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PROCEEDINGS OF THE 1990 NORTHEASTERN RECREATION RESEARCH SYMPOSIUM

FEBRUARY 25-28, 1990

SARATOGA SPRINGS, NEW YORK

NORTHEASTERN RECREATION RESEARCH MEETING
POLICY STATEMENT

The Northeast Recreation Research meeting seeks to foster quality information exchange between recreation and travel resource managers and researchers throughout the Northeast. The forum provides opportunities for managers from different agencies and states, and from different governmental levels, to discuss current issues and problems in the field. Students and all those interested in continuing education in recreation and travel resource management are particularly welcome.

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The Steering Committee wishes to thank John Nelson for his assistance in developing the conference data base.

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State Parks Management and Research Institute

Saratoga Springs, New York

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EFFECTIVE MANAGEMENT OF PARKS AND RECREATION INFORMATION

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Based on a recognition of definitional deficiencies of data; and linkages and structures needed to use data, this paper presents advances made by the Canadian Parks Service towards more effective data management using Entity-Relation data modelling, Artificial Intelligence (AI), Computer Assisted Learning (CAL), and Object-Oriented Design thinking.

Introduction: General Context

The system presented here was built on the basis of problems and needs recognized over approximately the last twenty years in relation to the collection and use of parks and recreation information on operations, clients, regional infrastructure, and facilities. Individuals such as Martin (1976) have been key contributors to development of information management, administration, and education, resulting in much more effective work both by EDP professionals and by "involved" managers. Unfortunately, much professional EDP work provides very professional management of not very professional information.

This paper takes EDP "tools" and shows how they can be used effectively in a parks, recreation, and tourism context. In the Canadian Parks Service (CPS) experience, it has been recognized more and more that the development of the "Park Use Related Data System" (PURDS) has been an evolving "requirements definition" for information management, and even more, PURDS is an evolving professional tool!

To avoid any misconceptions, it should be noted that this is a paper about concepts and professional requirements, not about EDP. In that respect, this paper does not deal with database administration, particular equipment and/or languages used for implementing the system which is described. Still, the concepts presented, by and large, are operating on readily available "AT" (20286) based computing equipment using a UNIX type operating system. (The system is also operable on a DOS system with extended memory.)

Structure, Needs, And Modelling

The Park Use Related Data System, PURDS, is based on a data model. The model provides a description or analogy to help visualize the data which are to be organized. This model is one way that users can view the data relevant to them. For the Entity Relations (ER) Model (Chen 1976) used here, the basic building blocks are entity sets, relationships and attributes. Entity sets refer to groups of "things" (e.g. employees, services, projects). Each entity set contains entities or records with "fields" of information about the "things" in the entity set, such as information which describes facility/assets or geographic locations. The descriptive information in fields are also called attributes or variables. For example, attributes for an entity set called "park employees" could include "position held," "identification number," "job title," and "salary."

Martin (1976) draws a clear distinction between the picture which users have of their data and, (1) their ability to access and "process" them, and (2) concerns with operating systems, a particular database language, disks, printers, etc. The way users visualize data is not necessarily the best way for a computer to store or process them. In fact, if user information requirements, in terms of having requests met in a timely manner, do not involve hardware and software, then one has an ideal situation in certain respects.

The EDP professional's responsibility is to see that the user interface, that is, the way users interact with the data, remains stable and is transparent to users, even as more efficient computers, alternate input/output devices, etc., are used, and even as software products pass into and out of the users' environment. Those who put their cards, disks or files into SPSS or SAS or a database may realize that such products carry definitions of data with them, and users generally do not know how data are stored in files or how files are accessed. Furthermore, SAS, SPSS, and the whole variety of 3rd and 4th generational databases set up their own user interfaces of a sort and operate "identically" on many computers.

Some principles which have dictated the PURDS model being created are: (1) to have information defined "adequately," (2) to know who which information is for, (3) to know "how information is interrelated," (4) to allow experts to aid/guide novices, (5) to have an effective vehicle which can provide staff at different levels of the organization with the necessary training to store, manage and use the kind of information at the level of detail that they need, and (6) to have a way to convey a basic but general and clear picture of the information resources available to the managers and personnel who are expected to use information.

Figure 1

I. 100+ NATIONAL PARKS, SITES, ETC.
II. 100+ NATURAL OR CULTURAL AREAS
III. APPROXIMATELY 5,000 PERSON YEARS
IV. 12,000+ BUILT FACILITY/ASSETS
  A. 200+ DRIVE-IN CAMPGROUNDS
  B. STAFF HOUSING IN MANY AREAS
  C. VISITOR SERVICE/INTERPRETATION BUILDINGS (INCLUDING KIOSKS, GATES)
  D. HISTORIC BUILDINGS, STABILIZED RUINS, AND LOCKS
  E. TRAILS (HORSE, BICYCLE, HIKING)
  F. SEVERAL TOWNS (MUNICIPAL SERVICES)
  G. HIGHWAYS AND ROADS (TRANSCANADA HIGHWAY, SERVICE ROADS)
  H. WILDERNESS AND ISLAND CAMPING
V. 10,000+ SERVICES/PROGRAMS (INTERPRETATION TO VISITORS, ETC.)
VI. 5,000 LEASES TO BUSINESSES/INDIVIDUALS
VII. SALE AND ADMINISTRATION OF $10+ MILLION [1] IN PERMITS, ETC. (THE COST TO PRODUCE THESE IS OVER $800,000/YEAR)
VIII. HUNDREDS OF DAMS & LOCKS ON HISTORIC CANALS
IX. CPS HAS ABOUT 40 MILLION ENTRIES AND 18 MILLION VISITS PER YEAR (E.G. OVER 700,000 PARTY NIGHTS ARE SPENT IN CPS CAMPGROUNDS)

Background On CPS:
Scale Of Information To Be Managed

Figure 1 above demonstrates that CPS has an abundance of physical plant and buildings, services it offers, employees, etc. A practical matter is that of having reasonable links of data to coding used for finance/accounting, facility/asset management, etc. PURDS development has ensured that it maintains its own independent coding. The system also specifies linkages to other CPS systems, as shown along the left hand side of Figure 2A. At some point in the future, CPS will have user interfaces that are managed through a CPS data administrator. Linkages between different "user" systems, which may be part of one large system, will be managed to see that other systems do not fall apart every time individuals decide to make a change in "their" coding scheme. Each user group can continue to function and the linkages to other systems will be looked after. For example, if I want information on the dock in Terra Nova National Park, if I have "coded" it as 7,000, I can keep on using that code forever.

The preceding referred to "knowing" and "experts." Expert systems really refer to systems which integrate "expert" capabilities into a system so that "typical" users gain from those capabilities (Barr and Edwards 1981). Why keep a live expert when you can build one into your system? Experts can set rules, and Expert systems apply them. Expert systems can also use experts' criteria for making decisions. "Patterns" in decision-making criteria can be established by experts identifying the values of criteria related to decisions which the expert would make. Where no exact match to an expert's criteria exists, a "similar" situation can be found by the system (see "Expert Systems in Tourism: Emerging Possibilities" which is forthcoming in the Journal of Travel Research and which has abundant practical references.)

The ER data model in Figure 2A, which shows much of the basic PURDS structure, to a degree even implies information management needs. Nevertheless, while being useful to give managers and users a picture of data, the Figure does not portray much of the "expert" or logic built into the PURDS. PURDS uses logical rules in many matters and a key issue in the evolution of PURDS has been to incorporate expert capabilities to assist users operating the system. As discussed later, PURDS data are described by structures and logical linkages that are very "naturally" described in languages such as MUMPS (Lewkowicz 1989) and PROLOG (Malpas 1987).

