Manual of Fisheries Survey Methods II: with periodic updates

Chapter 14: Conducting Roving and Access Site Angler Surveys

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Chapter 14: Conducting Roving and Access Site Angler Surveys

Roger N. Lockwood

Surveys of anglers are completed annually on various Michigan waters by the Fisheries Division to estimate angling effort and catch by species. Estimated angling effort is measured in angler hours, angler trips or angler days, and estimated angler catch is measured in numbers of fish harvested and/or caught and released. These surveys are conducted on inland lakes and rivers, and selected waters of the Great Lakes.

This chapter describes roving and access site angler surveys and discusses general methods for conducting these surveys. Equations for estimating angling effort and catch, and additional descriptions of survey methods, are given in Lockwood et al. (1999). Other reference sources are given at the end of this chapter.

14.1 Description

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Two separate sampling components are used to estimate fishing activity and success over a given period of time at a specified location – counts of angler activity and interviews of anglers or angler parties. Numerous methods exist for collecting data on both components. For example, angling effort (anglers or angler units which represent one or more anglers) may be counted from an airplane while a survey clerk interviews anglers at an access site as they complete their fishing trip. This type of complemented survey is referred to as an aerial-access angler survey. When anglers are counted from an airplane and a survey clerk interviews anglers while they are actively fishing (before they complete their fishing trip) the survey is called aerial-roving. Similarly, when anglers at a single location are both counted and interviewed by the survey clerk, the surveys are designated as either roving-access (complete-trip interviews) or roving-roving (incomplete-trip interviews). When angling effort is estimated by mail survey and catch by access interviews, the survey is a mail-access angler survey. Other complemented angler survey types may be used, but Michigan currently uses roving-access, roving-roving, aerial-access, and aerial-roving methods.

Counts provide estimates of angling effort (pressure) while interviews provide estimates of catch rate by species. The product of estimated effort and estimated catch rate is estimated catch. Counts and interviews each sample only a portion of the entire angling population and are assumed to accurately (without bias) represent that population. Routine information collected on count forms for each count are: location, date, type of count, duration of count (where applicable), mode of count, time of count, and counted numbers of units (anglers, boats etc.). Routine information collected on interview forms for each angler or angler party are: location, date, angling mode, whether fishing trip is complete or incomplete, number of anglers, start time of fishing trip, time of interview, and number of fish caught by species (catch-and-release and harvest information are recorded separately).

Catch and effort estimates may be calculated by day or multiple days within a time period (e.g., week days within a month). Angling modes (boat, shore, pier etc.) are calculated separately. These estimates may be summed to estimate catch and effort for longer time periods. Likewise, estimates from more than one location are summed to estimate catch and effort for a larger area. When anglers report the species or group of species they are targeting, targeted catch and effort may be estimated.

In addition to angling effort and catch, the angler interviewing process may be used to collect tag information from fish, angler residency, and bait type used. Anglers may also be queried regarding current or proposed fishing regulations and other issues.

14.2 Methods

Angler surveys consist of four basic elements: sampling schedule, survey clerk, angler counts and angler interviews.

14.2.1 Sampling Schedule

Sampling schedules are constructed to randomly sample anglers on various days and at various times within these days. Since survey estimates are based on mean values, both active and less active days and time periods are sampled. Stratification, such as by weekday or weekend day, tends to congregate similar activity levels and reduce variability in estimates. Supervisors must ensure that survey clerks follow sampling schedules. When a sampling schedule is not followed, data is not representative of angling population effort and catch, and resulting estimates will not accurately portray angling statistics during a given time period and location.

14.2.2 Survey Clerk

Survey clerks are an integral component in any angler survey and their importance cannot be stressed enough. Clerks must be able to perform in all weather conditions and in periods of both high and low fishing activity. The quality of a clerk's performance is determined by the quality of their supervision. Weekly contact by a supervisor promotes reliability and demonstrates to the clerk the importance of the job.

