CHAPTER VII- 8: A SCHEME FOR DECOMPOSING PARK ATTENDANCE LOADING CURVES AND RELATED ANALYSIS METHODOLOGIES

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ABSTRACT

The development of a scheme for decomposing park loading curves (the seasonal trend of daily use) is described. This scheme allows one to estimate probable daily use of a park when one has incomplete data by extrapolating "through" the gap in existing figures. More importantly, the procedure is a useful addition to existing procedures for developing use models for parks in that it suggests a way in which a total predicted use figure for a given activity in a given park will be distributed on a day-by-day basis.

Park loading curves have been broken down into two separate curves: (1) a continuous loading curve reflecting weekday use patterns and (2) a peaked loading curve reflecting weekend and holiday use. The method is described. The reader is told such curves should be developed for specific types of users and for each park-origin pair when a model is based on survey data collected during a relatively few days. The application of the procedure to study the effects of weather on attendance patterns through analysis of residuals is discussed.

PURPOSE

The purpose of this technical note is to present a procedure developed for analyzing park use curves for daily use of a park for a specific activity.

INTRODUCTION AND OVERVIEW

Decomposing the daily use curves for parks, here called "loading curves", into two components, weekday use curves and weekend (and holiday) use curves, has several possible applications. A rather simple one arises because the construction of a curve describing the general nature of the seasonal trend in attendance at a park can provide the basis for making reasonable estimates of total attendance figures for a park based on partial monitoring of use. A more important and sophisticated application is the use of the procedure to help increase the specificity and predictive precision of use models such as the Cesario model described in TN 4. Cesario's analysis was designed to determine the factors which contribute to a park's attractiveness and the factors which contribute to the tendency of a city's population to use a park (which Cesario called "the emissivity of an origin"). If one is to learn what these various park and city factors are, which influence a certain type of park use, it is necessary to begin by stating in adequately precise behavioural terms what use of a park is being considered, what origins and population groups are potential users and what might be important to them in choosing a park and activity.

There is a need to break down use between weekdays and weekends. Simply applying models to total use figures for a park can lead to considerable confusion when the purpose of analysis centres on the understanding of emissiveness and attractiveness parameters for some type of park use. This is so because most sites serve a variety of users. An analysis of total use figures for a site results in parameters for a meaningless "average" situation (Chafer 1969). If behaviour is to be accurately analyzed, it is necessary to disaggregate users of a park by type of use, time of use (weekend/ weekday, holiday etc.), origin of users and possibly by several other variables. The problem of disaggregation is also discussed in TN 30 and in less detail in a number of other notes e.g. TN 14, 18, 40.

Consider for purposes of introduction a relatively isolated campground which is not being used to capacity. If this site is too distant from most of its potential users for day use, they must come on a weekend or during a holiday. The emissiveness of an origin$_i$ with respect to that park, will thus be different for weekdays than for weekends and holidays (Beaman and Leicester1970, elaborate on the importance of time-budget constraints. See also TN 33.) Attendance curves for the use of that park over a season (loading curves) can be developed to reflect day-by-day use and will more or less resemble the curves in Figures 1 and 2. The curve in Figure 1 is more typical of an isolated park, as is evident from the great use on weekends in comparison to weekday use. Weekday use is almost negligible for most of the season. For various reasons the park with the loading curve in Figure 2 receives much more use throughout the week; some may be enroute stopover use (see TN 18) and some main destination camping use such as that for which Cesario has developed a model (see TN 4).

The basic point here is that whether a person from a given city goes to a given park on a weekday or a weekend depends on the amount of time he has available, which varies between weekdays and weekends and holidays, and depends on how far he is from the park. Persons from any given city, for a given activity at a given park, are assumed to behave according to the same kind of attendance function or pattern. So an important variable in the study of the loading curve for a given "city-park relation" is the relative amplitude of the weekend curve compared to the weekday curve. This is a function of the distance between the city and the park, of the attractiveness of the park, and emissivity of the city for the different kinds of trips. As well, the capacity of a site is a factor to be considered. So looking again at Figures 1 and 2, two questions should be asked: (1) what causes the difference in the overall use pattern of the two parks, and (2) how is the pattern a reflection of the different perceptions of the park at different origins?

