CHAPTER VII-TN 21: A METHOD OF MONITORING PARK USE A DISCUSSION PAPER

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ABSTRACT

There have been numerous surveys carried out in which information was obtained from users of parks. This paper reports on how experience beginning with the Canadian Outdoor Recreation Demand Study park user surveys in 1968 and ending with National Park park user surveys in 1974 has prompted the development and modification of various information gathering procedures.

The report presents specifics on why certain procedures were carried out in collecting data and in weighting data. As well there is a management perspective presented which raises questions about the need for the data that have been collected and about more efficient means for collecting information. There is an underlying theme in the paper that for efficiency there must be a concern with the objectives of collecting information and with the desired or necessary accuracy of the information to be generated from surveys. Efficiency matters should obviously be pursued before survey work is carried out.

OBJECTIVE

This paper describes the survey methods that have been developed and used by Parks Canada during 1968-1974 monitoring visitor use of Canadian National Parks. In describing the strengths and weaknesses of the procedures adopted, the objective is to evoke constructive critique that will result in the improvement or replacement of the survey methods.

INTRODUCTION

In 1970, the Park Use Research Section of the Planning Division of Parks Canada embarked on a five-year research program to aid planning and managerial decision making by developing standardized and economical methods of calculating the number of visitors to National Parks and of discerning appropriate profiles of park visitors and their activities. Plans were made to begin a three-year cycle of surveys in 1971 so that by 1973 users in all National Parks would have been surveyed. Part of the plan was to use a standard survey methodology, but major changes in the survey approach were made after the first year. This paper is particularly concerned with the surveys made in 1972 and 1973, which took place at the parks identified in Figure 1.

The objectives of the surveys were twofold. First, they were designed to obtain traffic partition rates for the park gates of the National Parks studied. These were considered very important because estimates of the numbers of park visitors in future years were to be calculated using simple traffic counts. Second, the surveys were to obtain activity and socio-economic profiles of visitors to each park to support general managerial and planning work.

GENERAL SURVEY STRATEGY

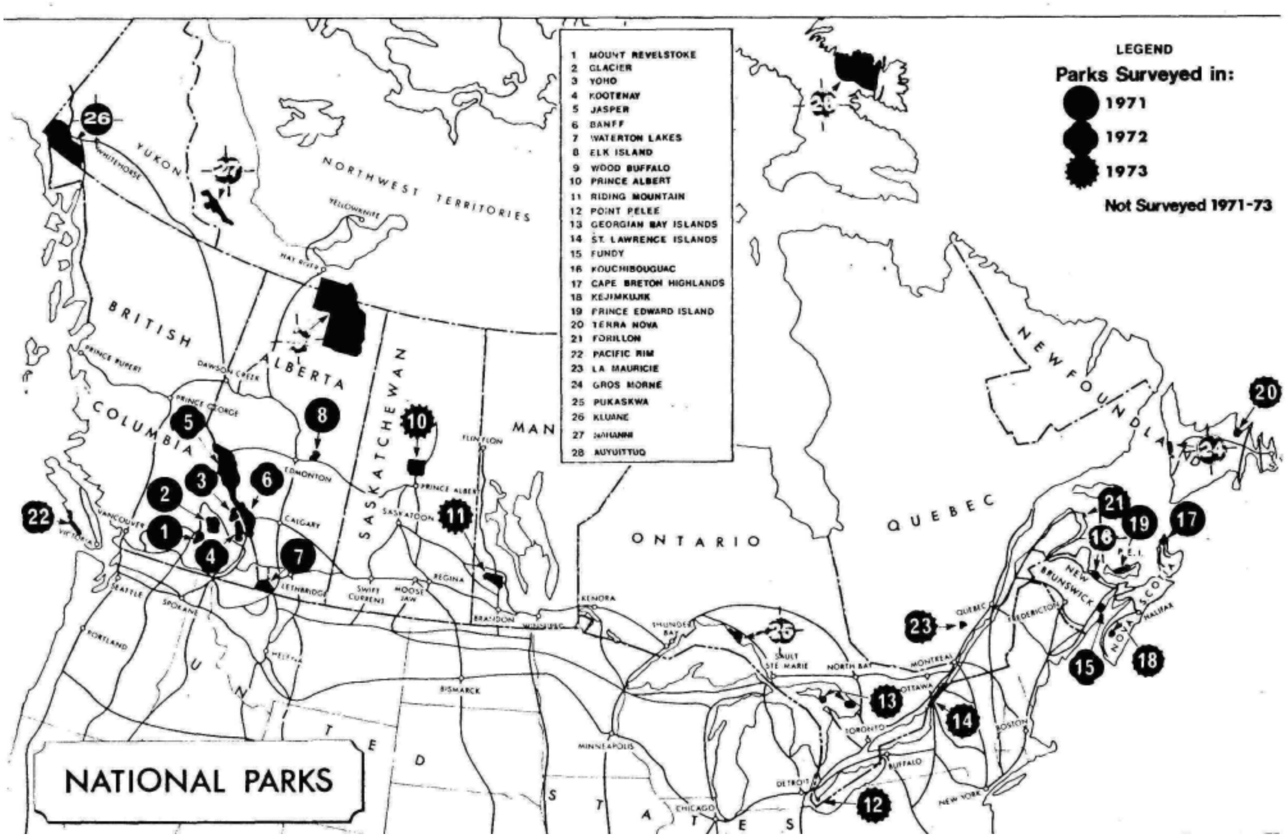
A survey method was developed which involved speaking to persons in ‘selected’ motor vehicles which entered National Parks by any of the major points of entry. In 1972-3 Parks Canada's concern was with visitors entering during the peak use season of June 1 to Labour Day. Thus at selected times of selected days during this period survey stations were located as close as possible to appropriate park boundaries, and workers at these ‘entrances’ recorded information in the way described below.

However, before describing the general strategy, one should note that the nature of visitor traffic in National Parks (and some other matters) were the cause of a number of concerns in developing a survey design.

1. Traffic volumes varied greatly between different park gates.

2. Traffic volume varied greatly on different days of the week.
3. Traffic content in terms of, for example, the proportions of Canadian visitors in the entering traffic, varied over the summer.
4. Information was needed on visitor use of parks outside the high-use season from July until the middle of August.
5. Traffic tie-ups at park gates were likely to occur when traffic was heavy if a high proportion of the entering vehicles were to be stopped.
6. Surveying visitors at exit points would involve problems for visitors in recalling their use of park facilities and their other activities.
7. The fact that high proportions of non-visitor traffic passed through some park gates meant that stopping a fixed percentage of incoming vehicles could result in very few contacts with visiting parties.

Figure 1 National Park Visitor Surveys, 1971-73



There was no need to stop transport trucks or other vehicles that could be identified as non-visitor vehicles. Consider that interviews were only started with passengers in every tenth vehicle and pursued with first entry visitors. If only one vehicle in five contained first entry visitors, the sampling rate would be essentially one in fifty!

Because the size of the universe of entering vehicles varied greatly at some park gates (a. and b. above) it was desirable to allow a survey crew to stop and interview as many vehicle parties as possible, but because of the inevitable problem of traffic hold-ups (e.), it was not feasible to conduct a census of entering traffic. Moreover, because of low proportions of visitor traffic to total traffic at various gates at various times, a standardized fractional sample applied to the whole park system was undesirable (g.). To avoid these problems, a sample was obtained by a procedure that involved an ‘interviewer’ stopping a vehicle, ascertaining specific information from the driver, ‘passing’ that vehicle and then stopping the next vehicle that passed the survey station that was not visually identifiable as a non-visitor vehicle. The type of sample obtained in this way was termed a ‘floating’ sample. It reduced the amount of time spent idle by interviewers during times of light visitor traffic, and eased traffic hold-ups at gates during heavy traffic.

Actually, the preceding description is an oversimplification of the sampling procedure. In fact, three types of records of the numbers and characteristics of visiting parties were obtained in the surveys: (1) traffic counts, (2) entry records, and (3) handback questionnaires.

Traffic count totals for each half hour on all vehicles entering each park gate during survey sessions were recorded on the form shown in Figure 2. (Fisher-Porter automatic traffic counters with a fifteen minute paper tape output have since been used successfully in a survey of Prince Edward Island National Park. The use of these counters reduces person power requirements by removing the need to have a person count cars.) Vehicles which could be identified without being stopped as not containing park visitors were excluded from the count and classified as ‘X’ in Figure 2. This was done (1) to avoid unnecessary inconvenience to business and commercial traffic, and (2) to provide a more accurate measure of the percentage of the universe that was visitor vehicles, than could be obtained using a sampling approach. These vehicles were also ignored by the interviewer who stopped and interviewed people only in potential park visitor vehicles.

Figure 2

Indian and Northern Affairs — Affaires indiennes et du Nord
Parks Canada — Parcs Canada

1973 PARK VISITOR SURVEY TRAFFIC RECORD
FEUILLE DE DENOMBREMENT DES VEHICULES

0 4 9 Job Number / N° de la tâche
0 1 National Park / Parc national
Gateway / Entrée

TERRA NOVA NATIONAL PARK — PARC NATIONAL TERRA NOVA

Date: Day / Jour; Month / Mois 0

Work Period / Période d'observation		Interview Period / Période des entrevues		Non-Interview Period / Période sans entrevues		Surveyor / Releveur	
Starting Time / Début	Length / Durée	Universe / Tous les véhicules	Identified Vehicles / Véhicules classés	Universe / Tous les véhicules	Identified Vehicles / Véhicules classés	No. / N°	Initials / Initiales

NPC 807N (4-73)

See instructions on reverse
Lire les instructions au verso

Contact between an interviewer and the occupants of those vehicles identified as containing potential park visitors involved the filling out of an entry record by the interviewer.