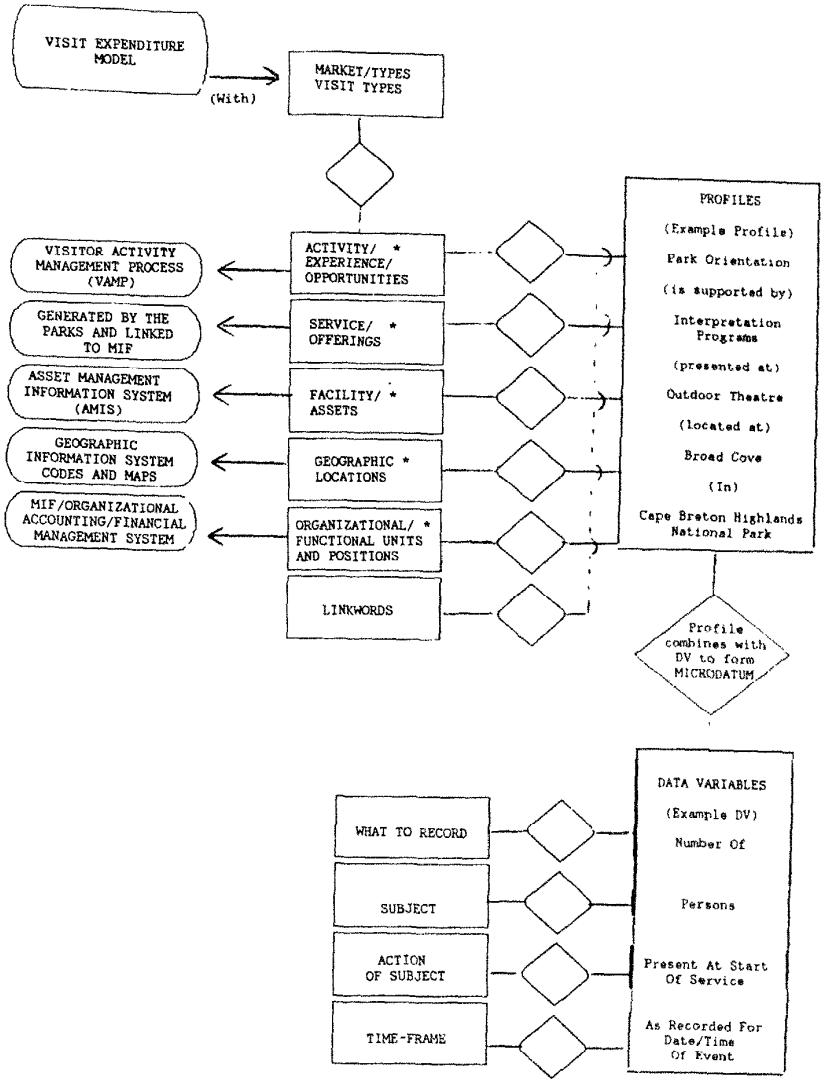
The PURDS Model, "The Theory": An Introduction

Analyses carried out in the 1980s, on how to achieve efficient management of park use related data for the CPS, led to the recognition that the foundation for data management had to be precisely defining data in such a manner that they could be consistently collected and relied upon. Defining things may not sound hard. It may not have ever been thought of as an evolving process. Beaman and Grimm (1988) reported on what, in 1988, seemed to be a fairly final status of PURDS. However, many more entity sets or lists are now linked together than were in the model in 1989. The definition of what is really needed in PURDS has been incremental, with new concepts depending on implementation and testing of predecessors. Much of what is in this paper was not discovered/understood <u>one</u> year before. And, what is presented <u>just introduces</u> many of the 1989 "discoveries" being exploited in 1990!

In the PURDS model (Fig. 2A), <u>Profiles</u> and <u>Data Variables</u> are the "key" Entity sets, at least for the socio-economic function of the CPS. They are only discussed briefly here, but the reader may refer to various documents (CPS 1989 and Cotter 1989) for details. As one sees in the top right of Figure 2A, the Profiles entity set combines information about the organizational infrastructure of the CPS. Profiles generally show what is being done and where (by a park, near a park, impacting on a park, impacted on by a park, etc.) In a Profile, information is combined on visitor markets or activities, services, facilities and assets,

[1] The hotels in our Alberta parks produce more room tax for Alberta than those in Calgary and Edmonton combined.

Figure 2A



* Attributes of Profiles which are entity sets themselves.

Basic PURDS Data Model And Its Linkages

geographic locations, and a responsible organizational unit. Data Variables (DVs) provide the companion to Profiles, offering systematic definition of what datum is to be recorded. The structure for Data Variables combines elements for "What to Record," the "Subject" which is being observed, the "Action of the Subject," and a "Time Frame" which states at which intervals (daily, hourly) or times the data are to be recorded (see Beaman and Grimm 1989). DVs were developed to overcome various problems recognized since 1972 or 1973 related to using "Units of Count."

Being able to describe "very precisely" what one is counting and why, to have a great deal of flexibility in doing this, and being able to prompt users with data definitions, may seem to have solved the major data management problems for the Park Use Related Data System. However,

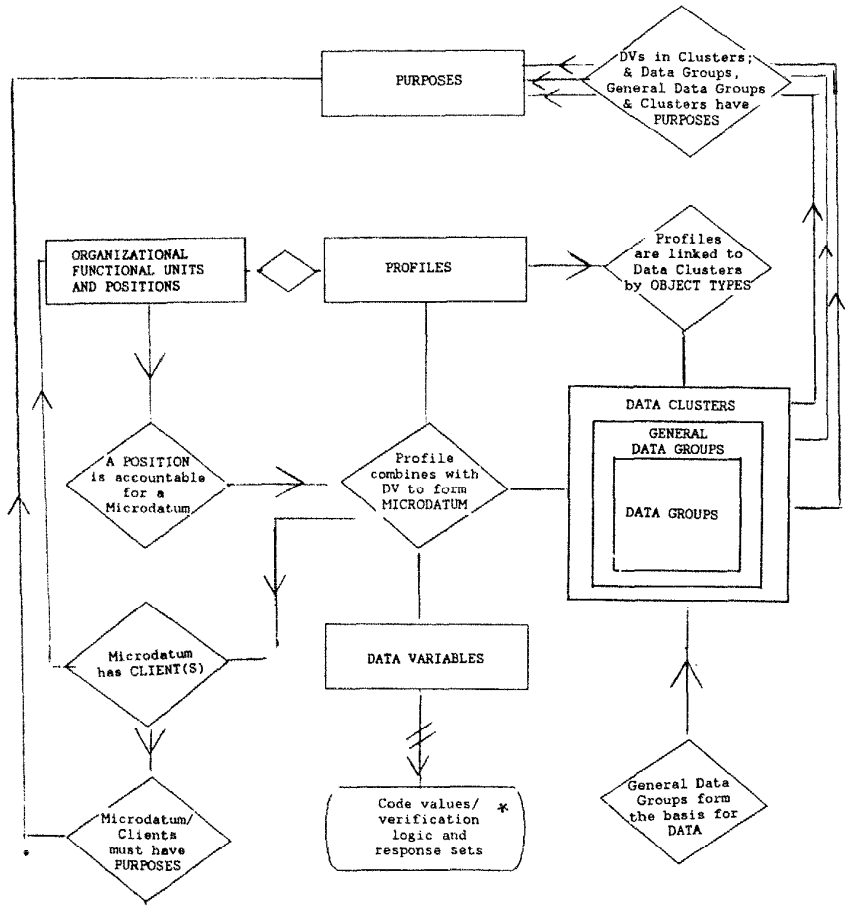
ıe Canadian Parks Service's market and park ;er survey data collection fell outside the ıitial conceptual framework. Visit Expenditure ›delling (see Whiting 1987, Beaman 1984, CPS)89) was not covered. There were also problems ›aling with forecasts. For example, while :ating the relation of a forecast to what is :esent, how, in a general manner, can different ›recasts be stored and, as necessary, along .th an identification of who made them and why? ›wever, the foundational structure of the PURDS : evolved by 1989 enabled work to proceed on ›ncept development required to incorporate ırvey data, estimates of visit expenditures and ›recast data.

What Is A Datum In PURDS

Data Entry, Data Use And Data Clusters: Their "Logical Foundation"

The practical viability of both PURDS Profiles and DVs stem from the fact that they are defined using open-ended lists. Virtually any data which can be collected can be defined "rigorously" through PURDS. Initially, the tendency was to focus on "datum" as observed counts on park use that could be stored, accessed and manipulated. The Data Entry facility (Cotter 1989) of the computerized PURDS Data Model allows data, as specified by a DV, to be recorded for a Profile. Figure 2A (see Profiles, Data Variables, and the linkage between them) presents the text for a Profile as

Figure 2B



* Generalization of Codes Lists involves a variety of linkages.

PURDS Data Structure

"Park Orientation is supported by Interpretation Programs presented at the Outdoor Theatre located at Broad Cove in Cape Breton Highlands National Park" combined with a DV which reads as "Number of persons present at start of service as recorded for the date/time of event."

For "user direct data entry," Menus were created. These are lists of Profile/Data Variable combinations used by particular individuals for recording data. Based on a Menu, the computer presents "prompts" which describe a Profile for which the values of a DV, also described, are to be recorded, along with certain dates and times for which they are to be recorded. In 1990, DVs that can be used to define data are being "upgraded" to allow methods of recording/computation to be part of the definitional structure.

The concept of a "datum" and "data storage" just presented is a micro definition of data. By combining a Profile with a Data Variable, one can say this is something for which I want to record data, and this is the datum which I want to record. One can select a Profile Number and a Data Variable Number with a date/time as shown by the examples presented in Figure 2A. Values recorded for the data can then be stored and retrieved. But retrieved to what end? Which data are comparable? Which can be aggregated or otherwise manipulated? These questions bring us to the concept of Data Clusters.

Let us say that we have something which physically we recognize as an entry/exit gate. The CPS has a few hundred park entry/exit gates for vehicles, along with campground entry/exit gates for vehicles. Presumably, all such gates can have certain DVs in common. The idea is quite simple. There is a common set of data which is reasonable to record for a set of "objects" such as entry/exit gates. This does not mean that everybody has to record them all! Some people's management style dictates that they record certain Data Variables, some require others. (As is discussed later, PURDS allows the "Purposes" of collecting any data to be associated with them so that users have on-line assistance in selecting which data they want to record.) A collection of DVs which could be used for recording data for a Class, for example of entry/exit gates, has been called a <u>Data Cluster</u>. So we can set up a Data cluster for a certain <u>class of objects</u> [an object oriented definition (OOD), see Sheu et al. 1989 and Oldford 1987].