In Figure 1, for example, the relatively small amount of day-by-day use throughout the week comes from communities which are fairly close to the park. The peaks which occur on weekends are due to an influx of visitors from slightly more distant communities. The amplitudes for these two separate components of the various origin-destination use curves can be used to develop a Cesario-type analysis for weekday and for weekend use. And, to stress a point already made here as well as in several other technical notes. The point is that such disaggregated models have greater structural validity and thus are better predictive devices than an aggregate model applied to data on a given park for all origins, for use at all times of the week. Specifically, for example, it would be a mistake to use the same single-equation model to explain use for the park for which camping use is shown by Figure 1 (Rowan's Ravine) as for the park for which data are given in Figure 2 (Meadow Lake). For the majority of the readers who are not familiar with Saskatchewan parks, it is useful to note that there is little to recommend Rowan's Ravine for weekday use from fairly far away. Nor is it the kind of park that one would typically seek out for a couple of weeks of camping. It is, however, an acceptable and convenient park for a quick weekend campout. Meadow Lake Park, on the other hand, draws and holds people more for extended periods than for short weekend stays. It is distant from most origins from which users come.

To further elaborate on the development of a loading curve analysis procedure, it is necessary to point out that here the focus is on one type of use, main-destination camping, which occurs on both weekends and weekdays. The loading curve for a park serving these types of campers for a given origin can conceivably be constructed by summing two separate curves:

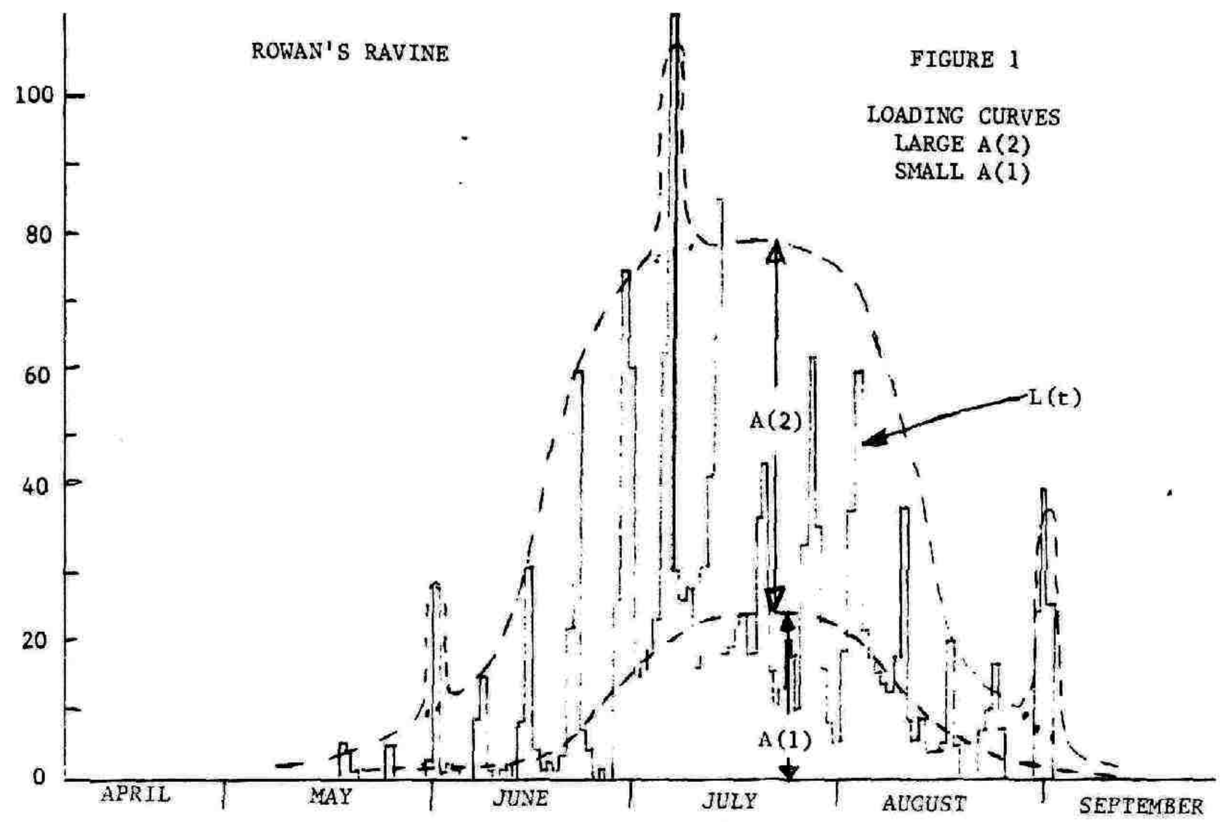
(1) A continuous, smooth curve which reflects loading by main-destination campers with relatively unrestricted time-budgets (this is termed the continuous loading curve).

