

RESOURCE INFORMATION TRACKING SYSTEM (RITS)

Preliminary Functional and Data Requirements Document

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BACKGROUND AND OBJECTIVES

The Natural Resources Management Division (NRMD) and the Cultural Resources Management Directorate (CRMD) are responsible for guidelines and standards relating to servicewide planning and management functions for natural and cultural resources within the National Park System. That these resources constitute the very basis for the existence and value of the National Park units, makes their wise and effective management imperative. Current and future generations would have no reason to visit and appreciate the Parks should deterioration or destruction of these resources occur. To assure the wise management of park resources and to meet the challenge of increasing threats to resource quality, park managers must make professional decisions based on current information and state-of-the-art techniques for natural and cultural resources management activities.

RESOURCE MANAGEMENT PLANS

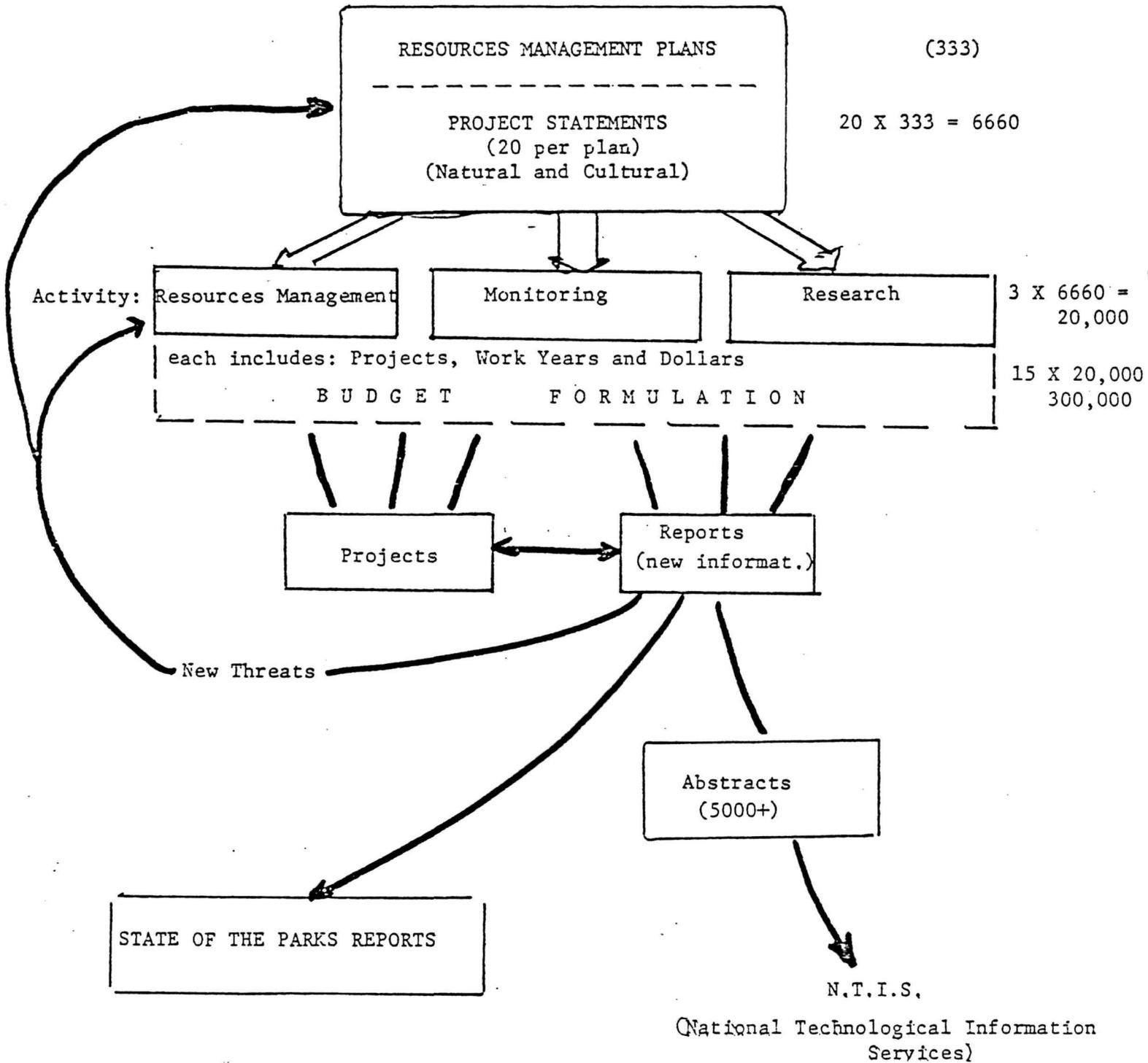
Resource Management Plans (RMP's) perform a critical role in natural and cultural resource planning in the National Park Service. An RMP, prepared by each park Superintendent and his/her staff, identifies a strategy for restoring and/or maintaining the quality of the park's natural and cultural resources. At the core of an RMP lies a series of projects statements which define ongoing resource management projects or other

special resource issues requiring attention. Within these project statements, one or more management, research, or monitoring activities are outlined to accomplish the project's objectives (Fig. 1.1). For each activity, the plan includes a priority ranking assigned by the Superintendent, a five year cost and personnel projections. These five year programming requirements enable the Service to project the funding and personnel necessary to accomplish the specific objectives of the projects and activities. When the park completes the plan, the Superintendent submits it to the Regional Director for review and approval.

Ideal resource management planning is characterized by being both comprehensive and dynamic. RMP's, then, should include projects and activities for all ongoings and special efforts which involve resource impact or manipulation. In addition, to ensure the vitality of a plan, the park Superintendents submit annual RMP revisions. These revisions report the progress made in accomplishing specific project objectives and update project and activity goals, priorities and five-year projections. Some projects and/or activities might be added while others might be reported completed in order to reflect the evolving resource management requirements. As with the original RMP's, the Regional Director has the responsibility for revision approval.

