survey based on license sales. We do have a rough selection that would remove the general population from the desired population we would want to sample. But based on proportions reported in other studies, our target group (Great Lake anglers, and specifically Lake Michigan) is a fraction of the total 1.3 million Michigan fishing license-holder population.

To address this issue, an exploratory pre-screening questionnaire was implemented in the spring of 1997 in order to identify stratification variables that may be potentially related to propensity to fish on Lake Michigan, or the Great lakes in general. The results show that propensity to fish on the Great Lakes was related to geographic residency and whether a trout and salmon stamp was purchased. These results were used in the development of a sampling scheme that would be used to derive a targeted sample pool for the creel mail survey.

Alternative methodologies to a mail survey were also explored, but the derivation of a targeted sample pool of Great Lakes anglers would be needed regardless of technique (mail, telephone, etc.). A telephone survey was ruled out because of concerns about biased sample selection (e.g., no telephone, unlisted phone numbers, high refusal rates, etc.) and because of the extensive lead time required. The longer lead time for a telephone survey, relative to a mail survey, is a result of the need for training interviewers, data entry program development, telephone number matching to license sales, and so on. Mail surveys remained the most flexible methodology.

Because of the costs and effort associated with identifying Great Lakes anglers from the license database, we adopted a panel study where annual license holders (residents and nonresidents) were followed through their 1997 fishing activity. While this might exclude anglers, the level of bias this introduces can be examined through comparisons between the 1996 and 1997 MDNR point-of-sale license databases. There are costs associated with following a group through a panel study (where respondents in the study are contacted several times over a given time frame) in terms of both materials and effort to keep the sample viable from attrition. Therefore, a screening questionnaire was implemented to derive a targeted sample pool for the creel mail survey.

A stratified sampling scheme was developed using the pre-screening questionnaire results in conjunction with other fixed cost limitations to derive the sample for the mail survey. A total of 10,000 1996 annual Michigan fishing license holders were randomly drawn within the eleven license type and residency category strata. The screening questionnaire was mailed in May, and the date designated as the cutoff for inclusion in the panel sample pool was July 1, 1997. The total number of respondents willing to participate was below the maximum level (n=2,500) set for the sample pool, so all who were willing were included in the panel

The first of the panel surveys and supplemental materials were mailed out to the panel sample at the end of June (1997) and continued on a monthly basis for five months through October's fishing. Portions of all the returned panel survey data have been entered. In particular, these portions that were entered enabled the panel non-respondent surveys to be implemented.

In addition to the panel survey, *24-hour* fishing license (i.e., *daily* license) purchasers were also surveyed monthly. For these license holders, the current (1997) MDNR point-of-sale license database was used. These samples were randomly drawn monthly based on point of sale geographic stratification. We experienced delays associated with missing licensee addresses and/or names in the database, forcing us to move back the date of the mailing of the daily surveys as much as a month from the end of a fishing month. Five hundred daily surveys a month were mailed out for the five-month survey period.

A separate survey instrument was designed for the *daily* license samples. Since the *daily* survey respondents did not have the preparatory materials to guide them beforehand, more instruction was needed in the survey with examples. Also, the panel survey was designed with the possibility of 31 days of fishing reporting which is not required for the *daily* angler surveys.

There has not been any final analysis or estimates derived to date, but the data entry on the panel surveys began in December and is in the process of being proofread. This needs to be completed first in order to conduct the non-response surveys, which are currently being prepared. The data entry for the daily surveys has already started and is nearly completed.

**Job 1. Title: <u>Analyze pre-screening questionnaire.</u>**

**Findings:** We examined literature and existing creel and fishing license databases in order to identify what factors (selection variables and possible multipliers) would be needed to develop a sampling strategy for this survey project. While some factors (such as county of residence) are readily identifiable, the existing databases do not contain information that can be cross referenced (specifically, what fishing license types are fishing on the Great Lakes. The literature is inconclusive about the proportion of Michigan anglers that fish on the Great Lakes (sources range from 25%-54%). We intended to develop a stratified random sampling scheme for the generation of a pool of respondents for the survey through a screening questionnaire. With the lack of information needed for the stratification variables, a pre-screening questionnaire was developed to address the deficiency.