Entry records were short questionnaires completed by a surveyor during short interviews with those drivers of vehicles that were flagged down and who pulled off at the survey station. Part of the interviewer's task in obtaining entry record data was to determine, by a series of questions, whether or not the party should be given a handback questionnaire.

The information requested (see Figure 3) was used by the surveyor to classify parties who were stopped and interviewed according to the purpose of their visits. Parties stating that they were entering to use facilities in the park were classified as park visitors. (Park visitors were also classified as repeat entry visitors or first entry visitors but this distinction is not pursued here.) For these parties, the size and composition of the parties and their origin according to the vehicle licence plates were observed and noted on these forms. The driver was then asked about the party's proposed location of accommodation that night and their length of stay in the area, and the responses were recorded on the entry record. Handback questionnaires were given to these visitor parties, while for other parties only their trip purpose was recorded on the entry record.

Handback questionnaires were longer forms than entry records and were attached to the bottom of entry records which had a common serial number (see Figure 3). The 'handbacks' were torn from the bottom of entry records on completion of driver interviews and either placed in a waste bin or given to parties. On giving the handback questionnaire to park visitor parties, they were asked to have the party head complete and return it to deposit boxes situated near the park boundary beside the different roads that could be used to exit from the park. They were asked to keep the questionnaire for the duration of their visit and only return it on their final exit from the park. A mailing address was provided for respondents who happened to take the questionnaire away from the park.

The reason for the use of a handback questionnaire after an interview at the park entrance was to provide information which described the party's use of recreation and accommodation facilities in the park, their actual (rather than intended) length of stay, and their preferences for types of accommodation and services in the park (see concern (f) above and Figure 3). Having the handback questionnaire available during the entire visit to the park made it possible for parties to record information during the course of their visit, thus reducing recall problems that could have affected responses to interviews conducted with exiting visitor parties. In addition, had an exit survey been carried out:

1. There would have been logistical problems as a result of the varying length of time required to complete the questionnaires.
2. Traffic problems would occur if the required number of cars was stopped at a given time in order to obtain the same accuracy as an entrance survey with about a 50% return of handback. (A survey in 1972 at Riding Mountain National Park was intended to assess the effect of non-response in creating bias, resulting in differences between entrance and exit surveys, but the need to prepare a French questionnaire resulted in data collection problems and subsequent cancellation of work on the survey.)
3. The interviewing of exiting visitors was of concern to management because of the possible reaction of some parties to being stopped when they were "all packed and raring to go".
4. Exiting parties could not be relied upon to supply surveyors with accurate information on their gate and time of entry; therefore traffic partition factors derived from exit surveys could only be used in subsequent years by taking counts of exiting traffic, instead of using the entrance data collection system presently operated by permanent staff or automatic traffic counters at most park entrances.

Figure 3

1973 PARK VISITOR SURVEY ENTRY RECORD
TERRA NOVA NATIONAL PARK

[0] [1] PARK
[ ] SURVEYOR'S NUMBER
[ ] [ ] GATEWAY
[ ] [ ] [ ] [ ] INTERVIEW TIME (24 HOUR CLOCK)
[ ] [ ] DAY
[0] [ ] MONTH

CLASS

3 ☐ BUSINESS
5 ☐ TOUR BUS
6 ☐ COMM. BUS
7 ☐ RESIDENT
1 ☐ THROUGH TRAFFIC
4 ☐ PARK VISITOR
2 ☐ REPEAT VISITOR

PROVINCE OR STATE OF ORIGIN [ ] [ ] [ ]

PARTY SIZE

[ ] ADULTS
[ ] CHILDREN

LANGUAGE

1 ☐ ENGLISH
2 ☐ FRENCH

JOB NO. [0] [4] [7]

Nº 11314 ·

ACCOMMODATION

1 ☐ INSIDE PARK
2 ☐ OUTSIDE PARK – NON HOME
3 ☐ OUTSIDE PARK – HOME
4 ☐ UNKNOWN

LENGTH OF STAY IN REGION

[ ] [ ] NIGHTS

1973 PARK VISITOR SURVEY HANDBACK QUESTIONNAIRE

Parks Canada Parcs Canada

TERRA NOVA NATIONAL PARK

JOB NO. Nº 11314 · [0] [4] [8]

PLEASE ANSWER ALL OF THE FOLLOWING QUESTIONS

1. How long do you plan to be away from home on your trip?
   ___ Number of Nights

2. How long did your party stay in this Park on this trip?
   ___ Number of Hours (if you did not stay overnight) OR ___ Number of Nights

3. If you stayed overnight away from home on this trip, please indicate the number of nights spent in each of the following types of accommodation.

Inside the Park

___ Commercial Housekeeping Cottage
___ Cabin Trailer
___ Tent
___ Tent Trailer
___ Self Contained (camper truck)
___ Other

Rest of the Trip to Date

___ Tent
___ Tent Trailer
___ Rented Cabin
___ Self-Contained (Camper truck)
___ Commercial Housekeeping Cottage
___ Private Home or Cottage
___ Cabin Trailer
___ Hotel or Motel
___ Other

4. Where is your present home located?

______ Town or City AND ______ Province or State OR ______ Country other than Canada/USA [ ] [ ] [ ]

5. Which one type of overnight accomodation would your prefer to use in or near this National Park?

1. ☐ Privately operated campground fully serviced (sewer connections, toilets, showers, food concession, etc.)
2. ☐ Privately operated campground semi-serviced (toilets, small food concessions, etc.)
3. ☐ National Parks campground fully serviced (sewer connections, toilets, showers, food)
4. ☐ National Park campground semi-serviced (toilets, firewood)
5. ☐ National Park campground unserviced or primitive
6. ☐ Rented Cabin – no housekeeping
7. ☐ Commercial Cabin – housekeeping
8. ☐ Hotel or Motel
9. ☐ Private Home or Cottage
10. ☐ Other (please name) ______

6. Did you experience any difficulty in finding campground accommodation within the Park? (Please check all that apply.)

1. ☐ No Difficulty
2. ☐ Forced to Arrive Early (before 3 pm.)
3. ☐ Campgrounds Full – camped in Park's overflow accommodation
4. ☐ Campgrounds Full – will look for accommodation outside the Park
5. ☐ Other ______

7. How many times did your party use each of the following Park facilities on this visit to the Park?

___ Picnic Ground
___ Picnic Areas
___ Wayside Stop
___ Viewpoints
___ Serviced Beach
___ Unserviced Beach
___ Boat Launching, Mooring or Docking Site
___ Boat Rental Sites
___ Day Use Area
___ Childrens Play Area
___ Indoor Interpretation Centre
___ Indoor Audio-Visual Theatre
___ Outdoor Theatre
___ Personal Contacts with Naturalist
___ Exhibit Trailer
___ Information Bureau
___ Unguided Hiking Trails
___ Guided Walks
___ Boardwalk
___ Guided Interpretive Trails
___ Unguided Trails
___ Canoe Routes
___ Fishing Areas
___ Campgrounds
___ Wilderness Camping Areas

8. Which if any, of the following would you have used if they had been available in this Park? (Check all that apply)

☐ Boat tours
☐ "Boat only" access campgrounds
☐ "Bike only" access campgrounds
☐ Cycle trails
☐ Motor boating
☐ Ocean tour boating
☐ Deep-sea fishing
☐ Other (name) ______

9. If you have any comments you would like to make on your visit to this National Park, please make them below

______

______

______

AS YOU LEAVE THE PARK, PLEASE DEPOSIT THIS CARD IN THE BOX LOCATED AT THE PARK EXIT. THANK-YOU.

If you are unable to deposit this card, please mail to: Chief Planning Division, National Parks Service, 400 Laurier Ave. West, Ottawa, K1A 0H4

OFFICIAL USE ONLY

[ ] [ ] DEPOSIT BOX [ ] [ ] DAY [0] [ ] MONTH [1] [ ] MAIL-BACK *FRANÇAIS AU VERSO*

NPC 518-1 (4-73)

In order to sample as complete a cross-section of park visiting parties as possible using the ‘floating sample entrance survey’, the survey schedule for each gate in each Park was stratified on the basis of known variations in the content and volume of visitor traffic to National. Parks at different times of day, on different days of the week, during different parts of the season. On the basis of the beginning and end of American and Canadian school holidays, which have a considerable influence on the volume and content of traffic entering National Parks, the season was divided into four parts: June 1 to June 16, June 17 to June 20, July 1 to August 16, and August 17 to September 4. On the assumption that traffic volume was higher and content more varied on weekends than on weekdays, weekends were sampled more frequently. This was achieved by dividing each week in the season into four types of day, each of which was sampled with similar frequency: Saturdays, Sundays (including holiday Mondays), Fridays, and weekdays excluding Fridays. (Defining an optimal balance in the schedule between weekend and weekday sessions depends on knowledge of traffic distributions or in theory could be achieved with a Baysian sampling approach. However, the latter would have presented severe practical problems in repeatedly changing schedules or only establishing them as data were received. Parks Canada's data for traffic distributions is being applied to optimal (cost-accuracy) Survey Strategies. See TN 19.) Because traffic also varied with the time of day, each day was divided into two periods, mornings and afternoons. Thus, for each gate in each Park, at least one survey session in each part of day (3 parts in 1972, 2 parts in 1973), in each type of day, in each part of the season was scheduled. In scheduling any additional sessions, preference was given to gates, periods and day-types which normally experienced heavy traffic or traffic that varied considerably in content, or to periods when heavy traffic at particular gates was known to occur.