Resource Management Plans currently serve several useful functions. First, they provide an organized framework for addressing the diverse

Figure 1.1 N.P.S. RESOURCES MANAGEMENT PROGRAM



natural and cultural resource management concerns facing park managers. In addition, an RMP formally conveys the resource issues and their relative importance in a particular park to the Regional Office. Furthermore, should the Superintendent or other key resource manager transfer, the RMP furnishes a means for quickly communicating resource issues and strategies to new employees while ensuring a consistent resource management program.

In addition to these benefits, the resource management and planning process has the potential to serve one other extremely important function. It would be most valuable for a manager or researcher with a particular resource management interest to learn about the experiences of managers and researchers in other parks having similar concerns. For example, suppose a Resource Management Specialist has a problem involving the invasion of an exotic tree into a pristine natural area. Knowing what other parks have experienced problems with the species, what techniques they used to inhibit or reverse the invasion (and with what success), what monitoring programs have indicated about its spread, etc. could help this Specialist formulate a strategy for handling the problem in his/her own park.

Easy access to information regarding such proposed, currently active, or completed resource management activities would help ensure the most efficient allocation of limited personnel and financial resources. Managers could apply techniques that have worked well in other parks

while at the same time avoid employing those that have not proven effective elsewhere. In addition, investigators are more likely to design research strategies to complement rather than duplicate other completed and ongoing efforts.

Unfortunately, obtaining such information would currently prove most difficult. Although RMP's do address the projects and activities proposed in parks, they do not always include specific details regarding the techniques, results, and success of these efforts. Even if they consistently contained such detail, thoroughness would dictate reading through every RMP, and parks do not generally have a copy of every other park's RMP. Furthermore, if RMP's were readily available, reading through over 300 of them would require a prohibitive amount of time. Although the details of RMP activities represents a tremendous amount of potentially useful information, the net effect is that presently this information is largely inaccessible to the resource manager in the field.

Besides RMP projects and activities, other potential sources of resource management information exist. Although conscientiously-developed RMP's will account for most NPS undertakings affecting resources, certain unplanned activities must be performed to address unanticipated problems that arise. In addition, a number of outside investigators perform resource-related monitoring and research in the parks without receiving NPS funds (e.g. graduate students conducting thesis research). The objectives, techniques, and results of these ad hoc efforts

might interest NPS managers and investigators with similar concerns. As with RMP data, however, information regarding these NPS-independent and unplanned NPS-conducted activities does not exist in any easily-retrievable format. Although some outside investigators wishing to remove rocks, plants, animals, etc. from a park must apply for a Collection Permit, records of such permits are decentralized and not readily accessible. Furthermore, they fail to capture information about projects that do not involve the physical removal of a resource from a park.

Up to this point, the existing limitations regarding information transfer have been considered from the standpoint of field personnel. Regional and Washington office employees, however, do not fare significantly better. The ability to identify, tabulate, and summarize resource-related activities would allow determination of issues and trends that merit servicewide and/or regionwide attention. Viewing management and research efforts from a multiple-park, regional, or servicewide perspective can assist in determination of overall priorities and encourage a more broadly balanced and efficient distribution of resource management efforts. An efficient mechanism to permit these broader perspectives does not now exist.

SYSTEM OBJECTIVES

The lack of adequate information transfer described above constitutes a serious impediment to NPS efforts towards reaching its greatest potential in resource planning and management. The primary goals of the proposed Resource Information Tracking System (RITS), then, are to increase access to resource management information and, through this increased information flow, to enable sounder planning and management decisions.

Records of research, monitoring, and management activities reflected in RMP's, performed to address the needs of unplanned situations, and accomplished in the parks by NPS-independent investigators can constitute a significant information base for contributions to NPS resources management. With the establishment of a computerized database recording such efforts, information flow among the parks, regional offices, and Washington office will improve tremendously. The Resource Information Tracking System will, among other things:

- provide the means to systematically document natural and cultural resource management, monitoring, and research activities that occur in National Park units through all stages of conception, implementation, completion, and project reporting.
- retain information on unplanned activities, that is, those activities initiated that have not yet been addressed in an RMP, and those conducted by non-NPS investigators without NPS funding.

- quickly provide resource managers with information about the techniques applied, degree of success, responsible individuals, subsequent publications, etc. for the RMP and other resource activities relevant to a particular resource problem or issue.
- help prevent unnecessary duplication of research or repetition of unsuccessful management techniques.
- reduce the need for paper data storage.

PROPOSED SYSTEM

The system discussed below has been proposed to accommodate the aforementioned goals of RITS. It will be described in terms of its general features, general data requirements, the flow of information, and the various impacts resulting from implementation and operation.

GENERAL FEATURES

As previously mentioned, the most serious limitation of existing resource management procedures is the inability to quickly determine the nature of others' work in a particular resource area. The most important feature of RITS, then, will be a conversational, easy-to-use database query facility. This facility will allow users to quickly access and report information relevant to RMP and other resource activities. Keywords, much like those used in automated bibliographic systems, will provide a basis for directing these interactive queries. Additional features will include:

- computerized storage of data from RMP and other resource-related activities that occur in NPS units. Bibliographic abstracts of reports and publications resulting from these activities will also be stored.
- an interactive data entry facility that permits periodic database updates to reflect: the annual RMP updates; data contained on RAP Applications and Reports; and additional abstracts relevant to resource activities.
- several annual reports that tabulate and summarize resource management on regional and servicewide bases.

GENERAL DATA REQUIREMENTS

Three logically-grouped categories of data are anticipated. The following pages consider the purpose and general characteristics of each category. The next chapter and Appendix 1 contain more specific details regarding data elements.