The pre-screening questionnaire addressed two main factors that would be used for developing the stratification scheme for the survey sample. The first was whether geographic residency was related to Great Lakes fishing, and the second factor was whether a *trout and salmon* stamp was more indicative of a Great Lakes angler (thus allowing for better targeting of the desired survey population). The two main objectives of this project are whether the survey information obtained can produce estimates that are as reliable as the on-site creel clerk surveys and whether it can be collected in a more efficient manner. To focus on the issue of reliability, the Lake Michigan information was given particular consideration. Therefore, geographic residency was stratified on four levels: Lake Michigan county of residence (LMC), other Great Lake coastal county (OCC), non-coastal county (NCC), and nonresident. Nonresidents of Michigan were able to be included if they had purchased a nonresident annual license or had moved out of state (but they still had a Michigan address in the Secretary of State's Office when they purchased their 1996 fishing license).

Due to changes in the 1997 Michigan fishing license fee structure, category labels used in the 1996 MDNR point-of-sale license database were changed to reflect the changes with the 1997 licenses. *Senior spouse* license was dropped and a *senior resident annual* license would now be required, the *trout and salmon* stamp was changed to all-species and daily license was changed to *24-hour* license. The *sportsperson's* license (which also includes hunting options) was dropped in lieu of a sportsperson's discount if licensee purchased any combination of 4 licenses (hunting or fishing). While the *all-species* and *24-hour* licenses are merely label changes (the original 1996 labels will be retained for any remaining discussion of groups used from the 1996 license database), the other changes affect the groups. Those who may have had a *senior spouse* license will now be considered as part of the *senior annual* license category. *Sportsperson's* license holders will now be included with the *resident annual* with *trout and salmon* stamp (which is the best fit to the opportunity afforded to them).

Of the recombined types of fishing licenses sold in 1996 (*resident annual, senior resident annual, non-resident annual, and daily*), the purchase of a *trout and salmon* stamp option applied to two of those (*resident and non-resident annuals*). When combined with the residential strata, a total of 15 strata groups were developed (Table 1).

These license groups encompass the entire 1996-97 Michigan fishing license holders point-of-sale database (over 1.3 million Michigan fishing license holders).  The pre-screening sample consisted of 133 randomly drawn license holders from each of the 15 strata groups (n= 1,995) in the license database.  As the license database is largely undocumented, invaluable assistance was received from Chris Larson in the Fisheries Division of the MDNR, Fisheries Division in obtaining the information needed to generate the pre-screening questionnaire mailing list.

The pre-screening questionnaire was mailed at a first class rate in April, 1997.  A return date of May 8, 1997 was given so that there would be time to conduct the screening questionnaire.  The response rate for the pre-screening questionnaire (Table 2) was only 43% by May 20, 1997 (which was the date that the screening questionnaire sample was to be drawn).  The pre-screening questionnaires still were being returned into the fall of 1997.  Many comments were made on the returned questionnaire postcards and by telephone calls received that they did not receive the questionnaire until after the return date.  Scrutiny of postmarks and returned mail also revealed other anomalies (e.g., two postcards mailed with first class postage and postmarked from the same town and date were received ten days apart).  Upon inquiry, U. S. Post Office personnel agreed that these cases were irregular, especially with first class postage, but they did not provide any concrete answers or resolution to the problem.

While past literature has suggested a wide range for the proportion of licensed anglers who fish the Great Lakes, there is more consensus toward the lower end of the spectrum (25-27%).  Given the higher proportions of respondents who indicated Great Lakes fishing (Table 3), there is clear indication that saliency was a major factor in the response rate.  This is also demonstrated by the proportion of NCC (non-coastal county) which had lower rates of Great Lakes fishing (26% for *resident annual* and 31% for *senior annual*).  The *resident annual* with *trout and salmon* stamp licensees from non-coastal counties had a proportion of 56%, but, as can be seen in Table 4, the purchase of a *trout and salmon* stamp indicates increased saliency.