The purpose of these stratifications was to obtain sets of entry records collected during surveyed sessions which could be ‘imputed’ into unsurveyed sessions at the same gate because they could be judged to be similar in traffic content according to their part of the season, type of day and period of day. In other words, it was assumed that variations in traffic content were greater between these stratifications than within them, the stratifications could be used to improve the accuracy of inflating the sample to represent the universe.

On completion of the surveys, all records were returned to Parks Canada headquarters in Ottawa where they underwent manual screening and keypunching. The records were then computer-edited to check the internal consistency of all three types of record. Subsequently, traffic counts were cross-checked with the numbers of entry records in order to detect any errors which led to a larger number of entry records existing for a given half hour than were vehicles counted during that half hour survey session. Error lists were produced and corrections made, and three separate, edited and sorted files were eventually produced.

WEIGHTING

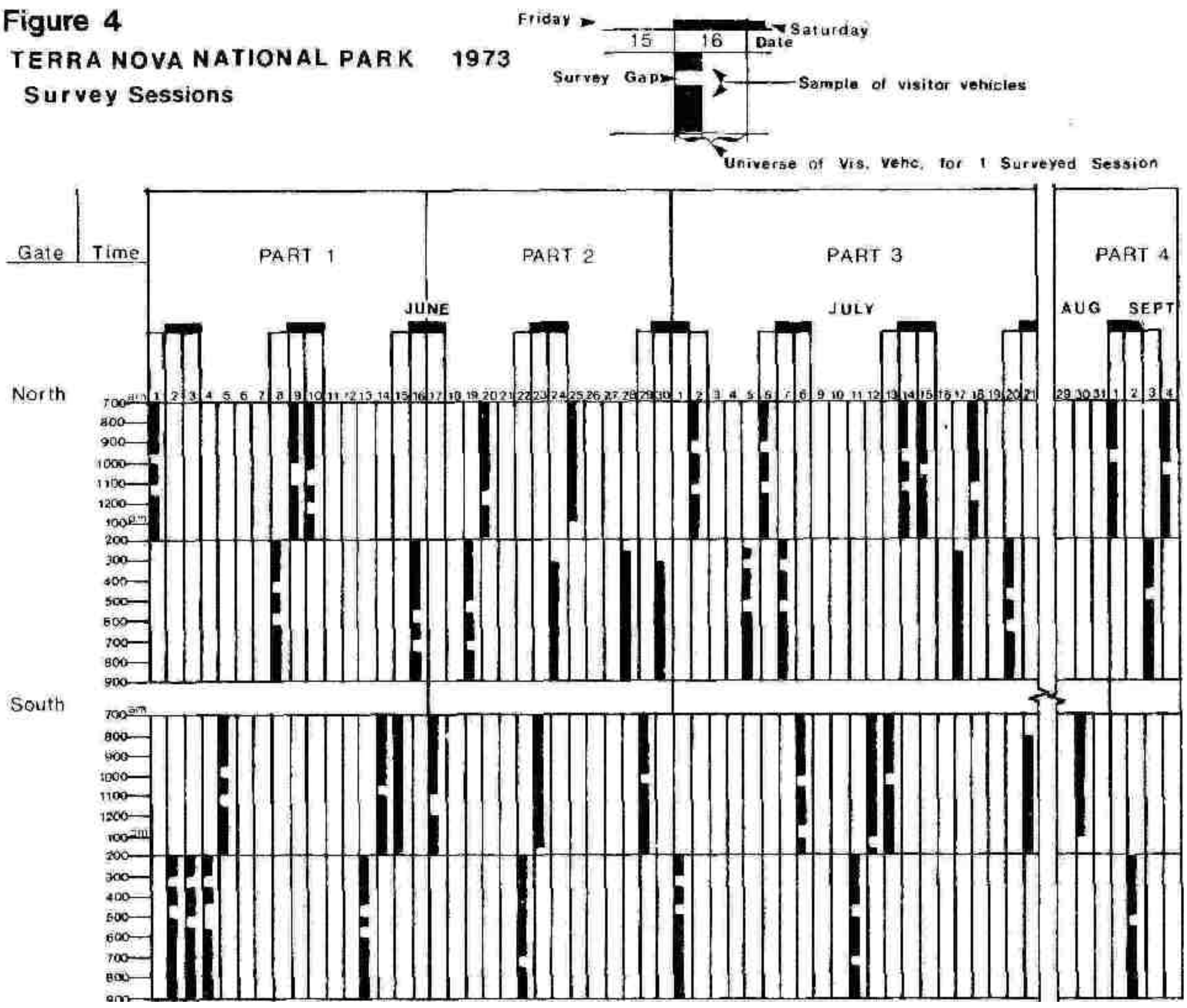
Entry Record Weighting

The first task undertaken with the entry record file was to calculate sampling rate weights for each and every half hour during which entry records were distributed. This was done in order to inflate the entry records to be representative of the universe of traffic stopped at each gate.

The size of the universe of visitor traffic during each half hour was estimated. The proportion of visitor vehicles of all vehicles which were stopped was assumed to have been the same for the total universe of vehicles which had been recorded as potential visitor vehicles. As explained above, this count had separated vehicles which could be identified without being stopped as non-park visitor vehicles, from possible or ‘interviewable’ vehicles. Thus, for a particular half hour survey session at a particular gate, let u = total universe of all vehicles entering, and x = number of vehicles identified as non-park visitor vehicles without being stopped.Then (u-x) Is the number of potential park visitor vehicles of which a certain number was stopped. If t = total number of potential park visitor vehicles stopped, the sampling rate is t/(u-x) and thus the sampling rate weight for a given gate, for a given day, for a given half hour is (u-x)/t.

It is notable that where x is large, that is a high proportion of entering traffic could be identified as non-park visitor, the sampling rate weight is more accurate than would be the case if identifiable vehicles were not counted. Thus, by identifying that part of the traffic to be stopped for interviews, greater accuracy was obtained than would be the case by taking a sample from the universe of all entering traffic.

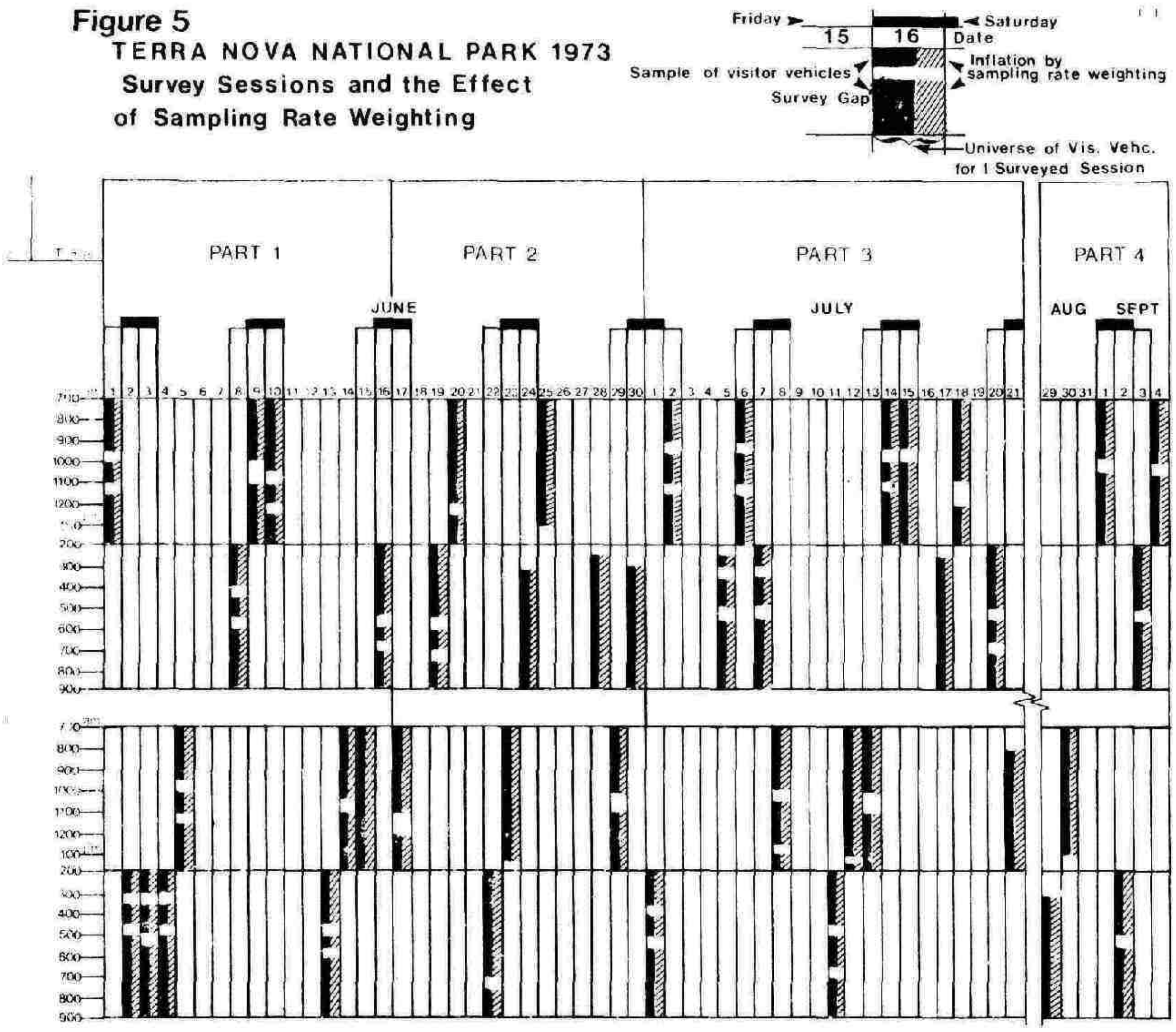
Figure 4
TERRA NOVA NATIONAL PARK 1973
Survey Sessions



The use of weights to inflate the number of entry records to represent the universe of visitor traffic during surveyed sessions is shown symbolically in the five figures beginning with Figure 4. In Figure 4, the shaded areas of the left-hand portions of particular periods, represented by complete cells, indicate those half hour sessions during which surveys took place. For the sake of simplicity the shaded areas are not drawn in proportion to the sizes of the samples, nor are the cells drawn in proportion to the size of the estimated universes of visitor traffic. The diagonal shading in Figure 5 shows symbolically how sampling rate weights were used to inflate the number of vehicles stopped to represent the estimated universe of visitor vehicles for each half hour surveyed.