Now, the PURDS concept of Data Clusters has led to having a box sitting within a box. In Figure 2B, it is illustrated that a Data Cluster is made up of Data Groups. It can be recognized that, within the DVs which could be used to record data for a vehicle entry/exit gate or for some other class of objects, a group of DVs will fall under the same Time Frame (hourly, daily, etc.). The important thing about that recognition is that data which fall under the same Time Frame operationally, are the kinds of data that would be collected by someone, for example, sitting in a kiosk at a gate recording numbers of seasonal permits sold by hour, number of vehicles passing through the pass-through lane by hour, number of entry kiosks open that hour, and so on. So Data Cluster data in a given Time Frame is a Data Group. DVs in a Data Group are items that, in some sense fit together "logically," because they have both the same "type of Profiles" and the same Time Frame.

Figure 2B elaborates on the PURDS structure shown previously, using an ER data model augmented by directional "logic" and some object-orientation. The arrows showing directions of relations are not part of ER modelling. The "logic programming" behind such arrows is inherent in PROLOG. Actually, the logical links are complicated and fraught with "Artificial Intelligence" and "Expert System" potential which can only be covered in a more lengthy article. As one example, the logic being developed lets one look at how a "vehicle entry/exit gate with visitor service" can be seen to have its "Data Cluster" defined by the combination of other Clusters for the "discrete aspects of what goes on at the gate." An entry/exit gate may have fee booths and "pass through" for non-user traffic, reentry, or seasonal permits. As well, it may have a park information centre and a regional tourist information office. Data Clusters for each of these special aspects add (set unions) to give the set of DVs for the "actual entry/exit facility." Another aspect of the logic being developed is that of manipulation of data for DVs in a Data Group, whether this be adding values for a DV to get daily totals, taking a daily maximum of values for a DV because adding maximums is not valid, or combining <u>different</u> DVs.

<u>General DV Groups: Applying DV Groups To Questionnaires and Forms</u>

The definition of Data Groups also leads to a different line of thought than that just cited. By generalization, there is a way to view Questionnaire data in a manner consistent with how other data are viewed in the PURDS (here reference is to the box between the box for Data Clusters and the one for Data Groups). Questionnaires involve "branching" levels. Each level can be "repeating" and linked to other levels "logically." General Data Groups have been developed considering them both as lists [as in LISP (O'Shea 1984)], and as logical data structures (as in PROLOG). In PURDS terms, a number of Data Variable Groups are put together along with information on when/how branching occurs, resulting in a General Data Group, or in other words, resulting in the data from a questionnaire or reporting form reflecting the logic behind the form. General Data Groups allow for branches, and for DVs and associated questions within branches, to be defined in a way which provides a full context in which to interpret data. Significantly, data from responses to questionnaires or forms thus <u>become part of a general structural pattern</u> and <u>vocabulary of data in PURDS</u> so that users do not

have to "look at" these data any differently than, for example, observed counts.

Discussion: Some Key Matters To Address In PURDS

A critical recognition in the evolution of PURDS has been that data management should be part of an "expert" system. PURDS should be acting as a Computer Assisted Learning (CAL) device. The CAL objective is providing on-line expert assistance to users in their data collection/ selection/analyses processes. It is partly accommodated by having data "Purposes," "Applications," and even "References" linked to DVs, Data Groups and General Data Groups. Analyses options for a form or questionnaire, or references to its application, are part of what PURDS is about!

Accountability, Client Positions, And Purposes For Data

In referring back to Figure 2B, it can be seen that Microdatum link to Positions. To achieve the objective of accountability for data within the organization, every discrete datum is identified as trackable to the "Position" which is responsible for ensuring that the particular datum is collected. Pre-coded Positions, based on the organization's personnel system, identify the name of the Position at the "local" level which is accountable for the datum, that is, which has direct authority to require that collection of that datum be carried out. From a practical point, the datum tracking system offers a point of accountability if data are not recorded as required.

The broader issue of accountability leads to its counterpart which is also accommodated through Positions, as seen in Figure 2B, and that is the tracking of clients for data. Because PURDS data are moved within the organization to PURDS and non-PURDS systems, in each PURDS database the clients for data are designated, so that, among other reasons, data transfer can be automated. Another aspect of accountability and clients relates to the "Purposes" of collecting any particular datum. Purposes and Positions are interrelated, since if a client has not been identified for a datum, there can be no purpose in collecting it! If there is a client, then the client should have a purpose for needing a datum. This is to justify spending resources to collect data, as well as to explain to the individual being held accountable, who needs the datum and why. The logic developed thus, in theory, prevents unnecessary data collection.

The Role Of Purposes And Data Clusters

Yet another side of Purposes relates to the provision of on-line functional advice to users. As part of the Computer Assisted Learning (CAL) aspects of PURDS, experts state what can be measured, and possibly what can be achieved (and how) through using a Data Variable in a Data Cluster, that is, through collecting a particular datum. This is illustrated in Figure 2B by the diamond shape connecting Data Clusters and Purposes which reads in part "Data Variables in Clusters have Purposes." Appropriate analysis techniques for the datum can also be stated. Purposes thus provide operational guidance and a communication and education vehicle on how data can be used in decision-making for management and planning. An aspect of PURDS not covered here because of space, is the fact that Purposes are also named for Data Clusters as a whole, or for sub groups of Data Variables, offering broader guidance on the selection of Data Variables for an object type as some data should be used in combination. This is implied by the "triple" lines/arrows in Figure 2B going from Data Clusters, General Data Groups and Data Groups, to Purposes.

An Integrated Picture Of Data

Traditionally, it was typical to describe data on park use in relation to multiple trips, multiple locations, etc., as portrayed in Part A of Figure 3. Without elaborating on details, in the integrated approach to data being taken, the PURDS allows for multiple records to be related, for example, records on trips to be associated with a party, records on different trips and locations visited to be associated with a trip and thus back to a party, activities participated in by party members at different locations to be associated with each member of a party and thus back to a party, etc.

Figure 3

Part A

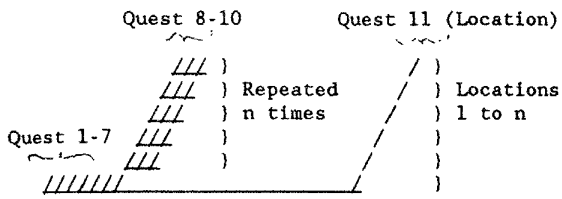
```
  Party       Trip 1       Trip 2   Location 1-10
Quest 1-7  Quest 8-10   Quest 8-10  (10 Allowed)
          (Activities) (Activities)
[///////]     [///]        [///]     [////////]
```

Conventional View Of Data

Figure 3A shows how conventional data might have party data with data for 2 trips and 10 activities on the same "card." PURDS data for the same situation is shown in Figure 3B with "computer directory" type structure where each trip is a "file" on a directory with "no" limit on the number of trips. Activities are

visualized similarly, with them also having a direct link to the "root directory" party.

Part B



How Data Are Viewed In PURDS

Storing, Accessing and Reporting: Generalized Queries

The question of storage of data and the efficient access to data is being approached in a radically different way than was envisaged in the first stages of PURDS development. While "Data Entry Stations" handle user direct data entry by storing microdata (by Profile, DV, and Date/Time) and offering listings of data by Menu, that is not a Data Cluster or Data Group approach! But why should it be? Well, in getting PURDS running for real, it was found that storage of large volumes of data on central databases for easy and timely access to the data, required thinking about data as has been portrayed in the foregoing discussion on General Data Groups. Not only should users see data for an entire questionnaire as a datum, the computer needed to see the data that way as well! All data recorded for a vehicle entry/exit gate for a given "Time Frame" can be a user interface datum, just as can data recorded in relation to observed counts on a beach for a given time or collection of "Time Frames."

The computer workings for actual storage, as cited earlier, should not be a user issue, and is not. Getting storage "problems solved" made it clear that users should view microdatum in terms of Groups which link them logically. Key links are Time Frames and the criterion that Data Variables belong to the same General Data Group. A crucial consideration in PURDS development in terms of data storage is the implementation of a query system which enables users to query data for a Data Cluster of a Profile to find out which data have been recorded over a certain time period. Alternately, users should be able to "ask about" certain types of Profiles and find out which Profiles (for gates, campground entries, etc.) qualify, in that they have data recorded for them, and, if desired, to "obtain" selected data so that analyses can be carried out using statistical analyses programs.

Object Oriented Design and Artificial Intelligence/Expert System

This paper has made a variety of references to the way that information about Data Variables o Profiles can be stored and used to analyze/ control the types of operations that are carrie out. Is the Data Variable such that it can be totalled? Can it be totalled over several specific Profiles? Can a collection of values reasonably be totalled over time for a given Profile? Analysis and support of the CPS Park Use Related Data System has discovered a number of "types of data," abstract data types, that are needed to do the organization's job effectively. So the concept of "special objects" comes into the picture.