Individual saliency factors used in examining stratification rationale were as follows:

| | Resident | | | |
|---|---|---|---|---|
| Geographic for Lake Michigan: | LMC | OCC | NCC | Nonresident |
| *Resident annual* | 94% | 12% | 64% | 70% |
| *Resident annual* with *T/S* stamp | 100% | 22% | 54% | 70% |
| *Senior resident annual* | 98% | 22% | 64% | n/a |

| Trout stamp effect on response rate: | License only | License with T/S stamp |
|---|---|---|
| *Resident annual* - LMC | 26% | 45% |
| *Resident annual* - OCC | 27% | 47% |
| *Resident annual* - NCC | 32% | 47% |
| *Nonresident annual* | 35% | 38% |

Percentages for Lake Michigan are of respondents indicating that they had fished on the Great Lakes (Table 3).  Percentages for trout stamp response rate are unadjusted response rates as received by May, 1997.  For each level sample size was 133.  These results illustrate that proximity is clearly related to fishing on Lake Michigan (i.e., more residents of non-coastal counties indicated fishing on Lake Michigan than residents from counties which border other Great Lake coasts).  Coastal saliency is also demonstrated by Table 3 in that the non-coastal county licensees comprise lower proportions of their respective license groups (*resident annual*, *resident annual* with *trout and salmon* stamp, and *senior resident annual*).  In addition, these

results show increased response rates among those who purchase a trout and salmon stamp (as of May 1997) and is indicative of saliency differences.  Use of *the trout and salmon* stamp as a stratification factor will assist in reaching our target population for sampling.


**Job 2.  Title:  <u>Develop sample stratification scheme.</u>**

**Findings:** While the point-of-sale licensing system (which electronically records license sales from vendor sites and is uploaded into the MDNR central computer server over night) can provide near real-time access to the Michigan fishing license purchasing population, but it does not directly provide access to the target population for this study, namely Great Lakes anglers.  The license database does provide an initial cut of Michigan license buyers from the general population as a whole, thus reducing the excess effort and expense of trying to reach the target population.  But even at the fishing license population level, the literature indicates that as low as 25% of anglers in Michigan fish on the Great Lakes.  This still leaves a possibility that a sample of four times the desired sample size would be needed in order to reach the targeted sample population.  In addition to focusing on Great Lake fishing information, our intent during this feasibility study was to be able to sample such that we could produce the best possible estimates for Lake Michigan. Until the pre-screening questionnaire, the proportion of Lake Michigan anglers was an unknown factor.

The results of the pre-screening questionnaire illustrate that the fishing license buyer population is not homogeneous and that differences among groups can help guide allocation of sampling effort.  Based on the pre-screening questionnaire, the differing return rates and proportions indicating certain activities (fishing the Great Lakes, fishing on Lake Michigan, etc.) were used to develop a sampling scheme which would provide the sample size required within a specific license category group.  Since each license group has differing rates of response or participation, they each will have a variable cost associated with them that will affect how many of a group can be sampled.  Cost factors used in the development of the stratification sampling scheme would be fixed printing and postage associated costs of the survey (based on an upper limit sample of 10,000 respondents).  These include $0.44 for the screening questionnaire (printing, materials, and postage), $0.22 for the returned mailing postage, and $7.00 for the panel surveys and preparatory items (printing, materials, and postage).  For the eleven license groups, the individual sample levels were set in order to target Great Lake (and Lake Michigan in particular) anglers.  This was done by applying the following sample size formula:

$$n_i \ = \ (n_i^* / 3n_i^*) \text{ x } 10{,}000,$$

where:

$n_i^* = \ N_i / (r_i/c_i)$ ; sample size for license category *i*,
$N_i \ = \$ total number of 1996 Michigan fishing license buyers for license category *i*,
$r_i \ \ = \$ unadjusted return rate for license category *i*  as of May, 1997 (Table 2),
$c_i \ \ = \ (0.44 / (r_i P_i) + ((0.22 / P_i) + 7.00)$ ; the cost associated with obtaining information from an individual in license category *i*,
$P_i \ \ = \$ proportion of Great Lake anglers in license category *i* that indicated they had fished Lake Michigan.

Based on the expected return and likelihood of Lake Michigan fishing $(r_i P_i)$ per group from the pre-screening questionnaire, it was determined that several groups might be susceptible to not having enough respondents to produce reliable estimates.  Rather than increase the total sample

size from 10,000 to the level needed, the decision was made to reallocate individual license category sample numbers in order to provide relative coverage expected for deriving the estimates.  Application of the sample size formula and conducting this reallocation is presented in Table 4.

*Daily* license purchasers from 1996 are not considered for surveying in 1997 since the likelihood of their actual participation is expected to be extremely low, thereby resulting in a vast waste of resources in both time and effort in order to obtain information.  The nature of recall for *daily* license holders is different than for the *annual* licensees.  An *annual* license holder may purchase a license in June and yet may not fish until August or may fish many times during any given month.  An *annual* license holder would therefore need surveys encompassing each month of the project as well as the preparatory materials  (log book, example survey, contact information, etc.) to assist in recalling the separate days' information.  A *daily* license angler, on the other hand, would have a limited amount of information to recall.  The real-time retrieval of the date of purchase of the *daily* license from the MDNR database would put their recall period within one month which would put it in the same time frame of recall that is requested by the other sample comprised of *annual* license holders.