In Figures 4 and 5 it may be noticed that there were 'time gaps' when no interviewing took place. During some survey sessions rain prevented the interviewing of entering vehicles, while sickness of survey crews or transportation difficulties also precluded a record of entering vehicles for various lengths of time. In addition, during each survey session, a meal break of one hour was taken by crews, resulting in there being no entry or traffic records for those sessions. To fill these gaps, entry records of the same day from adjacent time periods were duplicated to 'fill in for' the missing records as an estimate of what would have been observed.

Figure 5
TERRA NOVA NATIONAL PARK 1973
Survey Sessions and the Effect of Sampling Rate Weighting



The actual procedure used in making these 'time fills' depended on whether or not records existed for the time periods before and after a gap. Where such records existed/ the records from the preceding and following strata were duplicated. Since the length of time of the period to be filled and the 'filling' periods could differ, and typically one half hour was 'filled' by two thirty-minute periods, the sampling rate weights of duplicate records were modified by multiplication by another weight calculated as:

$$\text{Time Fill Weight} = \frac{\text{number of minutes in time period to be filled}}{\text{number of minutes in 'filling' period}}$$

When a gap occurred at the beginning or end of a day, records from the surveyed half-hour periods adjacent to it were used to fill the gap. The effects of the time filling procedure just described are shown symbolically in Figure 6 by the vertical shading.

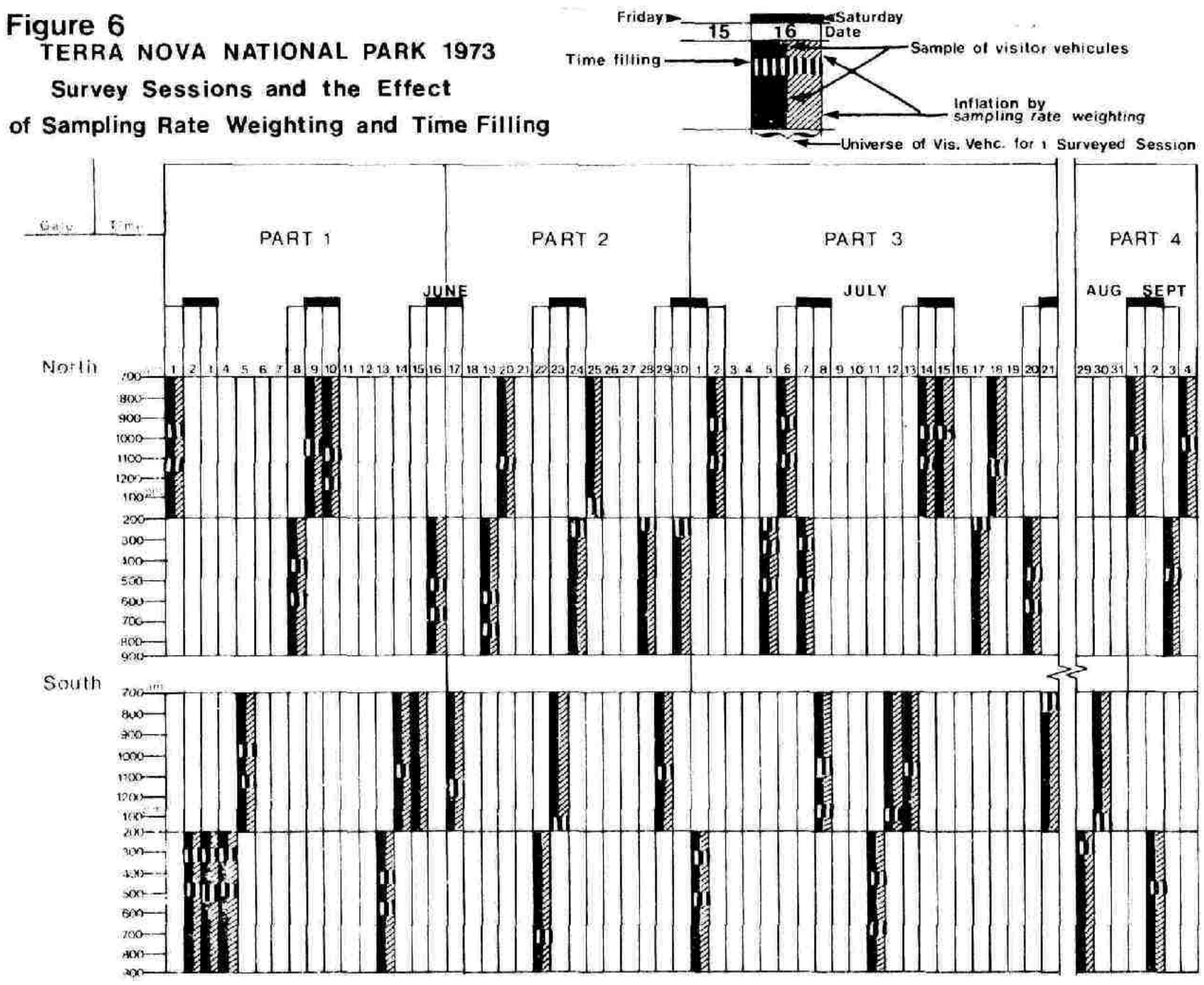
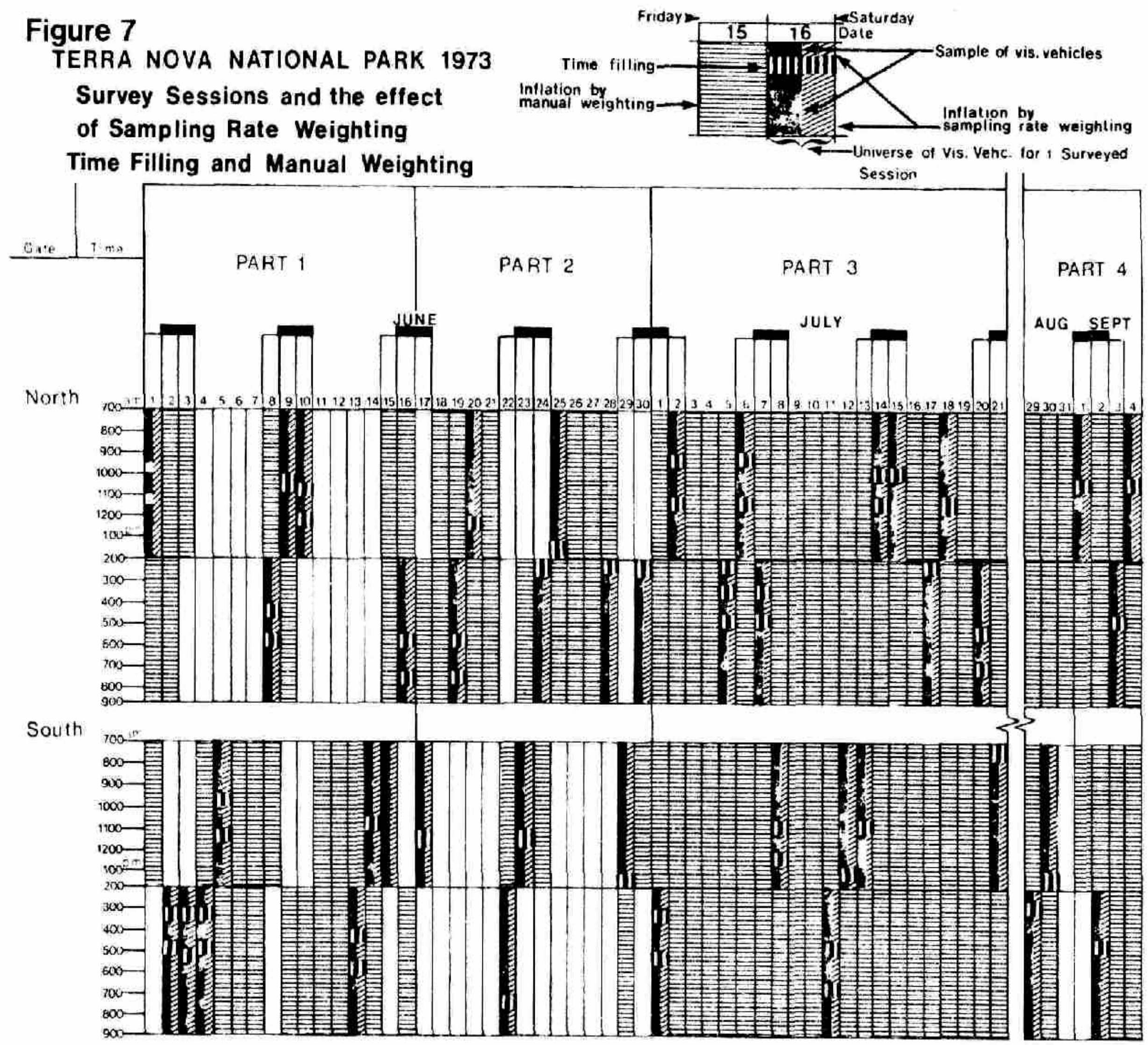