RMP Data

RMP's contain a series of project statements which describe objectives related to ongoing resource management functions or particular resource problems. Each project will include one or more research, monitoring, or management activities that outline the specific efforts designed to accomplish the projects' objectives. Automated data storage for projects and activities will represent a succinct image of the information contained in the RMP's for these projects and activities. This data will include titles, objectives and categories for both projects and activities. Additional data for activities will represent their status, cost and personnel requirement projections, and keywords that will serve as the basis for the interactive data queries.

Resource Activity Permit (RAP) Data

All resource research and some monitoring activities will require a permit approved by the Superintendent. In addition, the

NRMD and CRMD have expressed a desire to leave open the possibility of defining certain circumstances under which management activities will also require a permit. Whatever the type of activity, the permits will apply to both planned (in an RMP) and unanticipated efforts conducted by either NPS or non-NPS personnel. A modification and combination of the existing 'Collection Permit' and 'Investigator's Annual Report' (see Appendix 2) will serve as the vehicle for such a 'Resource Activity Permit' (RAP) that will contain three parts -- the RAP Application, the Permit itself, and the RAP Report.

The RAP Application will provide information on the investigator, the purpose of the project, methodology, and time frame. Park personnel will prepare the Permit and indicate an expiration date and any restrictions. Investigators and park staff will jointly complete the RAP Report at the end of the field season to provide such information as activity accomplishments, dollars expended, and management implications.

A one-to-one correspondence will exist between fields on the RAP and those contained in computer storage. Data entry will occur twice in a given year -- once after the superintendent issues the Permit and once upon completion of the RAP Report. Although the investigator will have to apply for a new Permit and deliver a new RAP Report for each year an activity continues, a single RAP record will suffice for data storage. If an activity requires more than one

season to complete, data entry personnel can simply update the record in the second and following years.

Bibliographic abstracts

Any written report or published article relevant to some specific activity described by the Resource Activity Report might constitute a valuable source of information to an investigator or manager interested in a similar issue. References to such reports will be stored in a database and their input can occur concurrent with RAP Report data entry. Data elements will represent typical bibliographic information such as author(s), title, year of publication, source, and a brief narrative summary of the report's content.

An initial load of abstract data could come from the Investigator's Annual Report submitted over the past several years. Some of the data (covering calendar year 1977) had already been automated and exists on computer tape. The remainder (1978 to 1981) resides in paper files.

RITS INFORMATION FLOW

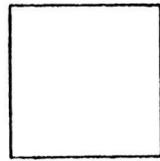
The following pages contain descriptions and diagrams that outline the anticipated flow of information through RITS and to and from its users. Before discussing the specifics of the individual procedures, the symbols used in the diagrams will be explained.

Figure 2.1 constitutes a legend for these symbols. Squares represent individual or organizational entities that send and/or receive information from other individuals or the computer. A square, then, might represent a resource manager, superintendent, regional office, etc.

Arrows indicate information flow (either physically or electronically) and its direction. A park may mail an RMP, for example, or a computer program may retrieve data from a magnetic disk.

Cylinders indicate some sort of computer-compatible storage device such as magnetic tape, disk, or punched cards. In order to simplify the diagrams, some non-computer information storage has not been displayed, but it is important to remember that such storage exists (e.g. paper files, copies of publications, etc.).

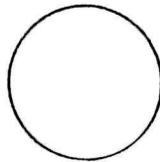
Finally, computer software or programs are displayed as circles.



INDIVIDUAL OR NPS
ORGANIZATIONAL UNIT



COMPUTER STORAGE



COMPUTER PROGRAMS OR PROCEDURES



DATA (INFORMATION) FLOW

FIGURE 2.1 SYMBOL LEGEND

Initial RMP Data Load (Figure 2.2)

The NRMD and CRMD have been reviewing and will continue to review currently existing RMP's for consistent interpretation of the guidelines for their preparation. Based on these reviews and requirements related to RITS, these divisions will update and clarify the existing guidelines. The initial data entry can occur after the parks complete RMP updates based on these revised instructions.

In order to best insure uniformity in the initial database, NRMD and CRMD will supervise the initial data load. Under this supervision, the actual coding of the data might be performed by a contractor or by student interns. Perhaps the best arrangement would enable a representative from each regional office to work with the NRMD and CRMD. By spending the first week or two of data entry in the Washington office, these representatives could develop an understanding of the nature of the consistency needed for the entered data. At the same time, any confusion resulting from the data entry requirements could be addressed in person, avoiding the delays and difficulties inherent in telephone consultations. In addition, distribution of effort among the regions will allow more personnel to engage in data entry activity and, hence, reduce the time required to make RITS fully operational. Finally, regional office personnel constitute the logical individuals

for contacting parks within their region to gain clarification
of ambiguous or improperly-completed project and/or activity statements
contained in a particular RMP.

