

Resource Data Management System Launched in Pacific Northwest Region

Editor's Note: Rich Winters, PNR's Associate Regional Director for Recreation Resources and Professional Services, has announced a comprehensive regional project to develop microcomputer data bases incorporating the natural resource data in each of the PNR parks. The project, developed by Gerald Wright of the University of Idaho NPS/CPSU, will be guided by a six-member advisory committee made up of park and regional office staff members, will start this spring, and will be tested first at North Cascades NP. The project, described below, is seen by Winters as having "clear management applications." Said Winters: "It will provide a link between resource management plan elements and specific data sets in a park. It will enable a manager to quickly find what data are available in any of the parks to help resolve a particular management issue such as an oil spill, erosion problem, insect infestation, etc. It will provide a lever for use in obtaining important sets of data from non-NPS sponsored research projects that are not in park files. It also will provide an opportunity to make duplicates of rare or one-of-a-kind data sets, thus aiding in their use."

By R. Gerald Wright

The proper management of the natural resources of parks is directly related to an ability to find and use information appropriate for the task. Unfortunately, recent surveys conducted in the Pacific Northwest Region have shown that most parks know little about what resource data are available, where they are stored, who collected them, and how good they are. Most parks lack the personnel needed to deal with this problem and are frustrated by a lack of knowledge of proper techniques to organize and code data, and by a lack of understanding of the types of computer hardware and software useful in managing data. The broad aim of this project is to attempt to provide solutions to some of these problems.

Data management implies the capability to uniformly store and use information in a systematic manner. Data may be stored on a computer disk, in file cabinets, or on microfilm and may be used in a variety of ways. A collection of data of a similar type gathered for a specific purpose is called a data set. A data management system makes it possible to:

1. retrieve all or portions of a given data set;
2. update, change, or delete all or portions of a given data set;
3. combine different parts of one data set or the data in several sets;
4. search and locate specific data elements; and
5. do routine arithmetic analyses on a given data set.

The objectives of this proposal are to:

1. Systematically locate and inventory the natural resource data of all parks in the Pacific Northwest Region; and then organize and summarize the characteristics of this information in tabular form in what will be called a data directory;
2. To evaluate the significance of each alphanumeric data set identified in the directory of the respective parks, and use project personnel to enter all data considered to be important to park management into a computerized data management system;
3. Using previously processed data, data to be processed by this project and data to be processed by GISFU, develop a prototype GIS of at least two parks

Table 1. Example of the structure of the data directory for a given park, and key elements in the data directory. (Keywords will be used where possible.)

Resource Category:

1. Study Number	Park unique numerical identifier for the study
2. Description of the Data	Brief description of the data set
3. Species	Major species measured (if applicable)
4. Type of Study	Indicate if it is a research, monitoring, inventory, or other type of study
5. Date(s)	Dates and seasons of data collection
6. Location(s)	Specific location(s) in the park of the study
7. Data Availability	Indicate where the data are stored, give addresses and phone numbers if available
8. Data Type	Whether data are numerical, mapped, alphabetic
9. Data Relevance	What the uses are or have been for the data
10. File Length	The number of records, elements, maps, etc. in the file
11. Reference(s)	Who collected the data, citations of any publications using the data
12. Cross-reference(s)	Indicate the numerical identification of any related studies in the park
13. Data importance	Indicate the results of an evaluation of the significance of the data
14. If and how computerized	Indicate if the data are computerized, the software used, and the format they are stored in
15. Related resource mgmt. plan elements	Indicate which elements in the resource plan the data set can be applied to

in the region.

This proposal views the establishment of a data management system as best accomplished in a decentralized manner which therefore makes each park ultimately responsible for managing its own data. It also takes an incremental approach starting at a basic level by doing an inventory and making a catalog of the data resources and then systematically building in complexity towards the development of a computerized data management system. This approach provides ample opportunity to evaluate progress at discrete time intervals and to make adjustments in procedures where necessary.

Throughout its course, this project will be guided by an advisory committee made up of selected park and Regional Office personnel who will assist in refining study methods, in evaluating the products at each step in the process, and in recommending alternative approaches where appropriate.

Objective 1. An inventory of all natural resource and visitor use data will be undertaken for each park in the region. Included will be mapped data such as

vegetation maps and trail locations; numeric data such as censuses and transect readings; alphanumeric data such as species lists, and collections such as photographs and museum catalog records. The characteristics of each of these types of data sets will then be organized and summarized in a data directory. Proposed elements of this directory along with a key to their meaning is shown in Table 1. A list of the type of data sets that would be included in the directory are shown in Table 2.