Figure 6
TERRA NOVA NATIONAL PARK 1973
Survey Sessions and the Effect of Sampling Rate Weighting and Time Filling

The use of sampling rate weights and time fill weights effectively provided complete sets of records for all periods during which a survey took place. These completed sets of entry records could then be given a further weight in order to inflate the number of records, so that weighted tabulations would give correct estimates of the total numbers of visiting vehicles entering each park. The weights used to do this, with the exception noted later, were manually calculated, and thus have been called ‘manual weights’. These weights were equivalent to the number of times that data for a given complete period would have to be duplicated in order to ‘fill’ all periods of the same type, on the same day-type and in the same part of the season at the same gate. For example, at a particular gate, there are data from a Saturday morning which was the only Saturday morning on which a survey took place at that gate in that part of the season. If there were three Saturdays in that part of the season, the weight of each record from the particular Saturday morning would be multiplied by a manual weight of 3.0. If there had been surveying on two of the three Saturdays in that part of the season, the manual weight would have been 1.5. This weighting inflated observations of give estimates for a major part of the park visitor traffic, as shown in Figure 7 by the horizontal shading.

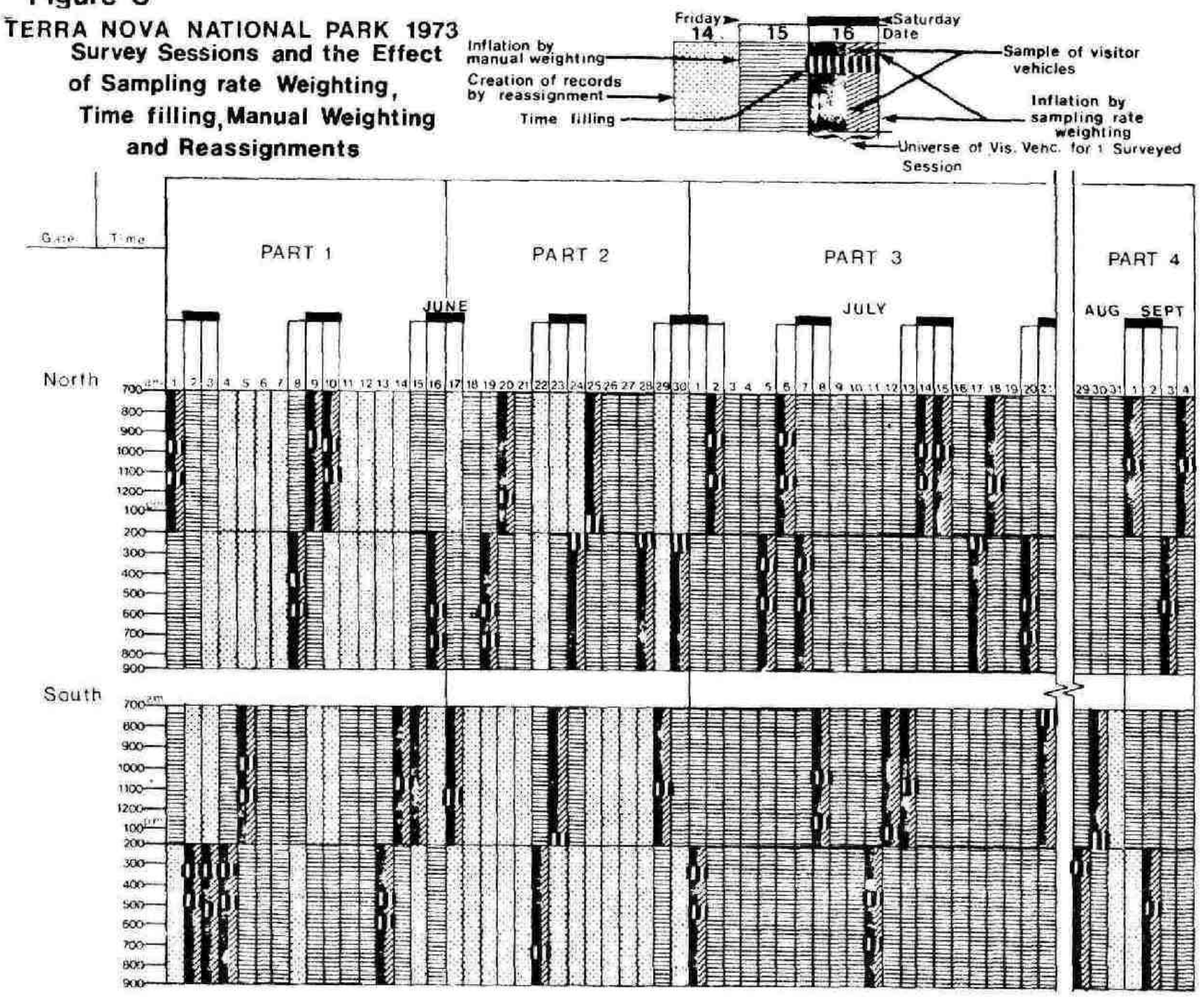


As Figure 7 shows, after time filling and manual weighting the only traffic for which there are not estimates occurred when, through error or logistical problems, such as sickness of crew members or rain an entire period of a given day-type within a part of the season, which was the only period of that type missed. In Figure 7, for example, this is shown as weekday afternoons at the south gate of Terra Nova Park during part 2 of the summer. Under these circumstances, 'estimates' of the missing data are created from data of the same day-type in another part of the summer which were duplicated to fill the gap. The weights on the records which were duplicated were multiplied by a 'reassignment weight' which generally reflected the different total traffic for the period with no data compared with the total traffic volume associated with the records which were reassigned. (Space does not permit the detailed explanation of how this weight was estimated; further information on this and other details may be obtained from Parks Canada on request.) Reassigned entry records were duplicated to fill missing survey sessions as shown symbolically in Figure 8 as the speckled areas. Copies of records were given the reassignment weights to correct for the different traffic volume.

The variables 'date' and 'month' were invalidated by both types of manual weighting described above. In order that tabulations of data using the variables 'date' and 'month' would not contain incorrect frequencies, the values of these variables were scrambled and made unavailable for normal tabulations.

Thus, at the end of the weighting process, all original entry records received a sampling rate weight, and, since no gate was surveyed on each of a particular period and type of day in the same part of the season, a manual weight. The duplication of records for time filling and reassignments was undertaken simultaneously and the weights assigned as shown in Figure 9. As the figure shows, the weight of entry records was the product of three weights if they represented entry records in a surveyed session which was reassigned to another part of the season.

Figure 8



TERRA NOVA NATIONAL PARK 1973
Survey Sessions and the Effect of Sampling rate Weighting, Time filling, Manual Weighting and Reassignments

<u>Handback Record Weighting</u>

The weighting of handback records required an additional special consideration. Since not all questionnaires for each surveyed period was returned, handback questionnaires could not be weighted simply by matching each one to its ‘parent’ entry record by serial number and then giving it the ‘parent's’ weight. This procedure could be undertaken for returned handback records, but obviously could not be used for unreturned handback questionnaires.

So, the assumption was made that the content of handback questionnaires of parties which did not respond was similar to that of similar parties which did respond. In other words, entry records with responses that were similar according to a number of criteria should, it was assumed, have ‘fathered’ similar handback records. Thus, entry records for which handback questionnaires had not been returned were each tested for their similarity to entry records for which handback questionnaires had been returned. Entry record ‘similarity’ was used as a criteria for imputing that a given handback record should be assigned to an entry record for which no handback had been returned.

Figure 9: PROCEDURE FOR WRITING OF FILE CONTAINING DUPLICATED ENTRY RECORDS

Original Entry Records Total Weight Sampling Rate Weight X Manual Weight	Time Fills Total Weight Sampling Rate Weight X Manual Weight X Time Fill Weight
Reassignments Total Weight Sampling Rate Weight X Reassignment Weight	Reassigned Time Fills Total Weight Sampling Rate Weight X Reassignment Weight X Time Fill Weight

The authors' justification of this assumption is that the latent structure model of Lazarfeld and Henry (1968) that suggested that different probabilities of handing back questionnaires are associated with people in different collectivities which in this case are defined to a high degree by the entry record variables.

To accomplish the desired matching, a file of original entry records was split into two files, one containing entry records with handbacks and the other containing entry records without handbacks. In this process, six new variables were created by arbitrarily grouping the values of the existing variables of origin, number of adults, number of children, day of week, accommodation, and length of stay. Entry records were judged to be similar if the values of the newly created variables and of several original variables matched.