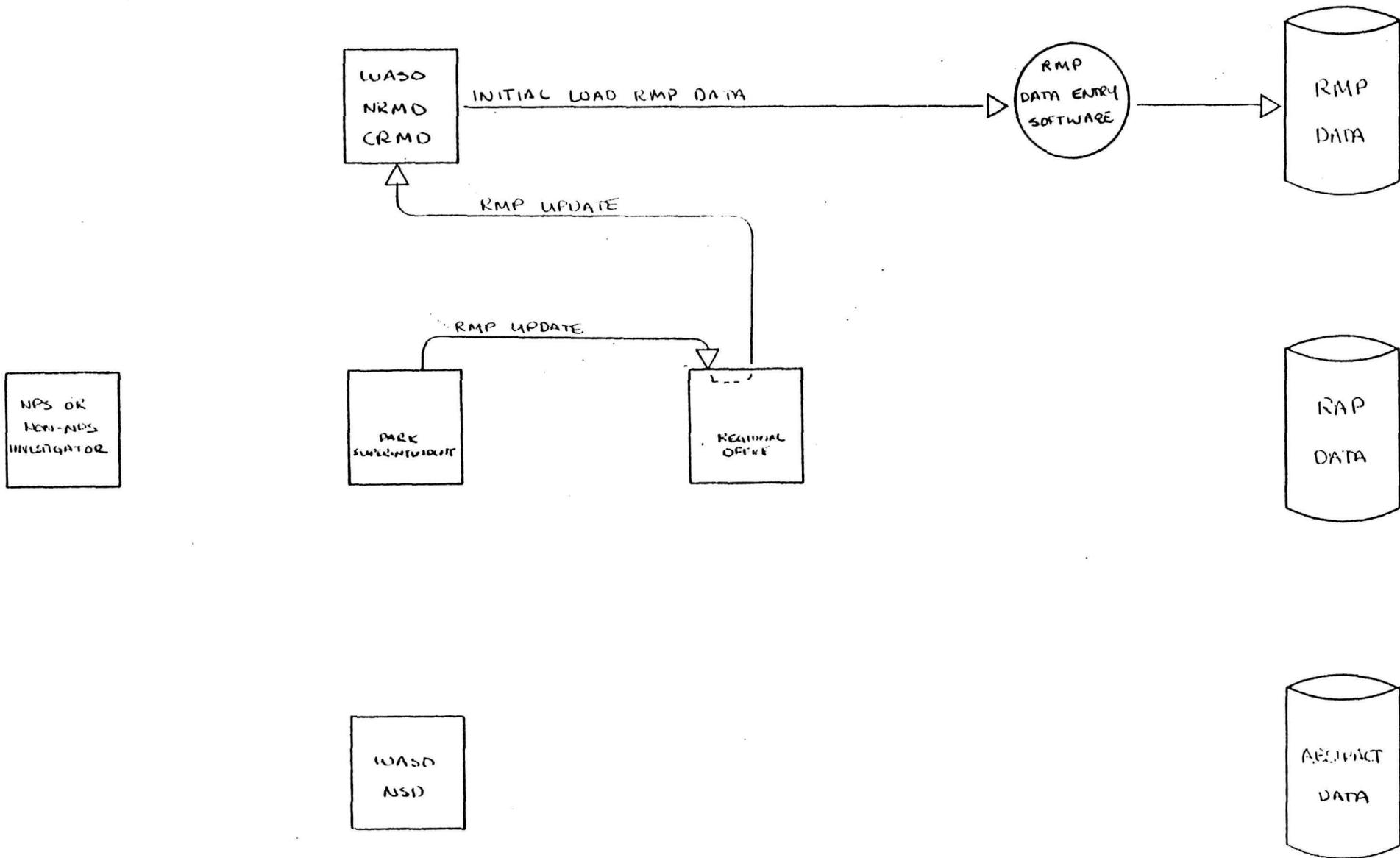


Figure 2.2 Initial load of RMP data

RMP Updates (Figure 2.3)

Park superintendents prepare RMP updates annually and transmit them to the pertinent regional office. As responsibility for approval of the updated plans lies with the regional director, the regional office constitutes the logical location for RITS data entry procedures to reflect the changes. Updates will consist of adding new project statements and/or activities and changing information for existing activities such as funds expended, anticipated future personnel and financial requirements, and current status. An interactive, screen-formatted data entry program with rigorous field validity checking will best accommodate these requirements.