This topic of special data objects for PURDS an even a start at an object oriented view of data (see Oldford 1987) requires more space than publication limits in this article provide. Suffice it to say that, as ER has solved many problems for PURDS, many major remaining problems will be solved by "Object Orientation. Object Orientation does not involve abandoning the progress made in the past, rather it offers the opportunity to build on it. Also by moving this way, the power and future flexibility of Object Oriented Languages (Ward 1989) and Databases will smooth the transition to the yea 2000.

Conclusion

This paper has discussed the PURDS Data Model and how it provides a formal data structure for the creation of systematic definitions which form the basis for data capture, storage, and reporting in relation to park use within the Canadian Parks Service. The needs and issues being pursued to make "The Model" more object-oriented and more explicitly defined by logic have been identified, as well as recent thrusts to incorporate elements of AI, expert systems and computer assisted learning as part of the database. These means are part of seeing that in practical terms, PURDS is not a system created to force data collection into a mold. It is a built on the concept that a good information management system can have CAL as a integral part, and as an expert system it can provide aid and assistance to users in a constructive context-sensitive sense.

This paper has presented PURDS and presented a feel for how non-EDP professionals should be starting to "relate" to their data. PURDS has progressed because non-EDP professionals have recognized that evolving methods in computer science are really new mathematical and logical tools for a much broader community (see Beaman 1985). It is as important to learn to use thes tools as it is to learn statistics or to learn to use a computer.

As documentation and papers come out during the next year or two, it will be seen clearly how the ideas of ER modelling, "sparse arrays" from

MUMPS, Logic Programming from PROLOG, list processing from LISP, and Object Oriented Design have played a critical role in PURDS evolution. These linkages are important since they enabled concept development in PURDS to be tied to work done by others, allowing PURDS to advance quickly and with confidence following paths which others have charted.

REFERENCES

Anderson, Norman H. 1981. Foundations of Information Theory. New York: Academic Press.

Barr, Avron; Feigenbaum, Edward A. (Eds.) 1981. The Handbook of Artificial Intelligence: Volume 1. Stanford: HeurisTech Press.

Beaman, Jay. 1985. A Data Base Model for Parks Canada. Heritage Resources Programme Presentation. Waterloo, Ontario: University of Waterloo.

Beaman, Jay; Grimm, Sylvanna. Park Use Related Data Recording: A New Direction for the Canadian Parks Service. In: Proceedings, 1989 Northeastern Recreation Research Symposium: 1989 April 3-5; Saratoga Springs, New York. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station NE-132: 69-76.

Beaman, Jay; Grimm, Sylvanna. 1990. Park Use Related Data Recording: A New Direction. In: Towards Serving Visitors and Managing Our Resources: Proceedings, North American Conference on Visitor Management for Parks and Recreational Areas. Waterloo, Ontario: University of Waterloo, Tourism and Recreation Education Centre, with Environment Canada, Canadian Parks Service.

*CPS 1989. Automated Entrance Kiosk Registration System: Reference Manual. Ottawa: Canadian Parks Service, Socio-Economic Branch.

*CPS 1989. Automated Registration/Registration System: Reference Manual. Ottawa: Canadian Parks Service, Socio-Economic Branch.

*CPS 1989. Data Entry Menus/Reports and User Direct Data Entry: User Manual. Ottawa: Canadian Parks Service, Socio-Economic Branch.

Cotter, Mary L. (Compiled and Edited). 1989. Park Use Related Data System (PURDS) Data Model: Concept Paper. Socio-Economic Branch, Canadian Parks Service.

Cotter, Mary L. 1989. Park Use Related Data System (PURDS) Data Model: User Guide. Socio-Economic Branch, Canadian Parks Service.

Gerrard, Stephen. 1986. Standard Query Language: It's a Standard, but is it a language? Computerworld. Volume 20, Number 38.

Grimm, Sylvanna; Beaman, Jay. 1990. The Park Use Related Data System (PURDS) Concept. In: Towards Serving Visitors and Managing Our Resources: Proceedings, North American Conference on Visitor Management for Parks and Recreational Areas. Waterloo, Ontario: Tourism and Recreation Education Centre, University of Waterloo, with Environment Canada, Canadian Parks Service.

Jaro, M.A. 1989. HyperQuest: A New Method for Interviewing Using Laptop Computers. In: Symposium 88: The Impact of High Technology on Survey Taking: 65-73.

Lewkowicz, John M. 1989. The Complete MUMPS: An Introduction and Reference Manual for the MUMPS Programming Language. Englewood Cliffs: Prentice-Hall.

Malpas, John. 1987. Prolog: A Relational Language and Its Applications. Englewood Cliffs: Prentice-Hall.

Martin, James. 1976. Principles of Data Base Management. Englewood Cliffs, New Jersey: Prentice-Hall.

Oldford, R.W. 1987. Object-Oriented Software Representations for Statistical Data. Statistics Technical Report Series (STAT-87-18). Waterloo, Ontario: University of Waterloo, Department of Statistics and Actuarial Science.

O'Shea, Jim; Eisenstadt, Marc. 1984. Artificial Intelligence: Tools, Techniques and Applications. New York: Harper and Row.

Sheu, Phillip C. 1989. Describing Semantic Data Bases with Logic. Journal of Systems Software. Volume 9, Number 1: 19-27.

Sheu, Phillip C.; Kashyap, R.L.; Yoo, S. 1989. Query Optimization in Object Oriented Knowledge Bases. Data Knowledge and Engineering. Volume 3, Number 4: 285-302.

Straube, David D.; Ozsu, M. Tamer. 1989. A Model for Queries and Query Processing in Object-Oriented Databases. Edmonton, Alberta: University of Alberta, Department of Computing Science.

Ward, Paul T. 1989. How to Integrate Object Orientation with Structured Analysis and Design. IEEE Software. Volume 6, Number 2: 74-82.

Whiting, P.G. and Associates. 1987. Economic Models of Environment Canada Parks, User Requirements Study. Ottawa: Canadian Parks Service, Socio-Economic Branch.

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MONITORING FOR QUALITY CONTROL IN NEW HAMPSHIRE STATE PARKS

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This paper reports the findings from a three year study (1987-1989) monitoring the quality of services at New Hampshire State Parks. Unlike most previous research which has concentrated on measures of overall satisfaction, the variables included on the 11-item visitor report card represent specific parameters which management can control. Regression analyses indicated that the specific indicators (e.g., cleanliness of the restrooms/grounds, helpfulness of the staff, etc.) influenced overall satisfaction and accounted for 50 percent of the variance. These findings suggest that satisfaction monitoring using parameters that can be directly manipulated by management is a useful tool for achieving a high degree of quality control in the services offered.

Introduction

All outdoor recreation agencies strive to provide quality recreation experiences. During the 60's and early 70's it was assumed that the increasing use of our nation's parks and forests indicated that the visitors were receiving satisfactory experiences. This trend toward increasing demand, however, has to some extent been reversed. Records maintained by the New Hampshire Division of Parks and Recreation, for example, show that while the number of camper days among residents has remained relatively constant, the number of non-resident visitors has declined substantially from 184,978 in 1973 to 112,855 in 1989.

Various explanations can be offered to account for this reduced demand. The trend may be indicative of a general societal shift away from camping/park related activities. Alternatively, reductions in visitor numbers could suggest a shift in the type and quality of services currently offered. Whatever the explanation, the trend toward decreasing participation highlights the need for monitoring visitors' expectations to gauge the extent to which these expectations are satisfied by the facilities and services offered.

Visitors to New Hampshire State Parks are asked each year to complete a brief *report card* evaluating the services and facilities at areas they visit. Results from these annual investigations provide a systematic method for monitoring the quality of services offered at State Parks and a management tool for indicating where improvements are needed. This paper summarizes the findings from three years of this monitoring effort (1987 - 1989).

The Concept of Satisfaction

Satisfaction is a common dependent variable in research on communities (Marans & Rodgers, 1975; Molnar, Purchit, Clouts, & Lee, 1979), marriage (Glen & Weaver, 1978; Snyder, 1979), jobs (Locke, 1976; Campbell, Converse, & Rodgers 1976) and recreation (Vaske, Donnelly, Heberlein, & Shelby, 1982). This research has both a theoretical and an applied focus. Discovering variables which explain or predict satisfaction can stimulate new theories of what makes people happy. From an applied focus, the concern is with identifying variables that not only affect satisfaction but which are also susceptible to management or manipulation. If such attributes can be identified and monitored, the potential for changing circumstances to create better living/recreation experiences is enhanced.

The concept of satisfaction is central to most discussions of recreation management. Researchers and managers have consistently argued that the "goal of recreation management is to maximize user satisfaction" (Lucas & Stankey, 1974; p. 1). If this objective is to be realized, two separate types of information are needed (Shelby & Heberlein, 1986; Kuss, Graefe & Vaske, 1990). The first involves a description of what is occurring at a given location. The second concerns an evaluation of the acceptability of various conditions.