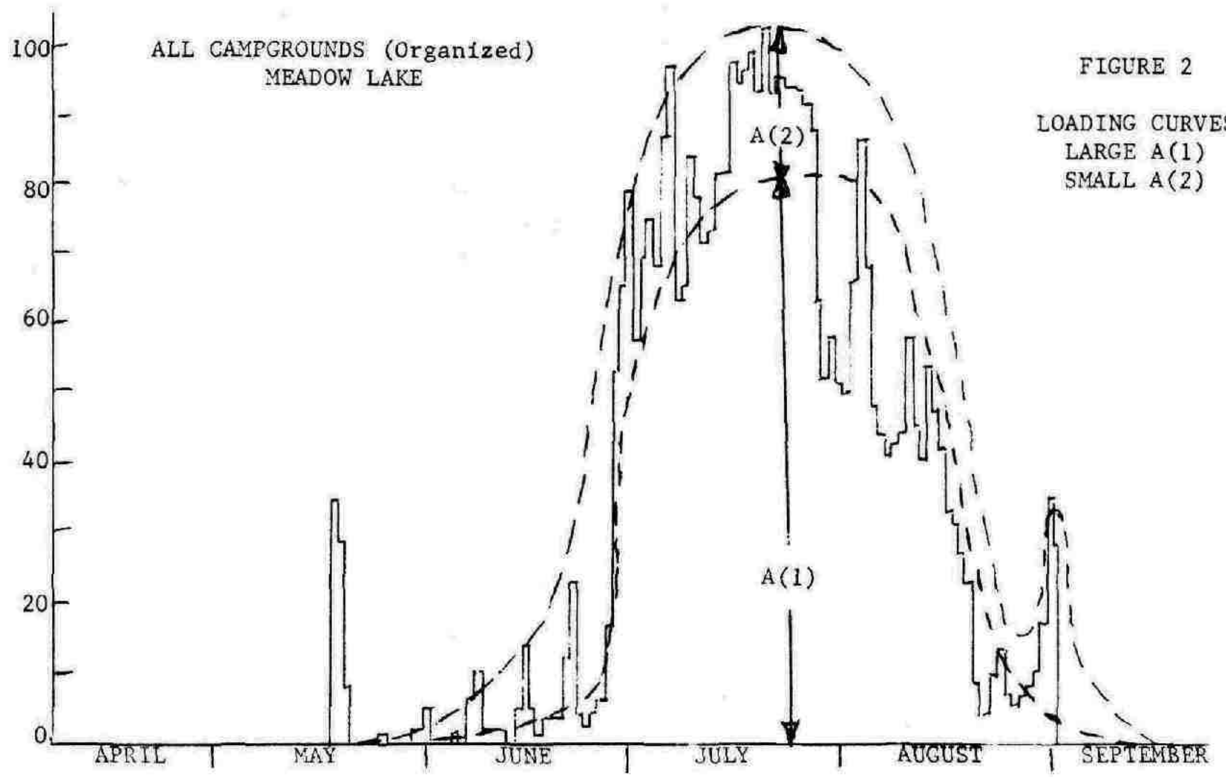
(2) A discontinuous, spiked curve which reflects the loading on the park by people with restricted time-budgets (this is termed the peaked loading curve).

The first curve can intuitively be considered to represent a seasonal trend in the average weekday use of a park while the peaked curve reflects attendance on weekends and holidays. A more precise definition of these curves and the method for deriving them follows.

It is important to stress that in actual planning and research problems it is essential that a set of loading curves be developed for each origin which significantly contributes to each type of use load of a park to be considered. The procedures developed and the example worked out here do not implicitly make this point clear. In fact the example presented, for reasons explained later, introduces some confusion.

Admittedly, all the disaggregation argued for in this note (breakdowns by each park in a system, each activity, each origin and time of use) will add to the number of calculations and data tabulations a researcher must handle. The authors argue, however, that unless extensive experience and testing prove otherwise, the additional work will pay off in better analyses being achieved with less data than would usually be required. Analyses should allow more valid predictions and from the insights into the factors affecting use levels the researcher should be giving useful advice to planners and policy-makers.