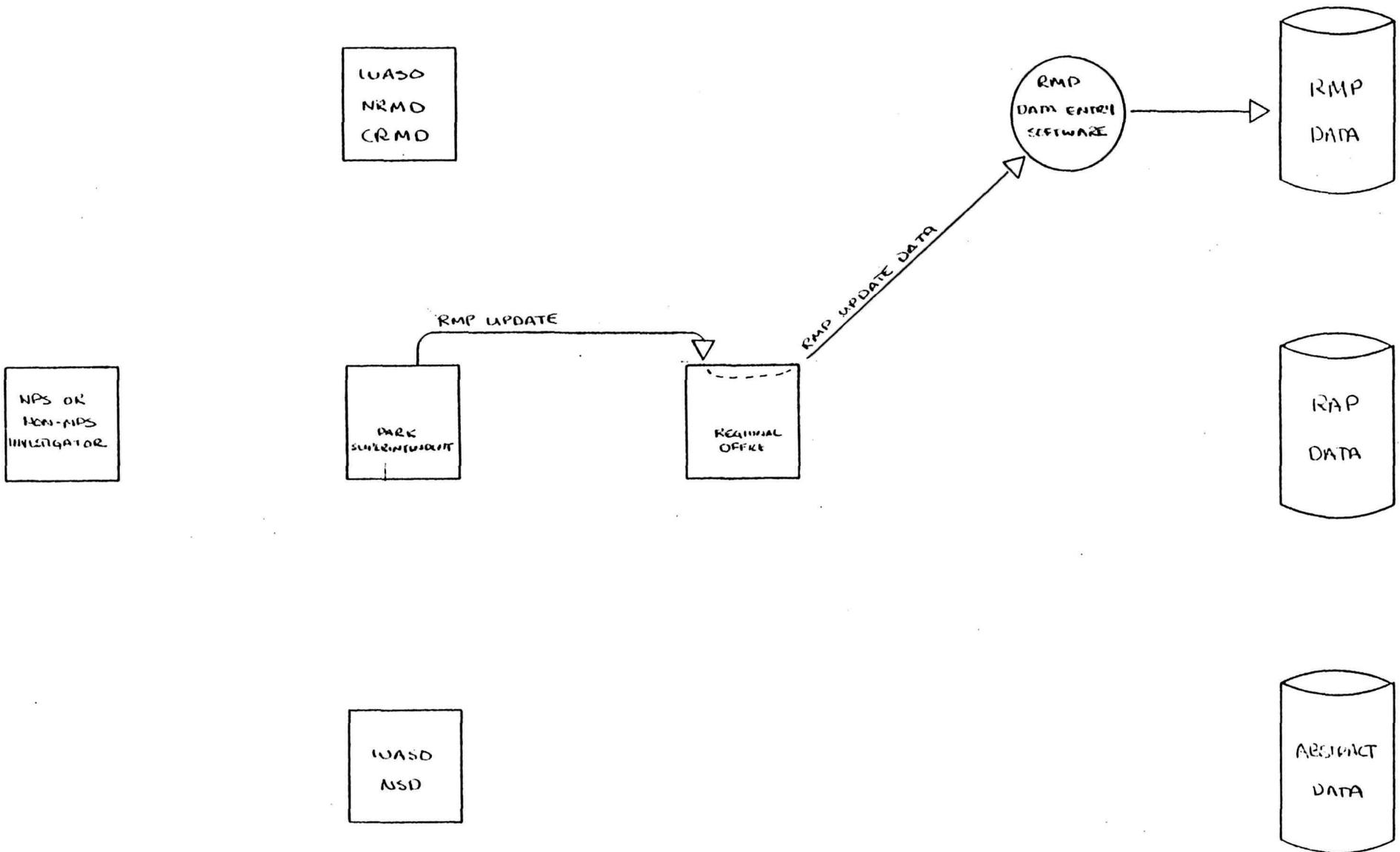


Figure 2.3 RMP updating

Initial load of existing abstract data (Figure 2.4)

The Natural Science Division (NSD) has expressed an interest in loading abstract data from Investigator's Annual Reports. Although most of the data resides in paper files, the data for 1977 exists on computer tape. As the Investigator's Reports generally have been filed for continuing as well as completed work, NSD will select some subset of the existing data which pertains to completed efforts.

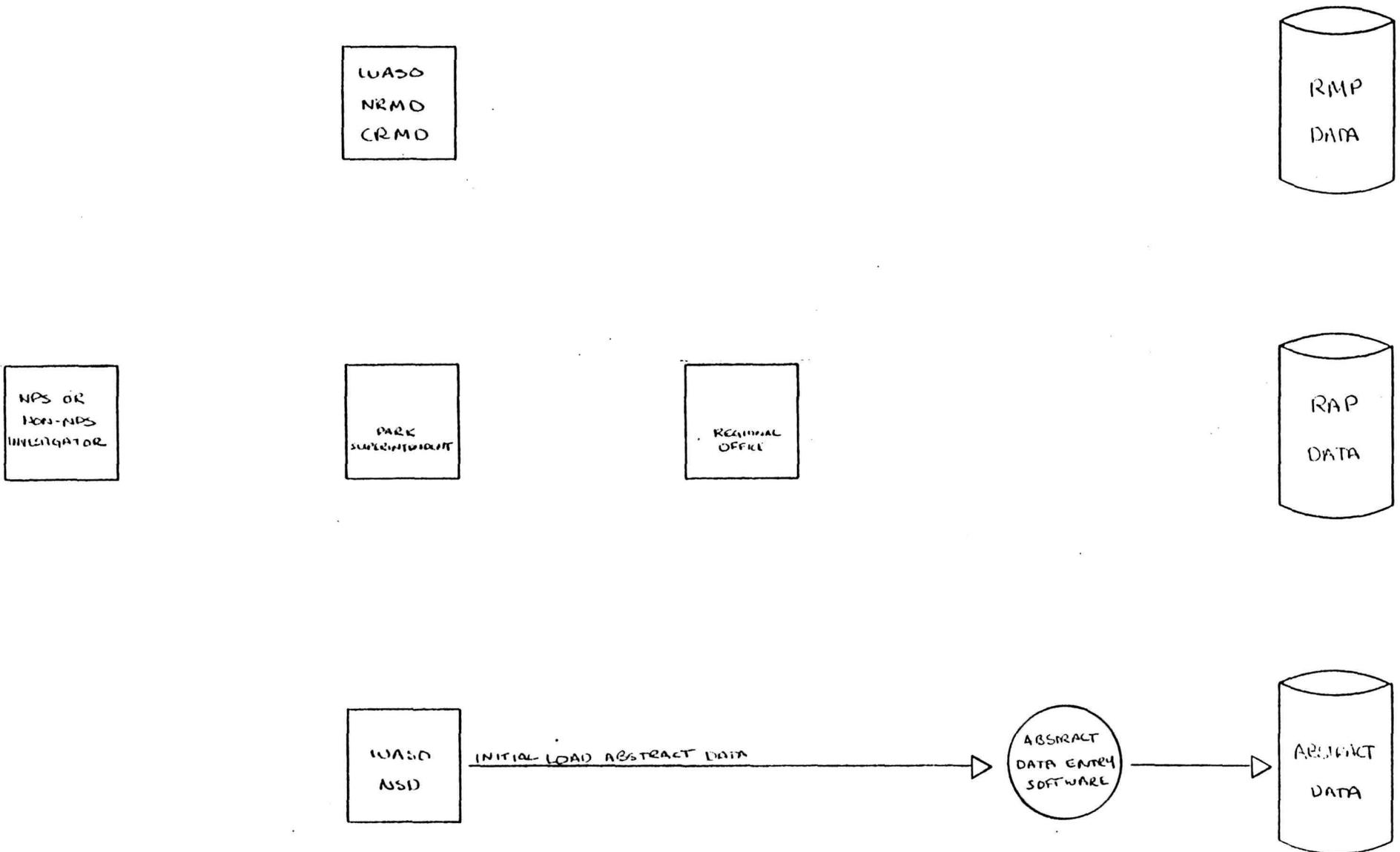


Figure 2.4 Initial load of abstract data

Resource Activity Permits (Figure 2.5)

Individuals wishing to perform research and monitoring activities in the parks will submit a RAP Application to the superintendent.* If the superintendent approves the application, he or she will then return an approved Permit to the applicant and forward a copy of the application to the regional office for data entry.