The descriptive component is concerned with observable characteristics of a recreation system. Two types of descriptive data are important: management parameters and impact parameters (Shelby & Heberlein, 1986). Anything an agency can directly manipulate is a management parameter. Examples of management parameters include the cleanliness of the restrooms, attractiveness of the grounds, or helpfulness of the staff. Impact parameters describe what happens to visitors or the environment as a result of visitor use patterns and other management parameters (Shelby & Heberlein, 1986). Changes in the perceived quality of the experience, negative reactions to unfriendly staff, or dirty restrooms are examples of impact parameters.

The descriptive component identifies how the system works, but it does not determine what is acceptable or appropriate. This involves a value judgment or a personal evaluation. For successful implementation, it is important that this evaluation result in a set of standards specifying the type of experience to be provided in terms of appropriate impact parameters as well as the degree of environmental modification acceptable to management.

Problems with the Satisfaction Concept

Despite the importance typically associated with the concept, satisfaction measures have seldom proven to be a useful management tool. Explanations for this situation range from the type of relationships that have been examined to methodologies that have been used.

Most of the existing research has concentrated on the relationship between number of visitors in an area and visitor satisfaction. Twenty-five years of research indicates that recreationists report high levels of satisfaction regardless of the density levels they encounter (See Kuss, Graefe & Vaske, 1990, for a complete review). Efforts to account for this lack of statistical relationship suggest that it is not surprising to find many people reporting high satisfaction with their leisure activities because they have freely chosen these activities to provide satisfaction. Heberlein and Shelby (1977) argue that because recreation activities are self-selected, individuals who are sensitive to increasing use levels are likely to be displaced to other resources. Those who remain will either be more tolerant of higher densities or will have adjusted their expectations to compensate for the situation.

Schreyer (1979) elaborates on the psychological mechanisms that may yield reports of high satisfaction: (1) individuals may *shift their perceptions* of the experience away from original evaluations in order to maintain the desired experience, (2) individuals may *shift their priorities* of expectations to maintain satisfaction, or (3) individuals may *change their behavior* to achieve preferred outcomes that have not been attained during previous occasions. All of these potential explanations suggest that it is unrealistic to expect satisfaction to be determined by a single situational variable like use intensity. From an applied perspective, satisfaction indicators must vary with changes in conditions that managers can control if they are to be useful.

Second, estimates of visitor satisfaction are typically derived from surveys of a single area at a particular point in time. Such one-shot surveys provide no baseline data for identifying and monitoring unacceptable changes that may be occurring. Data from several years using identical measures is required if satisfaction is to be a useful management tool.

Third, most satisfaction measures have considered only aggregate satisfaction. While such an approach does permit general comparisons between areas, it is impossible to disaggregate the conditions which led to the overall evaluation. From an administrative perspective, knowledge of negative visitor reactions to the helpfulness of the staff is more readily translated into subsequent management actions than information on reduced overall satisfaction.

Fourth, satisfaction is usually measured with Likert type scales where the response categories range from Highly Satisfied to Highly Dissatisfied. Although methodologically appropriate, it is difficult for managers to interpret the importance of knowing that visitors are somewhat satisfied as opposed to moderately satisfied.

The New Hampshire State Parks' Report Card

The report card overcomes most, if not all, of the limitations common to satisfaction research. First, in many situations, managers are legally or administratively bound to provide the public with recreation opportunities. Given financial constraints and the amount of money generated from fees, park administrators are often reluctant to limit the number of visitors using an area. Under such circumstances, visitor numbers is not a management parameter that can be easily manipulated. Thus, rather than focusing on the relationship between satisfaction and visitor numbers (a relationship that does not appear to vary), the report card focuses on indicators of satisfaction which are under the control of management.

Second, data from the report card are collected annually at a range of units in the New Hampshire State Park system, thus permitting the opportunity to monitor changes that occur over time within as well as between parks. Third, the report card contains specific management oriented questions as well as more general items such as first impression and overall satisfaction. Fourth, the report card's response categories parallel education based grading systems (e.g., A = excellent, B = better than average, etc.); a format that is easily understood and familiar to both visitors and managers.

Methods

The report card used for tracking visitors' satisfaction was developed in the late 1970's (LaPage & Bevins, 1981). The instrument was initially tested in a number of state parks in Massachusetts, Vermont and New Hampshire. Subsequent verification was conducted in collaboration with private campground facilities nationwide. In New Hampshire, 5000 report cards are distributed each year by park employees to visitors at over 30 units managed by State Parks. These include campgrounds, day use areas, beaches and historic sites. During 1987, 1855 completed cards were returned, compared to 1464 in 1988 and 963 in 1989.

The report card asks respondents to rate the park they visited on 11 variables:

First impression
Helpfulness of staff
Cleanliness of restrooms
Information at park
Attractiveness of park
Safety and security
Cleanliness of grounds
Ease of access
Hours of operation
Control of pets
Overall satisfaction

Responses to each variable were coded on a 5 point scale:

4	A	(excellent)
3	B	(better than average)
2	C	(average)
1	D	(below average)
0	E	(poor).

Results

The visitors' overall satisfaction with their state park experience increased from a B+ in 1987 to an A- in 1988, and remained at that level for 1989 (Table 1). Similar improved grades were noted for the cleanliness of the grounds. Letter grades for the perceived helpfulness of the staff and attractiveness of the park went from B+ in 1987 to A- in 1988 and returned to a B+ in 1989. Statistical differences, however, were only noted for the 1987-1988 comparison of the helpfulness of staff. Reactions to controls on pets declined to a B+ in 1989 from a grade of A- for the previous two years, but the statistical test for these comparisons was not significant. Cleanliness of the restrooms received the lowest grade for 1987 and 1989 (B). The grade for this variable during 1988 was significantly higher (B+). Consistent grades of B+ were reported each year for the remaining five variables.

On a park by park basis, the overall grade point averages (GPA) *across all three years* ranged from 3.96 to 3.06 (Table 2). Seven units received an average grade of A across this three year period. Three of these areas were historic sites (Daniel Webster Historic Site, Weeks State Park and Wentworth Coolidge Historic Site), two were campgrounds (Coleman and Lake Francis State Park), one was a day use area (Rye Harbor State Park) and one was an attraction (Franconia Notch State Park Tram). Nine of the units in this sample rated an A- over the three years, while another 22 areas received an average grade of B+. The lowest overall grade point averages (B) were given at Crawford Notch State Park Campground, Hampton Beach State Park, and Echo Lake/Cathedral Ledge.

Examination of the grades received at *each park* during *each year* (Table 2), show some consistency. For example, of the seven units showing an overall grade point average of A, only Lake Francis State Park reported a grade lower than A on a year by year comparison. The grade for Lake Francis during 1988 was an A-. Among the units with a three year average of A-, the yearly grades range from A to B. Comparing 1989 against the other two years, four of the eight parks reporting 1989 data showed improvement, two reported similar grades and two parks reported lower grade point averages. Between 1987 and 1989, 53 grade point averages could be calculated for the 22 areas with an overall GPA of B+. Forty-one of the individual year GPA's were B+ (77%), seven (13%) were A-, three (6%) were B and two (4%) were A. Finally, the three parks with an overall GPA of B, had yearly scores ranging from B+ to B-.

The grade point averages can also be compared relative to the unit's classification in the system (i.e., historic site, day use area, campground, or beach). On average, the four historic sites in the sample (Daniel Webster Historic Site, Weeks State Park, Wentworth Coolidge Historic Site and Robert Frost State Park) consistently reported the highest grade point averages [A] (Table 3). Across all three years, parks in the remaining classifications received an overall GPA of B+. The 1988 & 1989 grade point averages for day use areas were A-, an improvement from the B+ in 1987. The grades for campgrounds and beaches were consistently B+ during each of the three years.

Table 1. Report card grades across all parks

Grades[1] 1987	1988	1989	Variable	Mean[2] 1987	1988	1989
B+	A-	A-	Your overall satisfaction*	3.65[a]	3.71[b]	3.68[ab]
B+	A-	A-	Cleanliness of grounds*	3.65[a]	3.69[ab]	3.72[b]
B+	A-	B+	Helpfulness of staff*	3.64[a]	3.72[b]	3.66[ab]
A-	A-		Control of pets	3.68	3.69	3.66
B+	A-		Attractiveness of park	3.65	3.69	3.65
B+	B+		Your first impression	3.59	3.62	3.64
B+	B+		Ease of access	3.55	3.61	3.58
B+	B+		Hours of operation	3.51	3.53	3.53
B+	B+		Safety and security*	3.50[a]	3.57[b]	3.51[ab]
B+	B+		Information at park*	3.38[a]	3.51[b]	3.34[a]
B	B+	B	Cleanliness of restrooms*	3.28[a]	3.40[b]	3.31[a]

1. Grades were assigned based on the following ranges:

A	4.00 - 3.80	B	3.32 - 3.00
A-	3.79 - 3.67	B-	2.99 - 2.67
B+	3.66 - 3.33	C+	2.66 - 2.33

* An * following a variable indicates that the means for the three years vary significantly.