ESTIMATING LOADING CURVES AND AMPLITUDE PARAMETERS <u>Estimating The Continuous Loading Curve U(t)</u>

Equation 1 defines the loading curve for a park as a linear combination of a continuous loading curve U(t) and a peaked loading curve P(t). The parameters A(j,l) and A(j,2), each specific to a segment using park j, determine the form of the loading curve of the segment. The problem is how to derive U(t), P(t), A(j,1,o) and A(j,2) for each park-origin pair.

(1) Y(j,t,o) = A(j,1,o) U(t) + A(j,2,o) P(t)

WHERE Y(y,t,o) = participation at park j in the time period t from origin o

U(t) = the continuous loading curve

P(t) = the peaked loading curve

A(j,1,o), A(j,2,o) = amplitude factors (A-factors) calculated for j-o.

This representation is graphically depicted in Figure 2 which shows the addition of a peaked, discontinuous curve, P(t), to form the total use curve, Y(j,t).

The reader may find it desirable to assume that the bell-shaped continuous curves represent a normal curve with the mean around July 25 (appropriate variance to be calculated). However, since "numerical methods" and computers are to be used in the analysis, no great benefit accrues from following such an approach. So to determine U(t), it was originally assumed that loading curves were quite flat in the July 1 to August 15 period. Curves for different parks could thus be normalized so that large flows to a single park would not dictate the shape of the uniform curve, U(t), estimated. However, the results presented in TN 19 now indicate that the variance in visitor flows into a park is proportional to the size of that flow if the total flow is monitored, or to a multiple of the number of observations made if only part of the use of a park is monitored. If the concern is with day use, estimated total use and its variance are given by the formulas listed below, based on results presented in TN 19.

Let X = Estimated total daily use with approximately 2 people per party, then variance in

X based on TN 19 is approximately X, therefore:
= 2*(Observed number of day-use parties for that day) = 2X
Variance in X = 4Y

If one is considering continuous loading for overnight use and the figures being analyzed are for total campground use:

$$\text{Variance in continuous load party visit campground use} = \left(\frac{\text{Total party use for weekday}}{\text{Average length of stay}} \right)$$

This is because total visitors/average length of stay gives an estimate of the number of entering parties on which the continuous load function is based. Regardless, one can suggest appropriate variance figures so that a weighted estimate of the uniform function for weekdays for continuous use of a park for a given purpose can be derived. Such a formula was actually used in computing the results presented subsequently. Determination of U(t) and P(t) was at the park level for this initial analysis. An "average" curve was formed by adding up the data for all the parks considered in a given analysis. This average curve is generally irregular (due to error factors) and has gaps caused by leaving out weekend days.

The next procedure carried out was the generating of averages to fill in values for excluded weekends and for weekdays for which (by chance) there had been no observations in any park. Gaps were first filled by inserting the average of the observation before the gap and the observation after the gap. Then a smoothed curve was to be generated. This was to be done using a 5-point running average with weights 3,5,7,5,3. Thus, a curve was estimated with values filled in for weekends which is the estimate of the continuous loading curve U(t) used here (see Figure 3). In intuitive terms the procedure just described is a simple averaging process.

In summary, the rationale behind what was done is that when it is assumed that all units (park entries, facilities, etc.) have a U(t) curve implicit in their loading curves that applies to similar "units" unless being at capacity distorts the curve (as discussed later).One way of estimating U(t) is to extract it as an average. The average of all curves that contain U(t)'s is obtained in an attempt to average out "error effects" that lead to any particular park giving a poor estimate of U(t). When U(t) has been obtained for non-holiday weekdays it is possible to use estimated values of U(t)'s for weekdays to "extrapolate through" holidays and weekends. This is because U(t) is considered to be a smooth curve. In other words, use of a park on a weekend is due to the addition of an extra load or demand on top of the "average" weekday use. Finally, even after a U(t) curve has been built up, it may be expected that weather or other factors have resulted in irregularities in U(t) that should not occur. These irregularities can be removed to a certain degree by smoothing, but obviously a 5-day running average does not correct for August being a bad month all over Canada in a given year. This matter is taken up subsequently.

<u>Estimating A(j,1,o), Amplitude of Continuous Loading Curve for a Park-Origin Flow</u>

The estimation procedure used to determine A(j,l,o) for a given unit employs a least-square fitting approach where data for weekdays are fitted to the relation:

(3) Use = A(j,1,o)U(t).

The computations are carried out according to Equation 4 where the weights, W(i), reflect how much weight one wishes to put on given observations using the kind of weighting rules introduced earlier.