Investigators will prepare RAP Reports at the end of each field season and submit them to the Superintendent. Again, the Superintendent will forward a copy of the Report to the regional office for data entry.

* In cases where the activity involves endangered or threatened species, the Regional Director must provide final approval. In such case the Superintendent forwards the application to the regional office and, if approved, the regional office returns the Permit to the park for distribution to the investigator. In addition, some cultural resource activities will require an Antiquities Act permit approved by the Regional Directors. These exceptions to the normal procedures will occur quite infrequently, however, so the extra paper flow has been ignored in Figure 2.5.

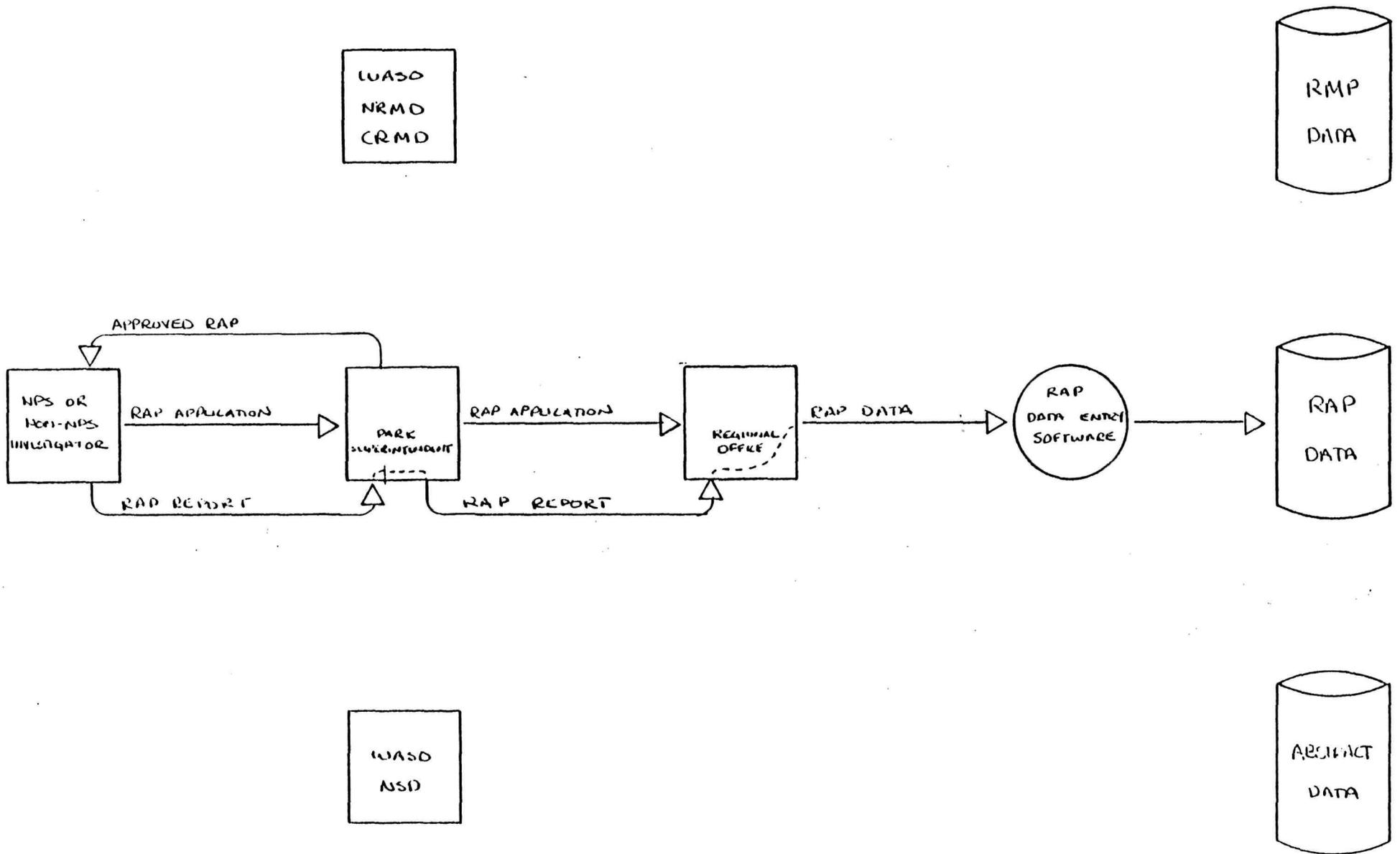


Figure 2.5 Resource Activity Permit

Abstracts (Figure 2.6)

Investigators will supply superintendents with bibliographic abstracts of completed reports and publications. These abstracts will often accompany RAP Reports but, for technical and popular publications, may not arrive until a year or two after an activity's completion. In any case, Superintendents will forward all abstracts received to the regional office for data entry.

RITS System Inputs (Figure 2.7)

Figure 2.7 represents a compilation of Figures 2.3 thru 2.6 and indicates the flow of all information relevant to all database input.