2. Means with different superscripts vary significantly at the $p < .05$ level.

Table 2. Overall grade point average (GPA) by park[1]

Park	Overall Grade Point Average 1987	1988	1989	All Years	Grade
Daniel Webster Historic Site	4.00	3.93	3.99	3.96	A
Weeks State Park	3.84	3.90	3.96	3.92	
Coleman State Park	3.90	3.80	3.84	3.87	
Rye Harbor State Park	3.84	3.87	3.92	3.87	
Wentworth Coolidge Historic Site	3.80	3.95	--	3.87	
Franconia Notch State Park Tram	3.83	--	--	3.83	
Lake Francis State Park	3.79	3.67	3.88	3.80	
Mt. Sunapee State Park	3.66	3.66	3.84	3.76	A-
Robert Frost State Park	3.71	3.53	3.94	3.73	
Rollins State Park	3.61	--	3.93	3.73	
Forest Lake State Park	3.57	3.10	3.96	3.72	
Milan Hill State Park	3.83	3.75	3.15	3.72	
Silver Lake State Park	3.68	3.69	3.76	3.72	
Wentworth State Park	3.61	3.79	3.75	3.72	
Kingston State Park	3.67	3.82	--	3.71	
Wadleigh State Park	3.67	3.81	3.58	3.71	
Greenfield State Park Day Use	3.71	--	3.66	3.69	B+
Odiorne Point State Park	3.61	3.66	--	3.66	
Moose Brook State Park Campground	3.64	3.54	3.56	3.63	
Monadnock State Park Day Use	3.60	--	3.64	3.62	
Wellington State Park	3.60	3.59	3.84	3.62	
White Lake State Park Campground	3.82	3.58	3.51	3.62	
Greenfield State Park Campground	3.62	3.58	3.72	3.61	
Monadnock State Park Campground	3.61	3.56	3.70	3.60	
Pawtuckaway State Park Campground	--	3.53	3.74	3.57	
Wallis Sands State Park	3.57	3.51	--	3.57	
Ellacoya State Beach	3.68	3.36	--	3.56	
Franconia Notch State Park Campground	3.45	3.66	3.46	3.56	
Winslow State Park	3.35	3.56	3.72	3.56	
Franconia Notch State Park Flume	3.54	--	--	3.54	
White Lake State Park Day Use	3.56	--	3.23	3.54	
Mt. Washington State Park	3.51	3.60	3.48	3.50	
Bear Brook State Park Campground	3.47	3.65	3.32	3.49	
Crawford Notch State Park Day Use	3.47	--	--	3.47	
Pawtuckaway State Park Day Use	3.51	--	3.34	3.47	
Miller State Park	3.35	3.54	3.55	3.46	
Bear Brook State Park Day Use	3.42	--	3.38	3.39	
Clough State Park	3.41	3.30	3.73	3.34	
Crawford Notch State Park Campground	3.16	3.35	--	3.29	B
Hampton Beach State Park	3.36	3.50	3.04	3.27	
Echo Lake & Cathedral Ledge	2.83	3.66	--	3.06	

1. The overall grade point average (GPA) represents each park's average grade across all variables on the report card.

Table 3. Overall grade point average (GPA) by type of park[1]

Type of Park	Overall Grade Point Average 1987	1988	1989	All Years	Grade
Historic Sites	3.84	3.90	3.96	3.90	A
Day Use Areas	3.56	3.74	3.70	3.65	B+
Campgrounds	3.59	3.60	3.58	3.59	B+
Beaches	3.55	3.58	3.40	3.53	B+

1. The overall grade point average (GPA) represents the average grade across all variables on the report card.

The distribution of visitors to New Hampshire State Parks varies considerably among the parks. Some campgrounds primarily attract New Hampshire residents (e.g., Coleman), while most visitors to Franconia Notch tend to be non-residents. Still other campgrounds show a more equal mix of resident and non-resident visitors (e.g., Greenfield). Of the 12 campgrounds in the State Park system, one can be classified as primarily resident visitors, seven attract a mix of resident and non-resident campers and four are visited mainly by non-residents.

Examination of the grade point average at Coleman, the resident visitor campground, shows a three year overall GPA of 3.87 or a letter grade of A (Table 4). Campgrounds attracting either a mix of resident/non-resident visitors or a predominance of non-residents received letter grades of B+ over the same period. Grade point averages were fairly consistent across the three year period for each of the visitor classifications.

One of the variables on the report card addressed the visitors' overall satisfaction with the experience while the remaining questions asked individuals to evaluate a specific component of their visit (e.g., cleanliness of grounds/restrooms, helpfulness of staff, attractiveness of the park, etc.). These ten specific variables were treated as predictors of the person's overall evaluation.

When the data from all three years were combined, nine of the ten predictor variables influenced overall satisfaction, and accounted for 50 percent of the variance in the dependent variable (Table 5). The visitor's first impression of the park was the strongest predictor of overall satisfaction ($B = .22$; $p < .001$). Cleanliness of the grounds and helpfulness of the staff ranked next in importance, respectively. Safety and security, cleanliness of the restrooms, and control of pets were least important among the significant indicators. The only variable to not enter the equation was the information received at the park.

Separate equations for each of the three years show a somewhat similar pattern of findings. The respondent's first impression was consistently the best predictor of satisfaction, while information at the park was not significant in any of the regressions. The size of the coefficients for the remaining predictors varied among the years, but each equation accounted for about half of the variation in overall satisfaction.

Because of the relative importance of the visitors' first impression, another set of regression equations were fitted. In these analyses, first impression was the dependent measure and the remaining eight questions were independent variables (Table 6). Results indicated that the attractiveness of the park and the helpfulness of the staff were consistently the strongest predictors of the person's first impression. For the combined sample, eight of the nine predictors had a significant and positive influence on the visitors' first impression. Control of pets did not effect first impression in any of the four equations. The amount of explained variance ranged from 35 percent to 39 percent. Because the variables on the report card can be manipulated by management actions (i.e., they are management parameters), these analyses suggest that most of the factors effecting an individual's overall evaluation of the experience and their first impression of the area can be influenced by the manager.

Table 4. Overall grade point average (GPA) by type of visitor[1]

	Overall Grade Point Average				
Type of Visitor	1987	1988	1989	All Years	Grade
Resident[2]	3.90	3.80	3.84	3.87	A
Mixed[3]	3.61	3.59	3.60	3.60	B+
Non-resident[4]	3.50	3.60	3.54	3.56	B+

1. The overall grade point average (GPA) represents the average grade across all variables on the report card.
2. Coleman State Park was classified as a *resident* campground.
3. Campgrounds in the *mixed* classification include: Bear Brook, Greenfield, Lake Francis, Milan, Pawtuckaway and Pillsbury.
4. Campgrounds in the *non-resident* classification include: Crawford, Lafayette-Franconia, Monadnock, and Moose Brook.

Table 5. Factors affecting overall satisfaction[1]

	Dependent Variable: Overall Satisfaction			
Independent Variables	1987	1988	1989	All Years
Your first impression	.18**	.21**	.27**	.22**
Cleanliness of grounds	.18**	.15**	.18**	.16**
Helpfulness of staff	.12**	.17**	.14**	.14**
Ease of access	.16**	.06*	.09*	.11**
Hours of operation	.11**	.07*	.11*	.10**
Attractiveness of park	.17**	.08*	--	.10**
Safety and security	--	.11**	.16**	.08**
Cleanliness of restrooms	.08**	.10**	--	.07**
Control of pets	.07**	.07*	--	.06**
Information at park	--	--	--	--
Explained Variance (R^2)	.52	.49	.48	.50

1. Cell entries are standardized regression coefficients
* $p < .05$; ** $p < .001$

Table 6. Factors affecting first impression[1]

	Dependent Variable: First Impression			
Independent Variables	1987	1988	1989	All Years
Attractiveness of park	.26**	.31**	.26**	.26**
Helpfulness of staff	.20**	.20**	.22**	.20**
Hours of operation	.12**	--	.16**	.08**
Information at park	.07*	.09*	10*	08**
Ease of access	.08*	.09*	--	.07**
Cleanliness of grounds	.10**	--	--	.06**
Safety and security	--	.07*	.09*	.05*
Cleanliness of restrooms	--	.07*	--	.04*
Control of pets	--	--	--	--
Explained Variance (R^2)	.36	.35	.39	.36

1. Cell entries are standardized regression coefficients
* $p < .05$; ** $p < .001$

Discussion

When used on an annual basis, the report card provides a viable management tool for monitoring not only aspects of the services which are meeting user expectations, but also those where improvements are needed. There are, however, some limitations/issues which would enhance the value of the instrument.

First, the report cards should be distributed during the same time period each year. The timing of the distribution period can influence not only the number of completed returns, but more importantly, the findings.