The use of the newly created variables meant that entry records were to be judged similar only if they were distributed at the same gate, within an hour on the same type of day and within 28 days of each other, to parties having the same region or origin, size, number of adults, similar intended length of stay and similar intended type of accommodation. Specifically (as shown in Figure 10) in the matching procedure the original ungrouped variables were dropped one at a time from each series of comparisons of entry records with no handback and with all entry records with handback records. The number of variables dropped before one or more matches was found determined the level of match. Thus entry records with original handback records were automatically assigned a match level of 1, those matched after the relaxation of the variables ‘number of children’ and ‘number of adults’ were assigned a level of match of 2 and so on. A ‘level 4 match’ would occur where two entry records with the values for all variables except serial numbers, number of adults and children, day of week interviewed, and accommodation intended. When a match to an entry record was found at a given level of match, comparisons at this level were continued to the end of the file in order that additional, equally similar, matches would also be found. The matching procedure was then repeated for the next entry record with no handback and iterated until the end of the file of entry records with no handbacks was reached.

Each entry record in the file of those without handback records which was matched to one or several entry records by this procedure was then identified by its serial number and that of the similar entry record(s) with the handback records as shown in Figure 11. The number of matches and the level of match were also recorded. As shown in Figure 11, when no similar case could be found for an unmatched entry record after all the constraint rules on matching had been relaxed, a dummy handback record was created with ‘missing values’ of zero for each variable. In order to be able to distinguish dummy from other handback records on the final files, a level of match of zero identified dummy handback records.

Figure 10: IMPUTATION RELAXATION RULES

Variable Name	Imputation Level 1	2	3	4	5	6	7	8
Park *	.	=	.	,	=	=	.	.
Gate *	=	=	.			.	.	.
Area of Origin								
No. of Adults - Grouped	=	=	=	=	.	=	.	.
Party Size - Grouped								
Day of Week Interviewed - Grouped								
Accommodation Used - Grouped	.	.	.	.	.	.	.	
Length of Stay in Days - Grouped								
Time of Survey (same half-hour)*	=	=		+60	+60	+60	+6 0	+60
Day of Survey *		=	=	±28	±28	±28	±28	±28
Class of Entry *	,	-	,	.	.	=	=	
Length of Stay in Days *	,	.	.	=	.	.		
Origin of Party *	-	.	.	,	=			
Accommodation Used *	=	=	=	=				
Day of Week Interviewed *	,	.	.					
No. of Adults *	,	,						
No. of Children *	.							
Serial Number of Questionnaire *								

* Original variables

To make the searches for matching entry records as brief as possible the files of matched and unmatched entry records were sorted by the values of each of the variables used in assessing similarity. In this way, an entry record with no handback record would only be compared with a group of entry records having the same values of park, gate, origin code etc., and each comparison could be completed with a single pass over a small part of the file of entry records with handback records.

DISCUSSION

The following discussion focuses on five areas that require some consideration in evaluating the procedures adopted for this and other similar surveys.

Survey Biases

At least two important sources of bias are found in the survey procedure described above which require some discussion.

1. Floating Sample Biases:

Using a floating sample with half-hour time intervals, and assuming that the average volume of traffic does not change drastically during a particular half-hour, a problem regarding the randomness of observations is encountered. Changes occur in the composition of entering traffic, usually signaled by rapid change in traffic volume, e.g. from park staff driving to work to visitors, or from non-resident arrivals to the rush of local people on Friday. In half-hours where such changes take place, the low volume traffic will be over-sampled. However, this bias occurred only in a few sampled half-hour periods each year at only a few parks and is unlikely to affect the highly aggregated figures by more than a very small amount.

An important problem with floating samples arises from the perpetually high probability of stopping slow vehicles that are at the head of line-ups of their own making. Such cars may be driven by the elderly, may be touring recreation vehicles, or may be slow for some other reason.

A consequence of this clumping problem is that recreation vehicles travelling together, such as caravans, are likely to be subject to only one interview. However, while ‘traffic volume equivalent’ of the caravan would suggest a large weight for the interview, the weighting procedures will assign the caravan vehicle the same weight as a private car travelling alone.

The latter problem could be remedied by simply applying a special inflation weight to caravans depending on the number of vehicles. To prevent the bias caused by selecting cluster leaders, a survey procedure for selecting a random potential visitor vehicle in a cluster could be used.

Figure 11a: EXTRACT FROM TYPICAL WORKING FILE PRIOR TO IMPUTATION PROCESS (sorted by Park and Serial Number)

PARK NO.	ENTRY RECORD SERIAL NUMBER	WEIGHT	HANDBACK RECORD SERIAL NUMBER
01	00567	4.5	00567
01	00568	4.5	unreturned
01	00569	4.5	unreturned
01	00570	3.0	00570
01	00571	3.0	unreturned
01	00572	3.0	00572
01	00573	3.0	unreturned
01	00574	3.0	00574
01	00575	3.0	00575
01	00576		00576
01	00		00577

Figure 11b: EXTRACT FROM TYPICAL WORKING FILE AFTER IMPUTATION PROCESS (sorted by Park and Entry Record Serial Number)

PARK NO.	ENTRY RECORD SERIAL NUMBER	WEIGHT	HANDBACK RECORD SERIAL NUMBER	NUMBER OF MATCHES	MATCH LEVEL
01	00567	4.5	00567	1	1
01	00568	4.5	03692	1	4
01	00569	4.5	00985	1	2
01	00570	3.0	00570	1	1
01	00571	1.5	03980	2	4
01	00571	1.5	01197	2	4
01	00572	3.0	00572	1	1
01	00573	3.0	00573	0	0
01	00574	3.0	00574	1	
01	00575	3.0	00575	1	
01	00576			1	1
01	005			1	1

At least two advantages of a floating sample over fixed sampling rates should also be noted:

- surveyors used their time more efficiently than in procedures using fixed sampling rates, and
- the problem of traffic congestion that can be created when employing a fixed sampling rate is avoided.

2. Entrance Survey Biases:

Probably the most dependable method of checking the reliability of an entrance survey is to undertake a simultaneous exit survey and compare the results of the two surveys. As mentioned above, Parks Canada attempted to carry out such a nonresponse bias survey in 1972 in which the underlying assumption, which may be questionable, was that aggregated responses to an exit interviews would be less biased than estimates that depended on making corrections for nonresponse to handback questionnaires. It was unfortunate that it was not possible to finish this survey as a result of difficulties in printing a second set of handback questionnaires. Actually, it is likely that because of biases occurring in how people answer questions on how long their visit was, what they did when they were about to leave and other questions, both entrance and exit surveys may be biased!

It is possible, however, to identify (if not measure) three important sources of bias that occur when using handback questionnaires:

(1) The handback questionnaire may influence behaviour by providing suggestions for activities that they would not have been considered otherwise.

(2) The handback questionnaire can be lost during a recipient's visit to a park and the longer the stay the more likely is the loss or destruction of a questionnaire. It was hoped, however, that losses occurred at a similar rate by visitors with similar entry record characteristics. Returns from an exit survey are not likely to be lost. Nor, are they destroyed for any number of reasons. Reasons for nonresponse at an exit are much clearer than reasons for nonreturn of a handback questionnaire!

(3) Multiple entry bias is created when some people enter a park many times on a simple visit while others enter only once. The latter causes a bias similar to the one that arises when a surveyor moves around a park interviewing people at random. In the one case the visitor who enters several times has a higher probability of being interviewed in an entrance survey than the person who enters once; in the other type of survey a person's probability of being randomly selected arises in proportion of the amount of time he spends being available to be selected at random. This is, of course, controlled by only collecting data and distributing handbacks on first entry. However, a number of ‘day visitors’ stay in a campground just outside a park, and ‘should’ according to some definitions of first entry visitors, be interviewed each day while people who stay a short distance from these people, but within the Park, should only be interviewed on first entry. Do these different visitors really know what their first entry is or can an interviewer clarify this easily? Evidence from a 1974 survey of P.E.I. National Park suggests that the answer is no.

Apart from these disadvantages of using an entrance survey there are two notable advantages:

(1) People were not inconvenienced by being asked questions as they were leaving a Park but instead had a questionnaire with them while in a Park. This allowed people to use their questionnaires to record activities as they were performed, thus reducing problems of

recall bias.

(2) Even if an exit survey had been carried out using a ‘floating sample’, there would be little difference in the number of completed questionnaires obtained from a given input of surveyor's time. 10 minute interviews at the Park exit, instead of 5 minute interviews at the Park entrance, would have produced a similar number of records if 50% of handback questionnaires were returned, as was the case in 1973. Moreover, obtaining answers to all questions for almost all interviews probably yields less biased results than would the inflation of 50% response to represent the universe. A lot depends on the nature of refusals to participate.

Survey Efficiency

This paper has introduced a number of survey design and weighting considerations that should be of relevance to persons carrying out such surveys or any similar surveys of people, on foot or in vehicles, who enter a geographical area subsequently leave it. It must be recognized that the paper has not dealt with a number of important issues including:

a) Whether a survey is the appropriate or most cost-efficient method of obtaining certain information.
b) Why a simple random interviewing of people, for example in a camping area, is not a more effective strategy for obtaining data on park users than that described above.
c) How to calculate the appropriate amount of sampling and the appropriate numbers of survey sessions on given day-types to achieve a cost efficient survey that, for example, has 99% probability that all estimates for the numbers of people being in certain values of 10 critical variables will be within 1% of the true number, or, at least, of the average that would be obtained in many replications of the survey.