The *daily* license holders to be selected for this portion of the mail creel survey would be drawn from that entire month's *daily* (*24 hour*) license sales in 1997 at the beginning of the following month.  Examination of the MDNR license database revealed that nonresidents comprise a large majority of the *daily* license purchases.  It was also determined that the place of license purchase was the most likely indicator of area fished.  Therefore, stratification for the *dailies* was based on the county where the license was sold and that these stratification levels would also reflect the Lake Michigan coastal, other Great Lake coastal, or non-coastal levels used in the panel stratification. In addition, a level for uncoded or out-of-state sales (some vendors in neighboring states are equipped for Michigan license sales with the point-of-sale system).  The sample size for each of the five monthly daily license surveys was set at 500 respondents, yielding a total *daily* license sample for the project at 2,500 respondents over the course of the mail creel survey period (i.e., June though October).

### Job 3.  Title:  <u>Develop screening questionnaire.</u>

**Findings:** A screening questionnaire, similar to the pre-screening questionnaire, was devised as a pre-paid business reply postcard.  Because of the limited time available before the need to begin the panel data collection, a question regarding the consent to be included in the sample pool for the panel survey (described in the cover letter provided to the recipient) was included in the questionnaire.  A question regarding the number of days fished on the Great Lakes was added to the survey to serve as an additional stratification variable (high, medium, low) if more respondents are willing to be involved in the panel survey than the funding for the project could accommodate

### Job 4.  Title: <u>Execute screening questionnaire to generate panel pool.</u>

**Findings:** In May and June (1997), a sample of 10,000 license holders from the 1996 Michigan fishing license point-of-sale database was selected according to the pre-ascribed stratification scheme.  The project was initially designed and budgeted for a working sample size of 2,500 licensees.  Since previous studies have indicated a range of 25-54% of the licensed anglers in Michigan fishing the Great Lakes, the low end of the range was used as a multiplier (i.e., a

multiplier of 4, resulting in a sample of 10,000 licensees). Although the stratification scheme would allow for more streamlining of the sample size, the compliance rate for the survey participation was an unknown. Therefore, the original sample size indicated in the project proposal was maintained.

The mailing list of 10,000 licensees was subjected to a verification software program by the Michigan State University's Printing Services Department in order to have a CASS certificate on file. This certification is mandated by the U.S. Postal Service for any bulk or any discounted/pre-sorted first class mailings. Of the 10,000 licensees drawn, only 9,800 had complete names and addresses (i.e., deliverable). The remaining two hundred licensees had missing fields (such as state, town, name, street address, etc.) that excluded them from the mailing.

Response rates for the screening questionnaire were half that of the pre-screening questionnaire sent the previous month (27% and 56%, respectively). As of late June (1996), the ratio of accept-to-decline for panel participation was about 2 to 1. Because of the impending start date for the data collection period, all willing individuals were selected for the panel sample (n=1,696). Several factors appear to have influenced the response rate. There were subtle changes to the questionnaire card (e.g., pre-paid business reply postage in lieu of a postage stamp, and Great Lake fishing for trout/salmon and Great Lake fishing for other types of fish were combined into a single fishing on the Great Lakes question). A major change from the pre-screening to the screening questionnaire was the inclusion of the question regarding willingness to participate in the creel panel survey (the effort required of a person on the panel and a statement that indicating willingness does not necessarily mean that a respondent will be chosen was included in the cover letter sent to the sample members).

There were other factors that led to changes between the two questionnaires. An external factor was the U.S. Postal Service. Since the panel survey was to be implemented on July 1st, a return by June 8th deadline was stated in order to allow sufficient timing of preparatory materials and panel surveys to be mailed. Many of the respondents of the screening questionnaire commented that the mailing did not reach them until after the deadline despite being mailed with first class postage in May. Other discrepancies were noted with the previous mailing and mail pieces being returned (example: two pre-screening questionnaires were postmarked from the same post office on the same day, one was received in three days and the other was received in ten days). A formal inquiry was filed with the East Lansing post office branch in order to determine the degree to which all mailings would be affected and in need of adjustment in the timing schedule. No conclusive results were determined to explain the discrepancies in the mail handling, but by August any glaring problems with the mail delivery timing appeared to have been worked out.