The number of completed returns for 1989 was substantially lower than for the previous two years. Reductions in visitor numbers and staff at the end of the 1989 season when the cards were distributed could have contributed to the relatively low response rate. Findings from the report card indicate that cleanliness of the restrooms was the only variable to decline significantly between 1988 and 1989. Because of limited female staff at the end of the 1989 season, it was sometimes impossible to maintain the women's washrooms. From a monitoring perspective, therefore, it is not possible to determine whether these findings are (a) representative of the 1989 season and indicate a true decline in the quality of this service, or (b) reflect a methodological artifact of when the surveys were distributed.

Second, procedures for distributing the report cards should be standardized across park units. Data from all three years show variation in the number of completed returns from each park. In some cases individual units in the system did not respond during a given year. The low return rate implies that care must be taken in interpreting park specific findings. With a small sample size, the average scores can be influenced substantially (positively or negatively) by the responses from a few individuals. The utility of report card monitoring efforts is thus reduced because changes in respondents' evaluations can be attributed to either actual shifts in the level of service or sample size effects.

Third, data from the report card describes the visitors' reactions to the services provided, but it does not indicate whether the level of service is acceptable to either the visitor or the manager. This determination requires a value judgment of the appropriateness of different conditions. For successful implementation, it is important that this evaluation result in a set of standards specifying the grade level for each variable at each park that is acceptable to management.

Fourth, monitoring the quality of services offered at a park may necessitate additional information beyond that obtained from the report card. Although the current instrument provides a useful management tool, not all questions of interest to managers can be addressed. Data from park attendance records, for example, indicate that the number of non-resident campers has steadily declined from 1973 to 1989. Since reductions in visitor numbers directly influence revenue production, it is important to identify indicators that have contributed to the existing situation. At the outset of this paper, we offered two alternative explanations. One hypothesis suggested that the kinds of services currently offered at State Parks is no longer consistent with the public's expectations. For example, does the visiting public now expect electrical hook-ups, hot showers, dumping stations, etc. A second explanation suggests that reductions in camper numbers reflects a general societal shift away from park related activities.

To examine these alternative explanations, the report card could be administered in other types of campgrounds (e.g., private and national) that offer a wider range of services. Tracking the attendance figures at these locations would place the visitation rates reported by State Parks in perspective. Finally, other surveys could be constructed to directly examine the reasons individuals have increased or decreased their camping activities. Each of these approaches would enhance our understanding of changes in camping participation patterns. Whatever methodology is employed, the point here is to simply highlight the need for additional survey/monitoring efforts to address the range of concerns of interest to managers.

Literature Cited

Campbell, A.; Converse, P. E.; Rodgers, W. L. 1976. *The Quality of American Life: Perceptions, Evaluations, and Satisfactions.* New York: Russell Sage Foundation.

Glen, N. D.; Weaver, C. N. 1978. A multivariate, multisurvey study of marital happiness. *Journal of Marriage and the Family.* 40: 269-282.

Heberlein, T. A.; Shelby, B. B. 1977. Carrying capacity, values and the satisfaction model: A reply to Greist. *Journal of Leisure Research.* 9: 142-148.

Kuss, F. R.; Graefe, A. R.; Vaske, J. J. 1990. *Recreation Impacts and Carrying Capacity: A Review and Synthesis of Ecological and Social Research.* Washington, D.C.: National Parks and Conservation Association.

LaPage W. F.; Bevins, M. I. 1981. *Satisfaction monitoring for quality control in campground management.* USDA Forest Service Research Paper NE-484. Northeastern Forest Experiment Station. Broomall, Pennsylvania. 6 pp.

Locke, E. A. 1976. The nature and causes of job satisfaction. In Marvin Dunnette (ed.) *Handbook of Industrial and Organizational Psychology.* Chicago: Rand McNally.

Lucas, R. C.; Stankey, G. H. 1974. Social carrying capacity for backcountry recreation. In *Outdoor Recreation Research: Applying the Results.* USDA Forest Service General Technical Report NC-9. North Central Forest Experiment Station. St. Paul, Minnesota, pp. 14-23.

Marans, R. W.; Rodgers, W. 1975. Toward an understanding of community satisfaction. In A. W. Hawley and V. P. Rock (eds.) *Metropolitan America in Contemporary Perspective.* New York: Halsread Press.

Molnar, J. J.; Purchit, S.; Clouts, H. A.; Lee, V. W. 1979. A longitudinal analysis of satisfaction with selected community services in a nonmetropolitan area. *Rural Sociology*. 44: 401-419.

Schreyer, R. 1979. *Succession and displacement in river recreation*. Paper prepared for River recreation Project. USDA Forest Service. North Central Forest Experiment Station. St. Paul, Minnesota, 45 pp.

Shelby, B. B.; Heberlein, T. A. 1986. *Carrying capacity in recreation settings*. Corvallis, Oregon: Oregon State University Press. 164 p.

Snyder, D. K. 1979. Multidimensional assessment of marital satisfaction. *Journal of Marriage and the Family*. 41: 813-823.

Vaske, J. J.; Donnelly, M. P.; Heberlein, T. A.; Shelby, B. 1982. Differences in reported satisfaction ratings by consumptive and nonconsumptive recreationists. *Journal of Leisure Research*, 14: 195-206.

AUTOMATED MARKET INFORMATION GATHERING IN THE CANADIAN PARKS SERVICE

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The need for up to date information related to marketing initiatives is imperative. State of the art data collection techniques provide opportunity for one step data capture through pop up survey modules attached to computerized registration systems. Visitors are surveyed at predetermined sample ratios and collected data is accessible from remote locations where analysis occurs. Up to date information is the key in evaluating a major marketing initiative related to Parks Service resources on Cape Breton Island in 1990.

Marketing In The Canadian Parks Service - Atlantic Region

The Canadian Parks Service has begun to undertake major marketing related initiatives. Marketing in the Atlantic Region of The Parks Service is primarily concerned with increasing public understanding and awareness of both the resource and mission of the agency. In order to satisfy mandated responsibilities, it is desired to influence use of resources in accordance with service capacities and to ensure that programs and services continue to match evolving visitor needs and expectations. A major initiative implemented for the 1990/91 operating season is the Cape Breton Island - Parks Marketing Strategy pilot project. This tactical marketing communication plan includes a high quality lure brochure, a five park vacation planner, and individual park welcoming flyers, along with publicity and strategic advertising campaigns. This plan is a result of a market situation analysis and subsequent development of an integrated strategic plan for the five resources located on Cape Breton Island which seeks to present the parks in a single positioning statement.

Evaluation Of Marketing Initiatives

Evaluation of initiatives has been identified as an integral step of any marketing process (Kotler, McDougall, and Armstrong, 1988, Mahoney, 1987). The ability to monitor or evaluate on an ongoing basis is critical to the success of marketing projects (Kotler et al, 1988). Progression of a communication plan must be monitored and evaluated regularly. A recognized shortcoming of such ongoing and up to date monitoring of projects rests with the difficulty in which time efficient and effective collection and maintenance of pertinent data occurs.

Recent literature discusses state of the art data collection in terms of computer assisted telephone interviewing (CATI) and associated methodologies (Nicholls, 1988). Available technology has greatly increased the usefulness of telephone services for such procedures. The ability to electronically collect and store data in such a manner can provide both effectiveness and efficiency advantages (Catlin, Ingram and Hunter, 1988). However, such advantages can be negated and time delays incurred when survey populations must be collected through gathering of telephone numbers, from a specific universe, to initiate call back surveys for evaluative exercises. Time delays also are experienced with mail-back surveys. Opportunities exist where situations lend themselves to methods of data collection and maintenance which also should be considered state of the art. Such opportunity is evident where a captive audience is available to provide the necessary universe for study. A captive audience is able to provide immediate information pertinent to specific study objectives.

Computerized Automation in The Canadian Parks Service

The Canadian Parks Service, Atlantic Region, has been test piloting computerized, automated registration systems both at campground kiosks in National Parks and visitor reception centres in National Historic Sites. This project is referred to as the Automated Kiosk System. Visitors registering in such locations provide a captive audience as previously referred. Abilities and technologies are now available to survey these visitors immediately upon registration contact with park staff. One step data capture via a "pop-up survey" module connected to existing computerized registration systems provides this opportunity. This system is referred to as the Automated Market Information Gathering System (AMIGS). In addition to processing the visitor's registration information, specific information can be requested of and collected from a sample

of the registrants. Short questions, requiring minimal input by staff receptionists, provide up to date information on an ongoing basis.

The Fortress of Louisbourg National Historic Park has provided the Atlantic Region with opportunity to test this system. The automated registration system operated at the site during 1989. In demonstrating its flexibility, a visitor survey was administered with the aid of the automated registration system. Visitors' names and addresses were collected at a specified ratio of one in ten. This information was later removed from the database on site, transported to regional office and a system was developed to produce mailing labels for mail back survey distribution. In addition, all registering visitor party representatives were asked for their postal code and language of communication to be used as control variables with the survey. Although this situation resulted in reduced costs and associated increases in efficiency of administration of the survey, it would not provide the necessary ongoing and up to date information for accurate monitoring of a marketing communication plan. This is attributable to time delays in collection and subsequent analysis of data.

The Fortress of Louisbourg has further provided appropriate opportunity to test the automated monitoring system in that it is a key component of the Cape Breton Island - Parks pilot project. Having committed substantial financial and personnel support to this project, it is imperative every opportunity for evaluation is investigated.