Much information on park visitor activities can be measured in ways other than surveys more accurately than by surveys. Campground registrations or adult and children ticket sales are good sources of data (a). (A comparison of total traffic volumes estimated by the 1973 surveys and by permanent traffic counters is shown in Figure 12.) However, when data on a party's activities in a park are to be used to analyze a park's operation, other data that presence of a party or person at a specific location are needed. Data on a person's movement within a park may be collected by the use of plastic cards similar to a credit or computerized library card (such a system as in operation on Long Island in New York State). Actually, a procedure tested at Gros Morne National Park in 1974 in a visitor survey carried out by Parks Canada involved assessing the use of a National Park by keeping a record of vehicle license plates. Although not completely original, the success of the method suggested its extensive use in 1975. In some parks where activities are highly oriented to moving from place to place by automobile, a large amount of information can be gained from license plates and visual observations made by surveyors of the people travelling in a vehicle or people getting into or out of a vehicle.

It is important to note that an optimal survey technique makes efficient use of time and money, and the 1972-73 strategy described above does not! As suggested in a footnote, automatic traffic counter can perform all the activities of the traffic counting member of a two-man survey crew except for counting cars that are not park visitor vehicles. A mechanical counter costing $2,000 (1975 price) can be set up to count traffic in one direction and to record it every 15 minutes, and to work 24 hours a day, 7 days a week with little servicing, no personnel or hiring problems, accommodation problems and so on. A survey crew member counting traffic for three months working 37 hours a week costs well over $2,000 plus expenses, and does not produce accurate data by 15 minute intervals that are ready to processed by a computer. The traffic counter performs more than four times the amount of counting as a crew member who works one-fourth of the hours in any week. Thus, a crew member and data processing staff can be replaced by a traffic counter and the remaining surveyors instructions modified slightly so an interviewer counts obvious non-park visitor traffic. One achieves better results than in 1972-73 at a lower cost even if the traffic counter were thrown out at the end of a summer!

Figure 12 COMPARISON OF ESTIMATED AND OBSERVED ENTERING TRAFFIC 1972-3

PARK	TOTAL ESTIMATED FROM	TOTAL RECORDED BY	PERCENT AGE
	1972		
Banff	838,402	961,158	- 12.7
Kootenay	257,776	unknown	--
Yoho	400,985	405,559	- 1.1
Jasper	307,303	316,465	- 2.9
Fundy	174,269	171,511	1.6
	1973		
Terra Nova	159,179	not reliable*	--
Kejimkujik	38,088	41,289	- 7.8
Forillon	76,666	68,952	11.2
La Mauricie	19,665	16,372	20.1 **
Point Pelee	47,185	72,686	- 35.1 **
Riding Mountain	166,816	192,591	- 13.4
Prince Albert	43,739	48,419	- 9.7
Pacific Rim	81,347	86,959	- 6.5

* Traffic Counters were not accurately calibrated

** Large differences may be accounted for by large amounts of night-time traffic or by pedestrian or other non-vehicle traffic during the daytime.

In a 1974 survey at Prince Edward Island National Park, where the traffic counter strategy was used, students could perform double the amount of surveying that they could using the old strategy because they did not count traffic. It was also useful for improvement of weighting to have hourly traffic data, 7 days a week all summer. Since traffic counters can be used for other purposes during the winter and are good for 10 years cost efficiency of surveying was greatly raised.

Survey Assumptions

Having ascertained that a survey is needed and efficiently designed vis a vis (a) and (b) above and even to the detail noted in (c), there are several sources of inaccuracy in returns that result from making the assumptions that (1) all people in a party would respond in a similar manner to a question, or (2) that all the people in a party participate in the same activities, and (3) that the responses of randomly selected party members can be inflated by party size to obtain a ‘universal’ picture of the users' opinions or activities.

It is hoped that in making these assumptions in collecting entrance survey data and in the weighting strategy used, returns provided:

(1) Data on parties, obtained from answers to questions that could be asked of whole parties, e.g. How many nights did you stay at the Park? (A not uncommon problem occurs when, for example, the husband leaves his family in a park for two weeks and visits them only on week-ends.)

(2) Answers from individuals to 'individually focused' questions. Alternatively, by obtaining a response from a random individual in a party and data on party composition, the appropriate weighting of responses would be possible. This would provide estimates of the percentage of individuals in the universe that give a certain response.

Filling Survey Gaps

It is the opinion of the authors that there is no fallacy in the approach endorsed of filling time gaps in data to complete daily data. It might be argued that there is less chance of adequately estimating traffic for local rush hours or other periods of traffic heterogeneity. However, it is more reliable to time fill from 'nearby' times of the same day rather than from identical time periods on similar days. Since the composition of entering traffic usually shifts slowly over a period of one or two hours, time filling within a day should only result in relatively slight biases particularly when gaps are filled from both sides. Given that time filling has resulted in the completion of every survey session, it is valid to assign 'manual weights' to data which reflect how often each afternoon or morning of surveying could have occurred during a given part of the summer, on a particular day type (e.g. weekday) at a particular gate compared to how often it did occur.

In addition, there is no reason why the handback imputation procedure used should not produce results as good as or better than simple inflation in correcting for non-response (see Figure 13). Actually, since matches were not found for some records, it was necessary to inflate a number of estimates to obtain an estimate for the universe. The authors hold that it was more accurate to inflate an estimate by 10% (by multiplying the estimate by 1.10), than it was to inflate a 50% response by 2.0.

Reliability and Validity of Data

In the preceding discussion it has been noted that there has been very limited progress in assessing and understanding the reliability of estimates obtained from the park user survey, yet this field of investigation has progressed considerably compared with that of assessing the validity of such estimates. However, there persists the problem that even if we know, for example, the true number of camper nights that occurred in a park, it is not possible to discuss how an estimate of this number based on a survey reflects on the validity of the estimate unless the reliability of the estimate is known. To determine whether or not the estimate is biased, rather than whether the estimation procedure is conceptually or mathematically unsound, the reliability of an estimate must be assessed before its validity can be determined. If the reliability of an estimate is known, and if an estimate of the reliability has been made, then a statistical test can be used to accept or reject the hypothesis that the estimate agrees with a true value. If the hypothesis is rejected, the validity of the estimate may be questioned. If the hypothesis is accepted, the validity of the estimate may be accepted conditional upon there being a chance that a more subtle analysis would show that the estimate was not totally unbiased. Thus, if a larger sample were obtained or improvements were made in weighting procedures an estimation procedure that is adequate for certain sample sizes and weighting procedures could be recognized as unacceptable when more accurate estimates can be made.

Figure 13: Comparisons of Original and Imputed Handback Records (Weighted Data for all Parks surveyed in 1973)

Total Party Size	Original	Imputed
1 person	742(4.2%)	775(2.4%)
2 persons	6454(36.3%)	13094(40.1%)
3 persons	2792(15.7%)	5879(18.0%)
4 persons	3643(20.5%)	6704(20.5%)
5 persons	2039(11.5%)	3805(11.7%)
6 persons	1257(7.1%)	1399(4.3%)
7 persons	482(2.7%)	530(1.6%)
8 persons	192(1.1%)	335(1.0%)
8 persons +	120(0.7%)	122(0.4%)
Totals	17785(100%)	32648(100%)

Table Chi square = 562.1 with 7 degrees of freedom

Grouped Origin	Original	Imputed
Same Province	11812 (66.4%)	27125 (83.1%)
Other Province	2367 (13.3%)	1113 (3.4%)
United States	3589 (20.2%)	4410 (13.5%)
Foreign	13 (0.1%)	0 (0.0%)

Chi square = 2403.9 with 3 degrees of freedom

1. Validity of Entry Record Estimates

There are some data available from alternative sources that permit a cursory examination of the validity of the procedures endorsed in this paper with respect to the weighting of entry records to estimate for the universe of Park visitors. Questions asked in the survey make it possible to estimate total entering traffic for surveyed periods, which can be compared with ‘observed’ entering traffic counted by automatic traffic counters located near the entrances to many of the parks (Figure 12).

Unfortunately, Figure 12 may be misleading in that the totals recorded by traffic counters are not perfectly accurate. A project is under way that has shown that traffic counts at one park gate were inaccurate by 100% because of the improper functioning of a pneumatic traffic counter. It should be noted that there are many reasons for the discrepancies between counts of entering vehicles and estimates of these counts based on the park user surveys. These include such factors as:

a) the survey only covers part of the day and night while traffic counts at almost all gates are collected over 24 hours;
b) all traffic counts obtained by the use of pneumatic tube counters are biased by the axel count factor that must be applied to convert a raw count to vehicles. Error from this source can be high unless an extensive investigation is undertaken to provide an accurate conversion factor;
c) where lanes are not separated, exiting traffic may be counted as if it were entering: and
d) if either loop induction or pneumatic tube equipment is not properly adjusted it may systematically over-under count traffic.

Thus, Figure 12 shows that there are some parks for which there is excellent agreement between estimated entry counts and counts. The recognition that no more can be said concerning the validity of estimates and that there are serious problems with traffic counts, prompted the initiation of two projects: to derive the possible best traffic counts by analysis of all existing Parks Canada and other counts, and to examine every traffic counter's location, calibration, maintenance, and other characteristics which effect its accuracy.

2. Validity of Handback Imputation Process

The only available independent figures that are known to be accurate and can be ratated to questions asked in the survey, are those showing party nights of "developed party campground" use. Figure 13 presents estimates and observations of this figure for Terra Nova and Kejimkujik National Park based on 1973 results. A research project which is underway will produce "split sample" estimates of the variance in the estimated figures. At present it is not possible to infer from Figure 13 whether the observed differences between observations and predictions can be accepted to be due to chance or if a bias (lack of validity) can be detected.