Although full implementation of the stratification scheme was not realized, very useful information regarding efficacy and multipliers was obtained. A non-respondent survey will be conducted to determine the self-selection and non-response bias associated with the sample that was used for the panel.

**Job 5. Title: <u>Develop panel survey.</u>**

**Findings:** Since comparison to the on-site creel surveys is the primary objective of this project, the information collected by the creel clerks and the form (*angler party interview* form) on which the information is recorded provided the content (variables) on which the mail survey instrument would be designed. All the information contained on the creel clerk form was integrated into the

mail surveys with the exception of: start time, end time, fishing methods, and selected target species (pink salmon, brown trout, splake, siscowet, lake herring, Atlantic salmon, and lake whitefish). These exceptions were based on several factors. In the case of times, the reliability of respondent recall and the decision to base estimates on a per trip or per day basis. Fishing methods was determined to be a nonessential question since no report or estimates are generated from it. The aforementioned targeted species were not included based on the presumed ability of Great Lakes anglers to differentiate those species or as a result of analysis of past creel surveys indicating a low presence of these species in either targeted or harvest numbers. With the exception of one screening question and three priming questions, no other questions unrelated to the *angler party interview* form were included in the survey design.

The on-site creel survey obtains information regarding a single day of fishing. The panel survey, implemented monthly, would cover up to 31 days of fishing for each panel member. In order to present what, in essence, is the equivalent of thirty-one creel clerk forms in a manageable survey instrument, a variety of survey designs and formats were tested. The selected draft version was pre-tested in June in Grand Haven, MI with the assistance of Sea Grant Extension Agent Chuck Pistis and with anglers on the Grand River in Lansing. Recommendations were taken under consideration and the final version was taken to the printers.

A separate survey instrument was designed for the *24-hour* fishing (*daily*) license holders to accommodate the need to report a much smaller time frame. A separate survey was also needed due to the fact that none of the selected respondents would have received any preparatory materials and would need more detailed instruction in their surveys. While the format of the *daily* survey varied from the panel survey instrument, the content remained the same.

### Job 6.  Title: <u>Execute panel survey.</u>

**Findings:** Michigan State University's Printing Services was selected to print materials needed for the project (surveys, envelopes, etc.). Cover letters and mailing labels were printed within the Department of Fisheries and Wildlife at MSU. Part-time workers, primarily students, were employed to assist in the preparation of the surveys for mailings. Mailings were conducted through the Michigan State University's Mailing Services. This process was done once a month for the five-month data collection period (i.e., June through October fishing).

Daily tasks included answering respondent inquiries, coordinating workers, processing returned surveys, and keeping the mailing list up-to-date. A toll-free exchange (1-888-MI-CREEL, 1-888-642-7335) was established in order to facilitate any survey respondents' questions or comments. Mailing list maintenance included resending returns with a change of address, correcting misspelled names and addresses from the Michigan Secretary of State's office and/or EDS Keypunching.

The *daily* surveys were also mailed on a monthly basis for recreational fishing over the five-month period (i.e., June through October). A lag time developed in the ability to send the surveys at the same time the panels surveys were mailed since many of the *daily* licensees had to have their name and address entered in from their sport card information. The point-of-sale licensing system used by the MDNR does enable access to near real-time retrieval of information, but there is a limitation. Certain pieces of information are readily available (such as type of license purchased or where purchased), but the licensee's name and address may not be readily available. If the licensee has purchased a Michigan fishing or hunting license before, then the information will be matched to their information already housed in the MDNR database. If

the licensee has a Michigan drivers license then they can be matched up through the Michigan Secretary of State's Office. But if the licensee does not have a Michigan drivers license, state identification card, or is from out of state, then the name and address information for the license database must be obtained from a sport card sold at the place of license purchase.

These sport cards are to be sent by the sales outlet to an outside firm (EDS) for data entry, and the sport card information is then made available to the MDNR license database. A lag time between when EDS receives the sport card and when the information is available to the DNR (about 10-14 days) was also confirmed by William Moritz in the MDNR, Wildlife Division. Initially, the *daily* licensee sample was drawn on or about the first of the following month (e.g., July 1 for June *daily* license purchases). The sampling was then extended to the about the middle of the month to compensate for the two week lag time.