It is recognized that finding and interpreting some data sets will be time consuming and difficult. The task will require the cooperation of appropriate personnel at each of the respective parks. The inventory will be done by a team of one or more research technicians, temporarily stationed at the respective parks.

When the directory for a given park is completed, it will be published and made available throughout the region. More importantly, it will be placed in a computerized information management system. This will allow each of the fields to be searched separately, information to be combined, and appropriate sum-

Table 2. Resource categories proposed for the data directory

Categories	Example Data Sets
Atmospheric Data	Air quality, acid rain, climatic data, air pollution data
Fish and Aquatic Organisms	Food habits data, habitat use data, counts, classifications, impact studies, population data, distribution information, endangered species
Geologic Data	Paleontology, structure and stratigraphy, glacier data, lava data, cave data, mineral deposits and claims
Hydrologic Data	Water quality, snow surveys, pollution data, acidification, limnology
Soils Data	Descriptions and classifications, erosion and capability data
Terrestrial Vertebrates and Invertebrates	Distribution, food habits, counts, harvest and use, population data, classifications, endangered species
Vegetation Data	Descriptions and distributions, disease and infestations, grazing use, endangered species, frequency and cover data
Visitor Use Data	Visitation statistics demographic and behavior data, impact data

Table 3. Estimated time in months including travel time required to complete Objective 1.

Time for each park	Parks*	Total Time
.75	EBLA, FOCL, FOVA, ORCA	3
1.7	NEPE, SAJU, WHMI	5
2.3	CODA, CRMO, JODA	7
5	CRLA	5
6.5	MORA, NOCA	13
7	OLYM	7
*NPS abbreviations for PNR parks		Total 40 months

mary reports to be produced. The estimated time required to complete the first objective is given in Table 3.

Products of this objective will include:

1. A published data directory for each park with copies distributed to all other parks.

2. A computer file on a common data management system containing the information for each data directory.

Objective 2. Each numeric data set in the directory for a given park will be evaluated by the research team along with knowledgeable park and regional office personnel as to its relevance to park management. Those sets considered to be most significant will be organized in a uniform format and placed into micro-computer files using a standard data management system such as dBASE III. In most parks, some data already are stored on computer files. Where necessary these data will be converted to the chosen data management system or, if they are already in that form, they will be incorporated directly into the park's data management system. Actual data entry and verification will be carried out by CPSU personnel at the University of Idaho. This task will involve about 11 months total effort.

The principal investigator will carefully research the format used for the various data files. The intent is to make them as compatible as possible with systems used by other regions. Contacts will be made with parks, national forests, and others involved with resource data base design and implementation.

Products of this portion of the study will include:

1. The establishment of a common data management system for the region and a report discussing its use.

2. A set of floppy disks (or equivalent) for each park containing all numeric data considered to be useful to management along with a report describing the contents of each disk.

3. A duplicate set of all data for all parks to be supplied to the Regional Office or other suitable repository.

Objective 3. The final objective is intended to be

a prototype effort and the techniques learned will be used to develop GIS for other parks. In part this objective is contingent on technologies that are only now being developed. For example, recent hardware acquisitions by the NPS Geographic Information Systems Field Unit (GISFU) should allow parks more easily and cost effectively to use this facility for remote processing of geographic data. Concurrently, technological developments also are making it possible to run NPS GIS software such as SAGIS on specially equipped 32 bit microprocessors. The budget calls for the acquisition of such a machine and associated peripherals to explore this possibility.

A combination of such approaches should ultimately permit parks to more easily develop and use their own GIS. Some parks in the region already have geographic data that have been processed by GISFU that can be incorporated into such a GIS. Part of the funds allocated for this project will be used to help GISFU to acquire, digitize and process additional geographic data for selected parks. The choice of the test areas to be included in this effort will be made with the guidance of the advisory committee. It is estimated that this task will involve 15 months effort.

Products will include:

1. Development of a functional GIS for at least two parks.

2. A report evaluating the feasibility of the techniques and hardware used in this project along with recommendations for future action.

The success of this project will depend in large measure on the cooperation of the personnel, particularly in resource management and science, in the respective parks. Assistance will be needed for example to help locate and interpret the various data sets. A commitment to the project goals from those individuals serving on the advisory committee will also be necessary for the project to succeed. Work space will be required in each of the parks for CPSU personnel for periods of from one to seven months.

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