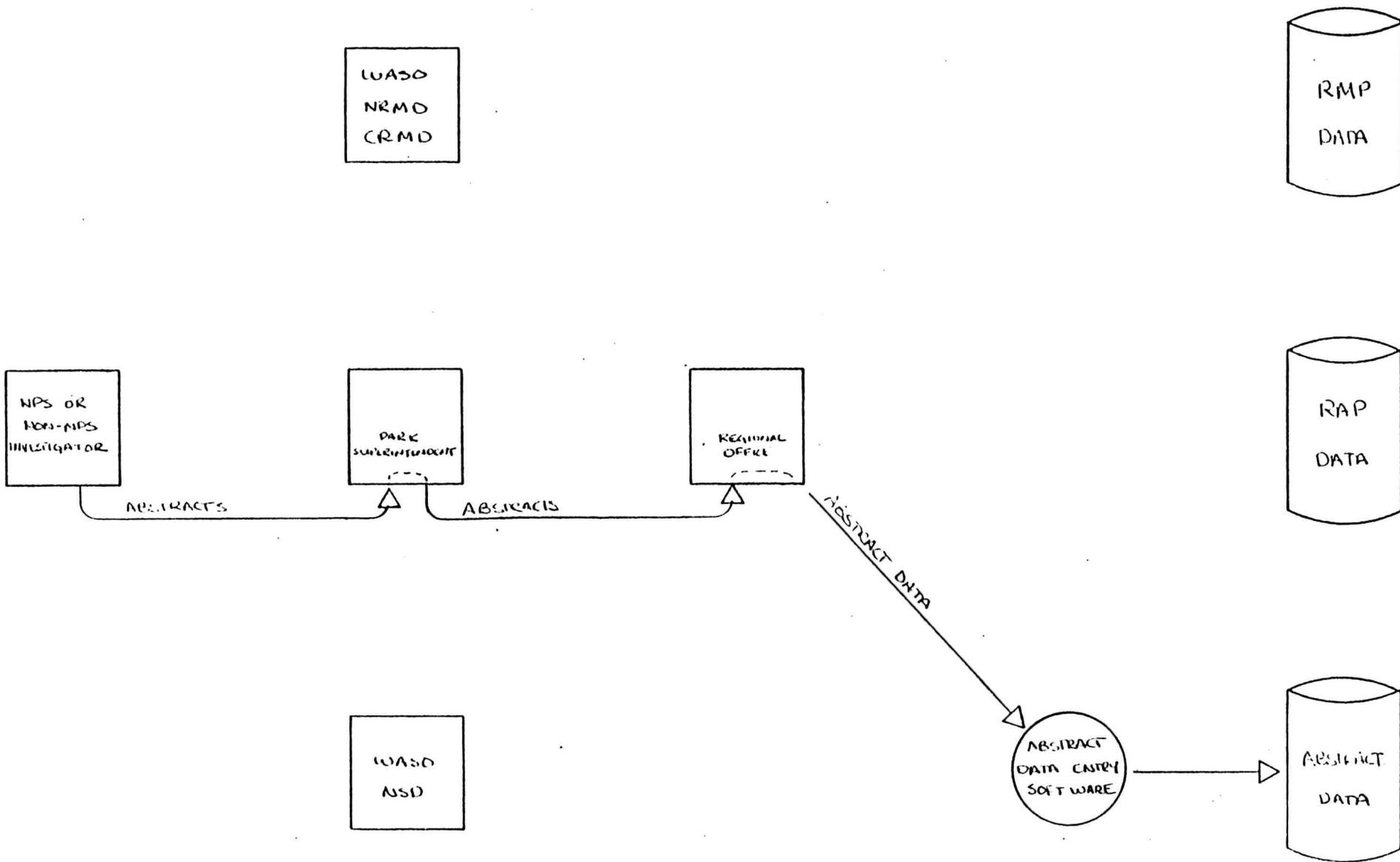


Figure 2.6 Abstracts

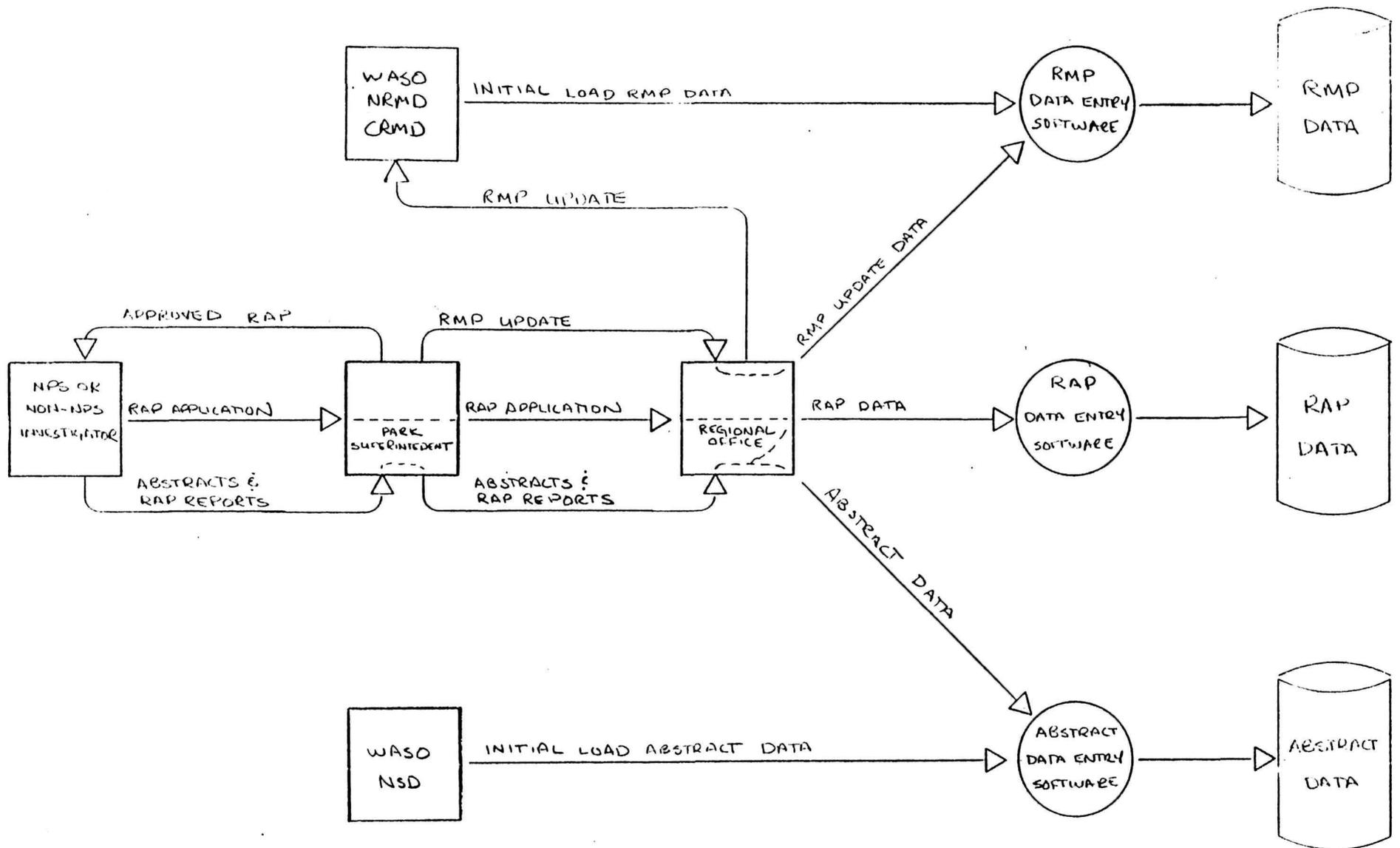


Figure 2.7 RITS system inputs

RITS System Outputs

For clarity, the categories of RITS data (RMP, RAP, and Abstracts) have heretofore been represented separately on the diagrams. As standard and ad hoc report requirements are likely to involve links between these groups of data (whatever their implementational structure), they will be represented as a group in this consideration of system outputs.