Even with the extension, the match rate (identification numbers to a valid name and address) was below fifty percent. The sampling had to be extended another 14 days to capture a majority of the targeted month's sample. This extension became necessary as the likelihood of introducing several bias factors (with a tendency toward overestimation) is greater with the samples drawn at the first of the month. One reason for the difference between the hunting licenses and fishing licenses match rates (i.e., the lag time) is that the Wildlife Division has implemented a special program with their vendors to insure faster compliance for obtaining the sport cards for data entry. The Fisheries Division currently does not have the same program. Although the vendors are supposed forward the sport cards as they receive them, there is some evidence it is performed to their convenience (which is why the Wildlife Division has implemented vendor incentives). The near real-time accessibility of the license database is actually one month to 2 months for complete licensee record information given the current method of data entry.

There is a higher non-response rate for the *daily* surveys, primarily due to low saliency and lack of preparatory materials and prior consent. A reminder postcard was sent 10 to 14 days after the first mailing for that month's sample (mainly in accordance with Dillman's Total Design Method for survey methodology, but also due to the length of delivery of first class mail within and outside of the state). Approximately 10-14 days after that, a second copy of the daily survey was mailed to the non-respondent.

**Job 7.  Title:  <u>Compare mail and creel survey estimates and evaluate results.</u>**

**Findings:** Estimates and results have not yet been generated as there are still data issues being addressed. While not completed, there has been substantial effort directed at the preparation for this job. This has included evaluating data entry software programs, hiring a data entry clerk, familiarizing and training clerk in the data entry software, creating data entry programs, and entering data already collected. The collection of non respondent data still remains before the database can be prepared for analysis. Most of the panel survey data has been entered, with the exception of assigning statistical management codes. Surveys to conduct non response and missing data queries are being prepared.

**Job 8.  Title:  <u>Prepare annual report.</u>**

**Findings:**  This report was prepared.

Table 1.–Stratification levels for the pre-screening questionnaire.

| Geographic residency | License type | Strata group |
|---|---|---|
| 1. Lake Michigan coastal county (LMC) | 1. *Resident annual* | 1. *Resident annual* (LMC) |
| 2. Other Great Lake coastal county (OCC) | 2. *Resident annual* with *trout and salmon* stamp (T/S) | 2. *Resident annual* (OCC) |
| 3. Non-coastal county (NCC) | 3. *Non-resident annual* | 3. *Resident annual* (NCC) |
| 4. Non-resident | 4. *Non-resident annual* (T/S) | 4. *Resident annual* with *trout and salmon* stamp (LMC) |
| | 5. *Senior resident annual* | 5. *Resident annual* with *trout and salmon* stamp (OCC) |
| | 6. *Daily* | 6. *Resident annual* with *trout and salmon* stamp (NCC) |
| | | 7. *Non-resident annual* |
| | | 8. *Non-resident annual* with *trout and salmon* stamp |
| | | 9. *Senior resident annual* (LMC) |
| | | 10. *Senior resident annual* (OCC) |
| | | 11. *Senior resident annual* (NCC) |
| | | 12. *Daily non-resident* |
| | | 13. *Daily non-resident* (LMC) |
| | | 14. *Daily non-resident* (OCC) |
| | | 15. *Daily non-resident* (NCC) |

Table 2.–Response rate for the pre-screening questionnaire.

| | | | Response as of: | | | |
|---|---|---|---|---|---|---|
| | | | October 1997 | | May 1997 | |
| Strata group | n | Adjusted n | Number Responses | Response Rate (%) | Number Responses | Response Rate (%) |
| 1. *Resident annual* (LMC) | 133 | 126 | 51 | 40 | 35 | 26 |
| 2. *Resident annual* (OCC) | 133 | 127 | 46 | 36 | 36 | 27 |
| 3. *Resident annual* (NCC) | 133 | 127 | 53 | 42 | 43 | 32 |
| 4. *Resident annual* with *trout* stamp (LMC) | 133 | 128 | 72 | 56 | 60 | 45 |
| 5. *Resident annual* with *trout* stamp (OCC) | 133 | 132 | 83 | 63 | 62 | 47 |
| 6. *Resident annual* with *trout* stamp (NCC) | 133 | 131 | 77 | 59 | 63 | 47 |
| 7. *Non-resident annual* | 133 | 127 | 63 | 50 | 47 | 35 |
| 8. *Non-resident annual* with *trout* stamp | 133 | 130 | 77 | 59 | 51 | 38 |
| 9. *Senior resident annual* (LMC) | 133 | 131 | 92 | 70 | 84 | 63 |
| 10. *Senior resident annual* (OCC) | 133 | 133 | 93 | 72 | 80 | 60 |
| 11. *Senior resident annual* (NCC) | 133 | 131 | 88 | 67 | 81 | 61 |
| 12. *Daily non-resident* | 133 | 122 | 64 | 52 | 54 | 41 |
| 13. *Daily non-resident* (LMC) | 133 | 126 | 47 | 37 | 37 | 28 |
| 14. *Daily non-resident* (OCC) | 133 | 128 | 59 | 46 | 49 | 37 |
| 15. *Daily non-resident* (NCC) | 133 | 122 | 44 | 36 | 40 | 30 |
| Total | 1995 | 1921 | 1009 | 53 | 822 | 41 |