(4) $A(j,1,o) = (\Sigma\, W(t,j,o)U(t)Y(j,t,o)) / (\Sigma\, U(t)^2 W(t,j,o))$

WHERE A(j,1,o) = amplitude of the continuous loading curve
t = weekdays for which there are data for the given unit,
weight to correct for varying variability

FIGURE 3A

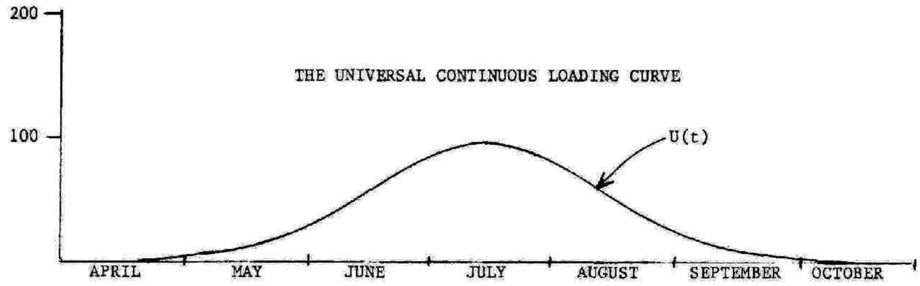


FIGURE 3B

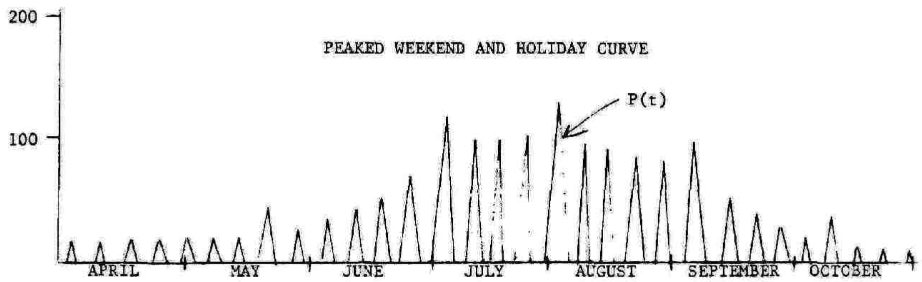
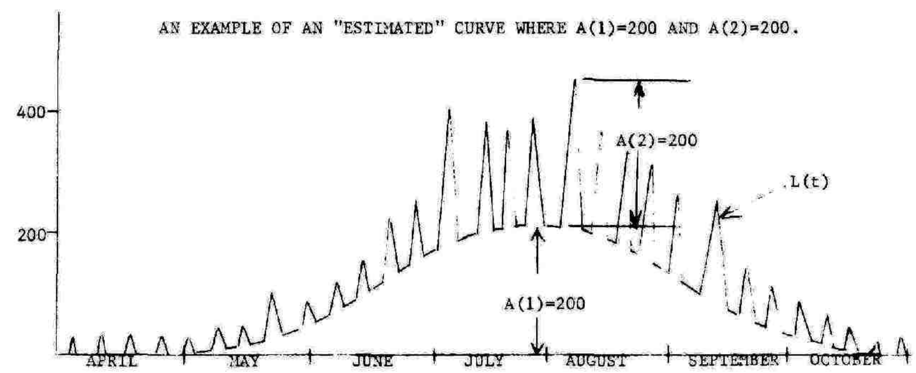


FIGURE 3C



Estimating the Peak Loading Curve pm

Given the continuous loading curve U(t) and its amplitude A(j,l) for park j, one may simply subtract A(j,l) U(t) from the observed loading curve Y(j,l) for weekend days only, t', to obtain an estimate of the weekend curve Z(j,t'). This relationship is expressed as follows:

(5) $Z(j,t,o) = Y(j,t) - A(j,l,o)\ U(t)$ WHERE t' = a weekend day.

A procedure analogous to the one employed to derive U(t) can then be used to derive P(t), except that there is no final smoothing of P(t) and the curve is not assumed to be smooth but rather peaked and not smooth. The discontinuous function P(t) is zero, by definition, on non-holiday weekdays (t').

It may be argued that the assumption of a U(t) curve moving smoothly through weekends and holidays has theoretical deficiencies since the increased use on weekends affects the "true" continuous loading usage. However, the procedure introduced here is suggested as at least offering a good first approximation to the behavioural pattern actually involved in park use. Anyway, the peaked function shown in Figure 3 was derived.