Just as the supervisor must not take the clerk for granted, neither should the clerk become complacent or indifferent. Changes may occur during an angler survey that directly influence the results of that survey. For example, concentrations of anglers may shift to a new area (such as a new boat access site). Clerks should recognize the importance of this change and notifying the supervisor so that modifications in the sampling scheme can be implemented. Training prepares a clerk for most, but not all situations, so a good survey clerk must be prepared to ask questions. For example, a species of fish may appear in the angler's catch that was not anticipated during training. Clerks should contact the supervisor so that additional training in identification can be implemented. The last thing any supervisor wants is to learn of problems after all data have been collected. When meeting the public, survey clerks represent the entire Department of Natural Resources. A survey clerk's mannerism and professionalism, and the way in which they treat equipment entrusted to them, are all important and reflect upon the Division.

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14.2.3 Counts

Single or multiple counts may be made at a given location and day. Counts are made of individual anglers or of angler units, which may represent more than one angler (such as boats, trailers, ice shanties etc.). Two types of counts are made, instantaneous and over time interval. Instantaneous counts are suitable for access or aerial surveys, while interval counts are only suitable for access surveys.

14.2.3.1 Instantaneous.–When all angling activity may be observed from a single vantage point, the instantaneous method is appropriate. Angling activity may be enumerated from the ground or from an airplane. In some situations a ground-based clerk must drive to more than one vantage point to count an area, however the count is still considered instantaneous. Spatial stratification is often used to ensure that counts are as instantaneous as possible. For example, a lake may be divided into several areas and each counted from a unique vantage point; or a clerk may drive along a river and count vehicles at access locations. From the air, angling activity is enumerated as the plane flies over each area. When more than one count location is used, direction and order of count are randomized to avoid potential biases. Care must also be taken to prevent double counting of anglers or angler units, especially if they may move from one area to another while the count is being made.

When instantaneous counts are made of ice shanties, either only occupied shanties are counted or all shanties (occupied and unoccupied) are counted. In the later alternative, the ratio of occupied to unoccupied shanties must be obtained during representative time periods to adjust the total shanty counts.

In some situations, fishing boats on a lake may be difficult to distinguish from non-fishing boats. In such situations, all boats (fishing and non-fishing) are counted and all parties (fishing and non-fishing) using the site are interviewed. Counts are then adjusted by the proportion of angling parties in the interview data set. This same technique may be applied to other counting units, such as boat trailers or vehicles at an access site.

14.2.3.2 Interval.–When anglers enter a fishery and disappear from the clerk's view, interval counts are appropriate. Typically, this situation occurs on the Great Lakes where boats leave a port and travel some distance out onto the lake to fish. Boats may be present in the fishery, but are not visible to the clerk for instantaneous enumeration. In this situation, all fishing boats leaving a port during a randomly selected time interval (duration) are counted. Interval counts are generally 15 minutes or longer in duration. As above, when fishing boats are difficult to distinguish from non-fishing boats, all boats are counted and all boating parties interviewed, then boat counts are adjusted to reflect only fishing boats. While counting units other than boats are entirely possible, appropriate conditions are rare. As previously noted, interval counts are made by ground based clerks (access count).

14.2.4 Interviews

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Since catch rates of complete-trip interviews and incomplete-trip interviews are calculated differently, care should be taken to collect only one type of interview (complete- or incomplete-trip) within a strata.

14.2.4.1 Complete-Trip Interviews.–When anglers or angler parties are interviewed by the clerk upon completing their fishing trip, the interview is referred to as a complete trip. Complete-trip interview information may be collected either from individual anglers or collectively from angling parties. Often the counting technique employed will dictate whether angler or angler party information is collected. In situations where instantaneous counts of anglers are made, either individual angler or angler party information may be collected. When angler units which may represent more than one angler are counted, angler party size information is collected.