Table 3.–License stratification groups from the point-of-sales fishing license database and the pre-screening questionnaire. [1] The pre-screening sample size (n) was 133 from each of the strata.

| Strata group [2] | N | Responses Number | Responses Percent | Respondents fishing Great Lakes Number | Respondents fishing Great Lakes Percent | Great Lakes fishers fishing Lake Michigan Number | Great Lakes fishers fishing Lake Michigan Percent |
|---|---|---|---|---|---|---|---|
| 1. *Resident annual* (LMC) | 127,547 | 35 | 26 | 17 | 49 | 16 | 94 |
| 2. *Resident annual* (OCC) | 220,612 | 36 | 27 | 25 | 69 | 3 | 12 |
| 3. *Resident annual* (NCC) | 236,040 | 43 | 32 | 11 | 26 | 7 | 64 |
| 4. *Resident annual* with *trout* stamp (LMC) | 96,980 | 60 | 45 | 48 | 80 | 48 | 100 |
| 5. *Resident annual* with *trout* stamp (OCC) | 132,801 | 62 | 47 | 46 | 74 | 10 | 22 |
| 6. *Resident annual* with *trout* stamp (NCC) | 140,088 | 63 | 47 | 35 | 56 | 19 | 54 |
| 7. *Non-resident annual* | 101,128 | 47 | 35 | 20 | 43 | 14 | 70 |
| 8. *Non-resident annual* with *trout* stamp | 28,693 | 51 | 38 | 33 | 65 | 23 | 70 |
| 9. *Senior resident annual* (LMC) | 27,600 | 84 | 63 | 47 | 56 | 46 | 98 |
| 10. *Senior resident annual* (OCC) | 46,364 | 80 | 60 | 50 | 63 | 11 | 22 |
| 11. *Senior resident annual (*NCC) | 51,268 | 81 | 61 | 25 | 31 | 16 | 64 |
| Total | 1,209,121 | 822 | 41 | 357 | 43 | 213 | 60 |

[1] Information presented in the table is for data collected as of May 16, 1997, which was the sampling date for the screening questionnaire phase of the survey.

[2] Daily license holders are not represented since they are not part of the survey pool being generated for the survey. Daily license holders will be treated with a separate sampling design.

Table 4.–Calculation and reallocation of sample sizes for individual license categories and expected returns.

| License category | $n_i$ | $n_i$ reallocated | Expected return |
|---|---|---|---|
| 1. *Resident annual* (LMC) | 1,647 | 1,047 | 125 |
| 2. *Resident annual* (OCC) | 1,716 | 1,516 | 33 |
| 3. *Resident annual* (NCC) | 2,029 | 1,379 | 71 |
| 4. *Resident annual* with *trout* stamp (LMC) | 836 | 836 | 301 |
| 5. *Resident annual* with *trout* stamp (OCC) | 859 | 859 | 65 |
| 6. *Resident annual* with *trout* stamp (NCC) | 1,021 | 1,021 | 144 |
| 7. *Non-resident annual* | 268 | 600 | 103 |
| 8. *Non-resident annual* with *trout* stamp | 941 | 941 | 99 |
| 9. *Senior resident annual* (LMC) | 168 | 600 | 208 |
| 10. *Senior resident annual* (OCC) | 235 | 600 | 50 |
| 11. *Senior resident annual* (NCC) | 279 | 600 | 73 |
| Total | 10,000 | 9,999 | 1,272 |

**Prepared by:** Dale A. Hall
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