Estimating A(j,2). the Amplitude of the Peaked Loading Curve for Park j

Given that the peaked curve has been determined from Z(j,t,o) by an averaging procedure like that described for obtaining U(t), one can use a formula similar to Equation 4 namely:

(6) $A(j,2) = (\Sigma_{t'} W(t',j,o)\ Z(j,t',o)\ p(t) / (\Sigma_{t'} W(t',j,o)\ P(t')^2)$

THE DATA FOR A TEST ESTIMATION AND THE RESULTS OF THE TEST

The data used in actually estimating the kinds of functions described above were from the Canadian Outdoor Recreation Demand Study's 1969 Park Users Survey. Data were collected in various parks from April to September for a total of 184 days. Analysis concentrated on main-destination campers, although of course, the procedures described here can be applied to other types of uses. Information about the CORD Study Park Users Survey is available in Volume III.

As described there numerous difficulties were encountered with the CORD Study Park User Survey both in field work and in information processing. Because of data collection problems, one should consider the estimates derived here as only illustrative of the procedures developed and not as valid predictions.

The few negative park specific peak function amplitude values in Table 1 can be called zero. One will note that these values occur for parks that essentially have no weekend peaking. On the other hand, Birds Hill Provincial Park in Manitoba and several other parks listed, in 1979, had a weekend use use amplitude over 2-1/2 times its weekday use amplitude.

DISCUSSION

Now that the method for estimating the coefficients and functions of concern here have been presented, there may still be serious concerns about the significance of the results and how to use them. One of the simplest applications of the results obtained is their use in estimating the total attendance at a park or components of this attendance. The area under the uniform curve can be determined, as can be the area under the peaked function (e.g. by mechanically adding it up using graph paper). When the areas under these curves are multiplied by amplitude factors the results are total use estimates for the periods for which area was computed. This is true when the original data have been weighted and processed in such a way that they represent the universe for which totals are to be generated. All the amplitude factors do is tell a person how many times the basic area defined by the peak or the uniform function is included under the function for the particular park being considered.

If, as before it can be assumed that estimation can be carried out in such a way that multiples of the uniform and peaked function give the actual unit loading curve for a park, then observations of the amount of use on certain days define the appropriate amplitudes for the peaked and uniform function. Thus there is a reversible procedure if the uniform and peaked functions are known. One can use a function that has been obtained to make estimates of use on particular days on which there were not observations. However, when one recognizes the possibility of doing this one considers that if it rains on a given day or there is something else about a given day such as cold temperatures that is known then it is possible to infer that an estimate based on the uniform function would be in error. Some of the variation around an unconditional predicted value is understandable in terms of information that Is known after an event. If one knows how weather usually varies, one can see that a profile can be developed as to how use is likely to vary, for example, taking into account how weather causes the expected value to deviate. This latter matter is taken up subsequently.

For now, consider that a researcher is able to recognize a day which may be considered a typical week day or typical weekend day for the usual summer season. In the context of the preceding paragraph this day can be described as a day on which the park will have "expected attendance".

TABLE 1: AMPLITUDE FACTORS FOR SELECTED PARKS FROM DATA COLLECTED DURING THE 1969 CORD STUDY PARK USERS SURVEY

Province	Name of Park	Al	A2
Quebec	Bon Arnie	38.73	63.08
	Mont	50.83	57.05
	Oka	48.72	34.44
	Vincennes	25.33	2.41
	Stone Ham	30.69	17.35
	Matere -	17.53	6.19
	Tremblant	53.04	81.92
Manitoba	Bird Hill	51.40	135.37
	Watchorn	5.63	12.49
	Helco Island	6.54	43.03
	Rivers	12.16	53.69
	Grand Valley	24.63	-0.12
	Spruce Woods	6.21	-0.51
	Rainbow Beach	19.80	7.20
	Clear Water	2.37	-0.07
	Wekusko	2.82	-0.08
Alberta	Wabamum	41.23	22.68
	Crimson Lake	48.50	147.18
	Bow Valley	19.09	48.35
	Bragg Creek	4.97	42.05
	Willow Creek	8.03	13.92
	Beauvais Lake	6.79	63.17
	Cypress Hills	34.38	22.43
	Chain Lake	14.53	45.22
	Dutch Creek	5.81	23.15
	Lethbridge	11.73	32.88
B.C.	Bamberton Be.	26.39	30.91
	Golden Ears	7.67	441.65
	Shuswap Lake	109.97	44.16