The estimation of a campground use figure from survey results implicitly tested the adequacy of the handback weighted procedure. However, unless weighting of handbacks altered the various categories of people in a way that changed estimates, Figure 13 actually shows the result of simply inflating handback results as opposed to using the imputation process. Figure 13 shows that the imputation process does in fact change estimates! It is to be hoped that this change is in the correct direction and that an advantage has been gained by imputing handbacks for the 60% of the people who did not return them. Inflating from a 46% response rate to 77% of questionnaires having handback meant that the very arbitrary assumption, that in making estimates for the universe (or same subset of it) those people who did not respond would behave like "some average person", was made for only about 24% of all records rather than for 54%.

Work is currently being undertaken to more fully evaluate the handback imputation process determining If similar entry records tend to have similar handback records. In this project, entry records with handbacks matched to an entry record are checked to see how similar are matched handbacks and how this similarity relates to what would occur by chance and by using other matching approaches. Cluster analysis and multiple discriminant analysis are being used to test the "adequacy" of matching.

ESTIMATES OF VARIANCE

The reliability of the type of survey described above was of considerable concern in Parks Canada's approach to user surveys to the extent that the design of the 1972 Park User Surveys was specified so that, sub-survey and its replicate were built into the overall survey design. However in the end it was recognized that the incompatibility of the weighting system with the sub-survey and replicate, made it impossible to estimate variance using the original plan. Instead, the results of the entire survey were split synthetically into two sub-samples. This was achieved by randomly dividing special weighted original entry records into two files. The error estimate was calculated as a function of the difference between the total weights of the two sub-samples using the standard deviation formulae:

S(A)= Standard deviation for number of “X” based on entry records =|M(1)-M(2)|/2
S(B)= Standard deviation for number of “X” based on handbacks =|M(1)/p-M(2)/p|/2
% error = 100(1.96) S(A or B)/(estimated number of "X"s)

WHERE M(1) and M(2) are estimates of the numbers of "X" (number of visitor days, number of U.S. visitor days, etc.) and p is the response rate for handbacks for the park or park gate being considered and when 1.96 could be replaced by other values if one used to be less or more certain of estimates in the way described subsequently.

The factor p appears in the formula because the way data were processed means that estimates made using handback information indicate the number of cases on which no information was available or imputed. Then one must make the choice as to whether the wish to say that they assume the 3000 people out of 10,000 who did not respond and were not similar to other people in terms of the imputation rules, behaved like the people: if estimates should be based on dividing observed numbers by (10,000 - 3000)/10,000 = .7.

Figure 14a: LEVEL OF MATCH OF IMPUTED HANDBACK RECORDS TERRA

NOVA NATIONAL PARK VISITOR SURVEY 1973

LEVEL SEASON OF MATCH	PART 1 JUNE 1-16	PART 2 JUNE 17-30	PART 3 -JULY 1- AUG. 16	PART 4 AUG. 17- SEPT. 4	TOTAL
No Match	2158 71.2%	1432 52.5%	3308 23.2%	632 30.2%	7530 34.0%
Level 1	404 13.3%	618 22.6%	4702 32.9%	686 32.8%	6410 29.0%
Level 2	31 1.0%	65 2.4%	139 1.0%	2 0.1%	237 1.1%
Level 3	32 1.1%	34 1.2%	493 3.5%	22 1.1%	582 2.6%
Level 4	289 9.5%	379 13.9%	4017 28.1%	488 23.4%	5172 23.4%
Level 5	57 1.9%	93 3.4%	184 1.3%	57 2.7%	392 1.8%
Level 6	12 0.4%	11 0.4%	148 1.0%	30 1.4%	200 0.9%
Level 7	34 1.1%	60 2.2%	869 6.1%	98 4.7%	1061 4.8%
Level 8	13 0.4%	39 1.4%	416 2.9%	76 3.6%	544 2.5%
	3030	2730	14276	2092	22127

Figure 14b: LEVEL OF MATCH OF IMPUTED HANDBACK RECORDS 1973

LEVEL PARK OF MATCH	TERRA NOVA	PRINCE ALBERT	PACIFIC RIM	RIDING MOUN- TAIN	POINT PELEE	LA MAUR- ICIE	FORIL- LON	KEJ
No Match	7530 34.0%	5868 20.3%	10025 20.6%	25588 29.1%	4811 14.1%	1149 18.0%	7433 27.6%	1743 8.0%
Level 1	6410 29.0%	15465 53.4%	24715 50.8%	34905 39.7%	18554 54.3%	3508 54.9%	9415 34.9%	14382 66.1%
Level 2	237 1.1%	325 1.1%	437 0.9%	985 1.1%	472 1.4%	101 1.6%	710 2.6%	128 0.6%
Level 3	582 2.6%	365 1.1%	160 0.3%	608 0.7%	522 1.5%	73 1.1%	1052 3.9%	135 0.6%
Level 4	5172 23.4%	4724 16.3%	8968 18.4%	17071 19.4%	8645 25.3%	1504 23.5%	7188 26.6%	4096 18.8%
Level 5	392 1.8%	157 0.5%	475 1.0%	136 0.2%	163 0.5%	3 0.0%	107 0.4%	2 0.0%
Level 6	200 0.9%	415 1.4%	2411 5.0%	2834 3.2%	842 2.5%	0 0.0%	91 0.3%	544 2.5%
Level 7	1061 4.8%	1396 4.8%	1349 2.8%	5364 6.1%	145 0.4%	48 0.8%	981 3.6%	354 1.6%
Level 8	544 2.5%	222 0.8%	116 0.2%	479 0.5%	17 0.0%	5 0.1%	0 0.0%	372 1.7%
	22127	28936	48656	87969	34171	6391	26977	21757

One may be interested to note some of the accuracy estimates obtained for the accuracy in numbers of first entry visitors to several National Parks. Obviously, the accuracy in estimates obtained from handbacks is only presented to show how accuracy becomes poorer when one must use handback variables (because the sample is smaller). The percent accuracy figures indicate that the predicted values have less than a 5% chance of being more in error than the value given. The numbers which follow provide a convenient guide to the highest accuracy to be expected. If one wants to know about the number of first entry U.S. visitors at Forillon for example, they are dealing with a group smaller than the universe on which there is data so the error in an estimate of the U.S. visitor can be expected to exceed 6.2%, the entry record accuracy figure given in Figure 14 (U.S. origin is an entry record variable).

_ACCURACY IN ESTIMATES OF NUMBERS OF FIRST ENTRY VISITOR BASED ON 1973 NATIONAL PARK USER SURVEYS

Estimates based on Park Records	Entry	Handbacks
Terra Nova	1.3	5.54
Kejimkujik	2.2	5.9
Forillon	6.2	23.7
La Mauricie	4.0	11.4
Point Pelee	3.9	12.3
Riding Mountain	1.5	11.9

CONCLUSIONS

This paper has touched on a number of design and weighting considerations in park—user surveys. Still numerous matters raised in the sampling of relevant articles or recreation survey research given in the Appendix have not been broached. In particular, there has been a focus on a number of practical considerations that are often not recognized in survey design. In many park visitor surveys carried out today, and even in the exceptional surveys where objectives are related in a useable way to the questions asked, common problems include:

1. Results are biased in a way that is not corrected by weighting and cannot be corrected because the necessary data for weighting do not exist.
2. Inefficient use of person power occurs in spite of high levels of skills available.
3. Results are improperly or inefficiently weighted, when often there exists readily available information that can be used to improve the accuracy of weighting.

Researchers must start to analyze their needs and find efficient ways of meeting them. If they do not take into account some of the points made in this paper, and use some of the survey techniques suggested as being practical in given situations, current problems with user research will continue. Moreover, given the growth in user research in Canada, both the number of problems and the amount of wasted resources will multiply.

Many researchers continue to believe that a planning decision made with some information is better than one made with none. In many cases the authors could not disagree more! The use of inaccurate information in decision making, used as if it were accurate, displays either ignorance or deceit. The authors, one of whom is a statistician and the other a planner, endorse intuitive planning decisions where the data available are so inaccurate that estimates made using them fall outside the accuracy bounds desired by policy makers or planners. It is hoped that this paper will bring closer the time when decision-makers are no longer willing to accept pretentious survey conclusions or, at least, pretentious claims to providing useful planning information when the vast majority of the information provided by the researchers is either inaccurate or remains unused, or both!

Researchers recognize the need for information to aid planning decisions, but even when they are able to provide data promptly they often provide biased information that may misguide the planning of a new project, confuse the evaluation of a project, or lead to the acceptance of an unwanted policy.

In this regard the authors recommend that researchers conducting user surveys order their planning and research priorities before collecting more new information of dubious accuracy at inflated costs. It is possible today to define objectives in such a way that questions asked in a survey can meet the needs of the planners requiring the information. In the 1960's, methodological problems were necessarily ‘solved’ by the imperative of making some planning decision rather than none at all. The constraints of the 1970's make it necessary, and expertise makes it possible, to define objectives more rigorously. Once this has been achieved, it will be possible to accept the challenge to undertake unbiased research efficiently, and to produce accurate information while working within person power, budgetary and time constraints.

APPENDIX

SOME REFERENCES TO USE AND USER RESEARCH
THAT SHOW THE VARIETY
OF PROBLEMS NOW BEING CONSIDERED

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