The Automated Market Information Gathering System (AMIGS)

The following is a description of the Automated Market Information Gathering System (AMIGS). The AMIGS was developed using the Entity-Relationship approach to logical database design, as was the automated registration system. It is designed to provide automated information collection and data transfer. It supports both local entry of data returned on a questionnaire and direct collection of data from the user with responses being computerized. This automated system provides for questionnaire administration to park users and for interview and weighting information transfer to a computer system for further processing. AMIGS provides continuous, up to date information in a manner which does not interfere with the registration procedure or other park operations.

AMIGS augments existing data collection systems and data banks acquired in conjunction with the Park Use Related Database System (PURDS) and associated socio-economic assessment procedures currently operational within the Canadian Parks Service. Additionally, it is easily integrated into existing data collection systems such as the automated registration system and provides a means to monitor visitor awareness and response to marketing activities. The operation of the automated registration system and its data collection capabilities provides a valuable opportunity to simultaneously acquire marketing information. While collecting required visitor information, this additional data gathering is accomplished in a complimentary and automated manner.

AMIGS functions as a module of the automated registration system. It is invoked and controlled through a management setup module which also is an add-on to the registration system. As a component of the registration system's management setup module, a user friendly interface for input of questionnaire text and corresponding valid responses is available from tables.

In the management setup routine, the desire to have the automated information gathering system operational is identified. The system remains active until a desire for termination is identified. The information gathering module remains active from one operating session to the next without any requirement to access the management setup at each operational session initiation.

All screen messages, forms, displays... have flexibility to appear in either official language with the exception of actual question text and responses which accommodate any number of languages (1-n) based on what is supplied in the questions and responses setup. The questionnaires are able to appear on screen, to the user, at any of several specified points in the transaction sequence (ex. arrival, start of cash transaction, end cash transaction, end of regular kiosk transaction). Once a questionnaire is set to be invoked at a specified "point" the system continues to operate in this manner until changed in the management setup. The point of end of cash transaction, prior to printing of the ticket/permit has proven successful in the past and is most commonly used.

Operation of this automated information gathering system is efficient so that waiting for questions, finding

response codes and storing data does not delay the registration process. Help or coded valid responses for each questionnaire are available at the user's request.

The sampling rate for strata that the interviewed visitor belongs, that is, party representation (level 0), individual representation (level 1)... is included in the selected response records. Where it is a level 1 or higher response, the respondent is identified (i.e.: by any of: male, 20-35 years; english speaking; female from US..., dependant upon specified criteria.)

For each questionnaire, a series of criteria must be met in order to present the questionnaire to the computer screen or visitor. These criteria relate to the specified sampling rate, origin of visitor, official language of preference of visitor, date and time of visit, group composition, and ticket/permit type. Any number of these criteria can be selected in the management setup and interrogated for each visitor registration as to satisfaction of the specified requirements. If criteria is met for any of the questionnaires, the visitor is interviewed with the appropriate questionnaire(s). This provides opportunity for sampling of different strata and sub-strata from initial samples. The sampling rate in affect at the time of query is included in the stored collected response data.

Each registration transaction is interrogated for satisfaction of criteria. Thus, additional information is required for weighting purposes in the survey process. An additional record is maintained for each registration transaction interrogated. This details which questionnaires were interrogated for, and the successful or unsuccessful meeting of the associated criteria. This data is referred to as the survey weighting information. The weighting information records are maintained in an additional file. These data provide a record of the survey universe which is represented by the collection of screening questionnaires interrogated for each registration transaction.

Data storage before transfer does not place extensive hardware demands on the registration system but are safe and reliable. Transfer of data is self-documented and allows for flagging of data transferred, so that when questionnaire response data are safely stored outside the registration system database they can be erased from within the system.

Collected responses and survey weighting information, as referred above, are maintained within the registration system during regular, daily operation. Upon completion of the operating day, or weekly, based on user specifications, collected response information and survey weighting information is transferred from the database system to flat files in the operating system environment.

Collected response information is maintained in a fashion allowing movement of data to an external database. Information off loaded is maintained only until it is transferred, stored, verified and backed up at the regional office. Upon transfer, the data becomes the responsibility of the regional office staff and data files are managed in accord with Access to Information, confidentiality and other legal and policy constraints.

In order to satisfy easy verified movement of data to the regional office the system includes automated routines using communication software to obtain the files stored at the registration site. This consists of selecting the remote location from which data is sought, invoking the communication software and a routine to transfer the most recently created storage file. This routine moves the file to the calling computer and notifies the user of successful or unsuccessful completion of transfer. Flexibility is provided to specify numerous remote sites and have the computer access and transfer each with no interaction from the user.

Operational Advantages of AMIGS

The following operational advantages can be realized through use of the AMIGS:

i) Acquisition and availability of ongoing information;

ii) Occurence of one-step data capture resulting in increased effieiencies;

iii) Documented and maintained sample criteria, sample rates, and weighting information;

iv) Automated logic checking of collected data;

v) Storage of data on media accessible for documented and veriiable transfer;

vi) Minimal to no interruption of the visitor's experience.

Evaluation and Monitoring Opportunity Potential

In implementing this system, several advantageous opportunities in evaluation and monitoring of marketing and related projects will be accessed. In 1989, each visitors' postal code and official language of preference was recorded. This resulted in clearly defined markets based on origin and language. During 1990, collection of these data are vital for comparative purposes. However, collection of additional information can provide much more.

Specific information integral to the evaluation of the CBI - Parks Marketing Strategy project relates to the visitor's awareness or possession of the CBI - Parks printed promotional materials. With the additional knowledge of the visitor's association with these materials, ongoing evaluation can assist in determining the success of the brochure's distribution plan.

The following example demonstrates such evaluation. By way of a regular monitoring exercise, it is discovered that fewer visitors are originating from mainland Nova Scotia and that proportionately fewer, in comparison to New Brunswick visitors, have any awareness of the print materials. Thus, distribution in Nova Scotia can be adjusted accordingly. If a disproportionate number of the Nova Scotia visitors are from outside the Halifax area, in comparison to 1989, more materials can be distributed within this area or the distribution locations can be adjusted. Note that this type of evaluation is most effective in the early days and weeks of the operating season. This same scenario is valid for any origin base (i.e.: Quebec, Ontario, New England, other United States...). The collection of ongoing, up to date information is imperative in order to make such adjustments possible.

Another method of evaluation of the CBI parks pilot project is available on an ongoing basis in that the effect of the print materials is known continuously if visitors are queried as to its importance in a decision to visit or other related questions. Thus, from a broader, Parks Service perspective, such a system could be used to address several Park or Site related issues which are identified during the operating season.

A common complaint of park managers is the inability to access or even complete lack of collection of information pertinent to responsible, proactive management decisions required on an ongoing basis. An automated marketing monitoring system, therefore, can have a much broader affect and appeal. Field level analysis on an automated and time efficient (i.e.: immediate) basis also will be realized in the near future. Automated and user friendly, yet sophisticated analysis and reporting facilities will be attached to the automated registration systems through PURDS or other such systems. This situation will allow for immediate addressing of issues by park management with little burden on Regional Office staff.

Initiation of this survey process is dependant upon park management's consultation with regional office staff. If a more in depth visitor survey is required at a site, a similiar system can be used to gather names and addresses of potential survey respondents as was during 1989. However, this information should be available to regional staff on an ongoing basis with no effect upon the operation of the registration system as was the situation previously. The registration system had to be shut down and regional staff required to access the data in order to transfer that required information to a diskette which was then physically transported to the regional office. No difference exists between requesting visitors' names or more specific questionnaire response.

Summary

As a functioning module of an automated registration system, the AMIGS system provides for questionnaire administration to park users and for interview and weighting information transfer to a computer system for further processing. This one step data capture leads to increased effectiveness and efficiency and reduced financial costs in data collection exercises.

Use of automated systems such as AMIGS increases evaluation and monitoring potential for the Canadian Parks Service and researchers in general. Research technologies such as this must be explored for futhering the understanding of the recreation and leisure phenomena.

References

Catlin, G., Ingram, S., and Hunter, L., 1988. The Effects of CATI on Cost and Data Quality. In J. Kovar and E. Doucet (Eds.) Symposium 88: The Impact of High Technology on Survey Taking. October 24-25,1988, Ottawa, Ontario.

Kotler, P., McDougall, G.H., Armstrong, G., 1988. Marketing. Prentice-Hall Canada, Inc., Scarborough, Ontario.

Mahoney, E.M., 1987. Designing A Promotion Strategy. Michigan State Chamber of Commerce Cooperative Extension Service, Michigan State University.

Nicholls, W.L., 1988. The Impact of High Technology on Data Collection. In J. Kovar and E. Doucet (Eds.) Symposium 88: The Impact of High Technology on Survey Taking. October 24-25, 1988, Ottawa, Ontario.

The National Tour Association, 1987. Partners in Profit: An Introduction to Group Travel Marketing. The National Tour Association.