Now, consider that it is desirable to get estimates of the expected use of a park based on a minimum use of information; one can make the conscious choice to collect data on days where the expected or typical use of a park will occur. From such use data it is quite conceivable that the shape of the loading curve, actually just the peak function amplitude and the continuous loading function amplitude, can be determined very accurately, say from only two or three weekend days and two or three weekdays of observations. One is not concerned with having 20 days of data collection or some other relatively large number to be able to counter balance the effects of bad weather on one survey day and exceptionally good weather on another data collection day. Obtaining information about the effect of weather could be a separate project which could be carried out with equally small amounts of information to be used to estimate the parameters in a more generalized model (introduced subsequently). If parks are not working at capacity so that uniform loading curve appears to he appropriate for- explaining use it seems clear that researchers should take advantage of similarities in the use patterns for different parks that reflect similarities In behaviour of people from different origins and minimize the person power that (1) is tied up in collecting data and (2) is subsequently tied up in its processing, etc. The distribution of flow theory in TN 19 is relevant in determining how much data collection would be necessary to expect a certain accuracy in park use or other estimates to be made. Obviously, one source of systematic error that may occur when use of a park is estimated using uniform functions and peaked functions is that the representation (the model) is incorrect because the park is operating at or near capacity. Actually, the uniform function for a park could give very good results while weekend peaks could be so high that during the middle of the season the capacity of a park is exceeded so that people from certain origins do get into the park and other people from other origins do not get into the park: the people who can get there early from the close origins get in while those people who would ordinarily come to the park but would get there too late to get a camping spot do not come. However, such problems can be easily recognized as long as any kinds of decent records allow one to know if a park did operate at capacity and how frequently it operated at capacity.

The preceding paragraphs have been explicit in suggesting that it may be possible to use the loading curve method to define some rather efficient ways to obtain information on parks and thereby to make estimates of total season use at a minimal cost. Still the authors, at this point in time, accept that this application may be questionable. Yet it is no more questionable in terms of the accuracy that will be produced than what is obtained in many costly surveys that are now carried out. Recent work at Parks Canada has confirmed that with very extensive expenditure of person power in park visitor surveys, total use figures for many parks still have a high probability of being in error by more than 4 or 5 percent on park use totals. When one begins to disaggregate information to get origin-destination flows, user types, etc. it is possible to imagine that the accuracy of figures produced from surveys involving 5 to 10 thousand interviews at a park is so low that one should be concerned about the usefulness of survey results. As is indicated in CORD study Technical Note 21 there is definitely room for creative innovations in defining ways to measure park use. Whether one method or another is appropriate depends on what kind of use one is trying to monitor and one's objectives in monitoring it. If one is trying to monitor developed campground use, then campground registration forms with origin information are obviously the place to get data. Large amounts of information collected can be obtained and processed very cheaply. However, measuring day use of a park presents drastically different problems, particularly when parks have numerous entrances and numerous day use areas. In trying to assess the amount of day use in a park it may be very plausible that one of the most accurate approaches to obtaining use information and one which can involve the least manpower is to collect license plate information on cars entering a park on particular days with "expected/normal attendance". By also obtaining information on license plates for those vehicles of people who stay in the campground it is feasible that day users' vehicles could be identified. Incidentally, as part of the visual recording of information, one can record the number of occupants in vehicles. So the use of a license technique to get day-use information in conjunction with the total or partial enumeration of users of campgrounds provides a good alternative to surveys or other methods that have been used in the past to obtain park use information. License plate data can be collected for locations other than park entrances and campgrounds so researchers not only get the usual origin-destination information but also profile information on what visiting parties have done. One test has also used the selection of plates with certain final numbers or letters to draw a manageable sample size from a large universe.

But, to return to the main theme of loading curves, there is the possibility that, for example, weather effects are being confused with errors resulting from the way the model is specified. Although some procedures can be used to remove residuals that appear to be a result of the deficiencies of the model, this avoids the issue of why the model fails.

It may be noted that since there can be seasons or months of adverse weather, care is necessary to avoid confusing long term weather patterns with structural error.

The following discussion assumes that the residuals vary because of the influences of the weather. Consider the class of models incorporating weather factors C(j,1,t) and C(j,2,t) defined by:

(7) Y(j, t) =

$C(j,1,t)\ A(j,1)\ U(t) + C(j,1,t)\ A(j,2)\ P(t) + \varepsilon_U(t) + \varepsilon_P(t)$

WHERE

$\varepsilon_U(t)$ and $\varepsilon_P(t)$ are "error terms" reflecting "natural" variance of the continuous load and peaked load, respectively.