14.2.4.2 Incomplete-Trip Interviews.–When anglers are interviewed by the survey clerk while actively fishing, prior to completion of their fishing trip, interviews are of incomplete trips. To avoid angler party size bias, only individual angler catch information is recorded, not angler party catch information (Lockwood 1997). Incomplete-trip interviews are advantageous when instantaneous angler counts are made and the clerk has easy access to anglers. For example, anglers at a pier or open ice fishery are readily accessible for interviewing. In the case of an open ice fishery where anglers may gain access to the lake at many points, incomplete-trip interviews provide a very efficient sampling method. When this method is appropriate, a clerk is usually able to collect more incomplete-trip interviews than complete-trip interviews, thus sampling a greater proportion of the angling activity. Minimum fishing time for incomplete-trip interviews is 0.5 h (Pollock et al. 1997).

The situation and type of count may dictate whether complete- or incomplete-trip interviews are required. For example if interval boat counts are made, angler party trip length information is required to convert boats per interval to boat angler hours. This information can only be obtained from complete-trip interviews. In addition, anglers are not available for interviewing prior to completion of their trip.

14.2.4.3 Voluntary Interviews.–Catch records voluntarily submitted by individuals not randomly selected are called voluntary interviews. Such records may be submitted by fishing guides, boat livery or resort operators, lake association members, or cooperating anglers. Interview forms may be distributed prior to the starting date of the angler survey, or made available from boxes on site or be distributed after the trip (e.g., post cards left on vehicle windshields). These records are especially valuable for fishing localities or anglers inaccessible to survey clerks. This situation occurs when anglers enter a fishery from resorts or cottages on a lake. The survey clerk may easily interview anglers using public launch sites, but anglers accessing the fishery from private dwellings may be difficult or impossible to interview. Voluntary interviews will be of complete trips and catch rates are calculated as for complete-trip interviews collected by a survey clerk.

There are disadvantages to voluntary interviews. Of primary concern is the uncertainty as to their representation of an angling population. For example, avid anglers may report their fishing trips more often than less avid anglers, anglers may exaggerate their catch, anglers may report successful trips more often than less successful trips, and species of fish may be more likely to be misidentified. When using voluntary interviews in conjunction with interviews collected by a survey clerk, catch rates of all sampled anglers and percentages of successful anglers should be compared before combining these two types of interviews. Differences or similarities in rates of catch and success should be viewed objectively.

14.3 Implementation

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Implementation of an angler survey begins with planning and includes: determining purpose of survey, site evaluation, designing count and interview forms, determining number of clerks needed, special equipment needs, and survey clerk hiring and training. Assistance in planning and conducting a Great Lakes survey is available through the Charlevoix Great Lakes station (study 427) and for inland surveys through the Institute for Fisheries Research in Ann Arbor (study 646). Surveys categorized as Great Lakes are those surveys done on the Michigan waters of the Great Lakes, connecting waters, and river sections with fisheries for runs of Great Lakes species. Inland surveys are those done on any of the remaining lakes or rivers, including river sections directly connected to the Great Lakes where migrations of Great Lakes species are not present.

Often, the survey purpose and site evaluation will greatly influence number of survey clerks required. In some situations, subsampling prior to the actual survey will determine potential precision of estimates and number of survey clerks needed. When a survey is designed to extend over an entire season (summer months for example), a seasonal vehicle from Motor Transport Division may be required for the duration of the survey. In the case of river surveys or ice fishing surveys, a canoe or snowmobile, may be needed.

Training is a joint effort between Research personnel and the biologist requesting the angler survey. Orientation should include a general overview of angler surveys and the purpose for the current survey. Training should include correct completion of count and interview forms, clerk behavior (public relations), operation of equipment and fish identification.

The biologist (supervisor) initiating the angler survey is responsible for procurement of vehicle(s), special equipment and survey clerk(s), and daily supervision. Regular contact (weekly) with the survey clerk is essential for quality survey results. The supervisor should check count and interview forms submitted by the clerk for completeness and correctness; additional proof reading will be done by Research personnel. Data processing and timely calculation of estimates are the responsibility of Research personnel.

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