Also the conditions below are satisfied: (7.1) $\varepsilon(C(j,1,t)) = \varepsilon(C(j,2,t)) = 1$ and $E(\varepsilon_U(t)) = E(\ \varepsilon_P(\ T)\ ) = 0$

Equation 7 implies that attendance Y(j,t) for a given park j and for a given day t, is a function of continuous load and peak load, modified by weather conditions.

The use of Equation 7 raises many issues that are not immediately obvious. If it is recognized that there can be good and bad seasons in terms of weather, the A(j,l) and A(j,2) as determined by the procedure outlined previously assume an average season (e.g. C(j,i,t) = 1 for i = 1,2) for the days surveyed. If the season was not averaged, there is an "identification problem" since the A(j,1) and C(j,1,t) become interrelated when the suggested estimation approach is employed. However, if the C-functions are known or if simultaneous estimation techniques are employed, the identification difficulty can be overcome.

Issues also arise regarding the distribution of the $\varepsilon_U(t)$ and $\varepsilon_P(T)$ error terms. In estimation there should at least be consideration of the variances of observations and consideration of problems introduced by serial correlation.

Regarding the C(j,1,t) and C(j,2,t) and their statistical relationship to the A-factors, one may note that the C-functions are in a certain sense random variables that fluctuate about 1.O. One way to express these variables is:

(8) $C(j,i,t) = 1 - C'(j,i,t)V(t))$ i = 1,2

WHERE V(t) refers to weather conditions at time t (Beaman & Leicester 1969).

To a good approximation one may expect that an estimation problem may be stated as:

(9) $C(j,i,t) = 1 + \Sigma_k\ (B(j,i,k)\ D(j,i,k))$

WHERE D(j,i,k) is the deviation of weather variable k from an appropriate site specific mean based on an average season.

One may also consider partial derivatives of Equation 8. In Equation 9 the B(j,i,k) are then assumed to give, at least to a good approximation, the nature of the "response surface" relating to behaviour of people in response to weather in the neighborhood of the "average point".

A couple of closing observations about the difficulty of studying weather effects are in order. People who have come a long distance and planned to stop at a given park are not in a good position to alter their plans at the last minute because of poor weather. Parks which serve mainly as main-destination campgrounds for communities within a fairly short distance would exhibit total loading curves more directly tied to the weather. Parks which have national drawing power, however, would have loading curves not as closely tied to daily variations in weather. This emphasizes the importance of disaggregating use figures by origin or type of visitor before trying to explain behaviour on the basis of use figures. From another perspective people not only respond to actual weather conditions, but also to their perceptions and anticipation based primarily on short-term forecasts of weather conditions. A forecast for a rainy weekend when in fact the weather turns out to be sunny and warm is a situation where a lower level of use than if the forecast had been accurate.

Referring to Figures 1 and 2, the reader will notice a relative depression of use of both parks in late July and early August. Meadow Lakes exhibits a more sustained dip in attendance, reflecting its use as a tong-term, main-destination campground. It is several hundred miles from large communities from which users come and few campers are likely to drive that distance when the weather has been bad and is predicted to remain so for some time. Rowan's Ravine draws campers from 30 to 40 miles away. In this case the decision to use Rowan's Ravine can be made quickly if there is a break in the poor weather for a weekend. Without belabouring this point, it should be clear that the situation of a park *vis-a-vis* the origins of potential campers will affect the use of that park in many diverse and often subtle ways.

CONCLUSION

Regarding one purpose of this paper, the derivations of functions for the estimation of weekend and weekday use, one can see that establishing the kind of peaked functions and continuous functions for different parks for different origins gives one insight into the fundamentals of park. use. The amplitudes of these functions are obviously better objects for analysis than total use estimates. As well, sums of such functions for various origins for a given park give a curve that can be used by planners and managers in estimating the use of a park on a daily basis. These matters relate to the general need for researchers, planners and managers to take time to develop an understanding of the components of park use, rather than focusing the gross figures. What is more, the fact that relatively limited data can be used to develop a broad understanding of general use patterns at parks makes the procedures introduced in this note not only conceptually useful but potentially analytically powerful in the statistical sense that it allows one to make efficient use of information.