Two types of system output will occur - standard, fixed-format reports required in such frequency as to merit pre-programmed report software; and, ad hoc reports produced to satisfy some unique informational needs. All NPS organizational levels are expected to require both types of these reports so all will need access to software to accommodate these needs (see Figures 2.8 and 2.9). Both batch and interactive report requests need to be accommodated. Line-formatted interactive reports are recommended to enable users with relatively unsophisticated computer terminals to access the data.

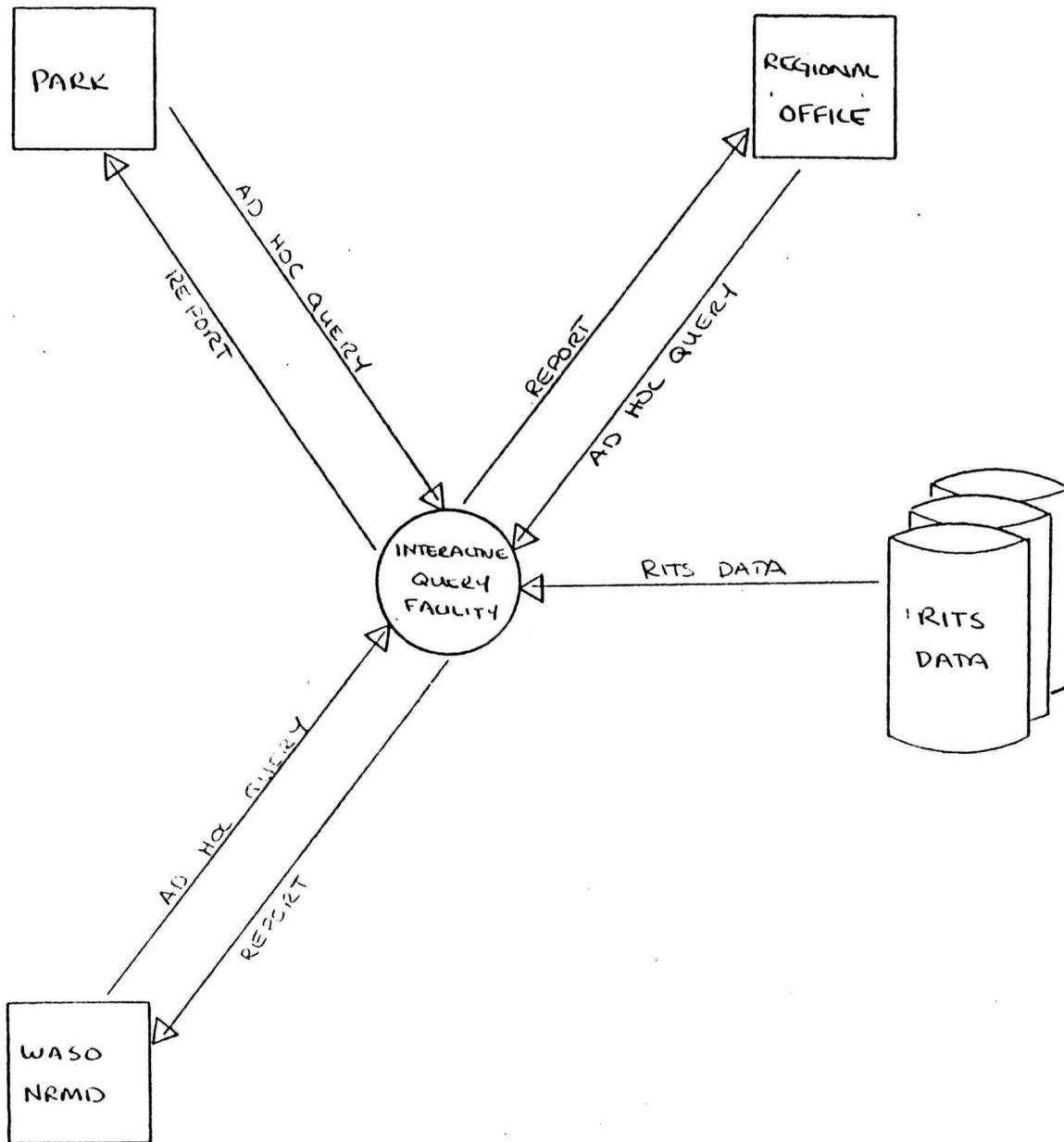


Figure 2.8 AD HOC QUERYING

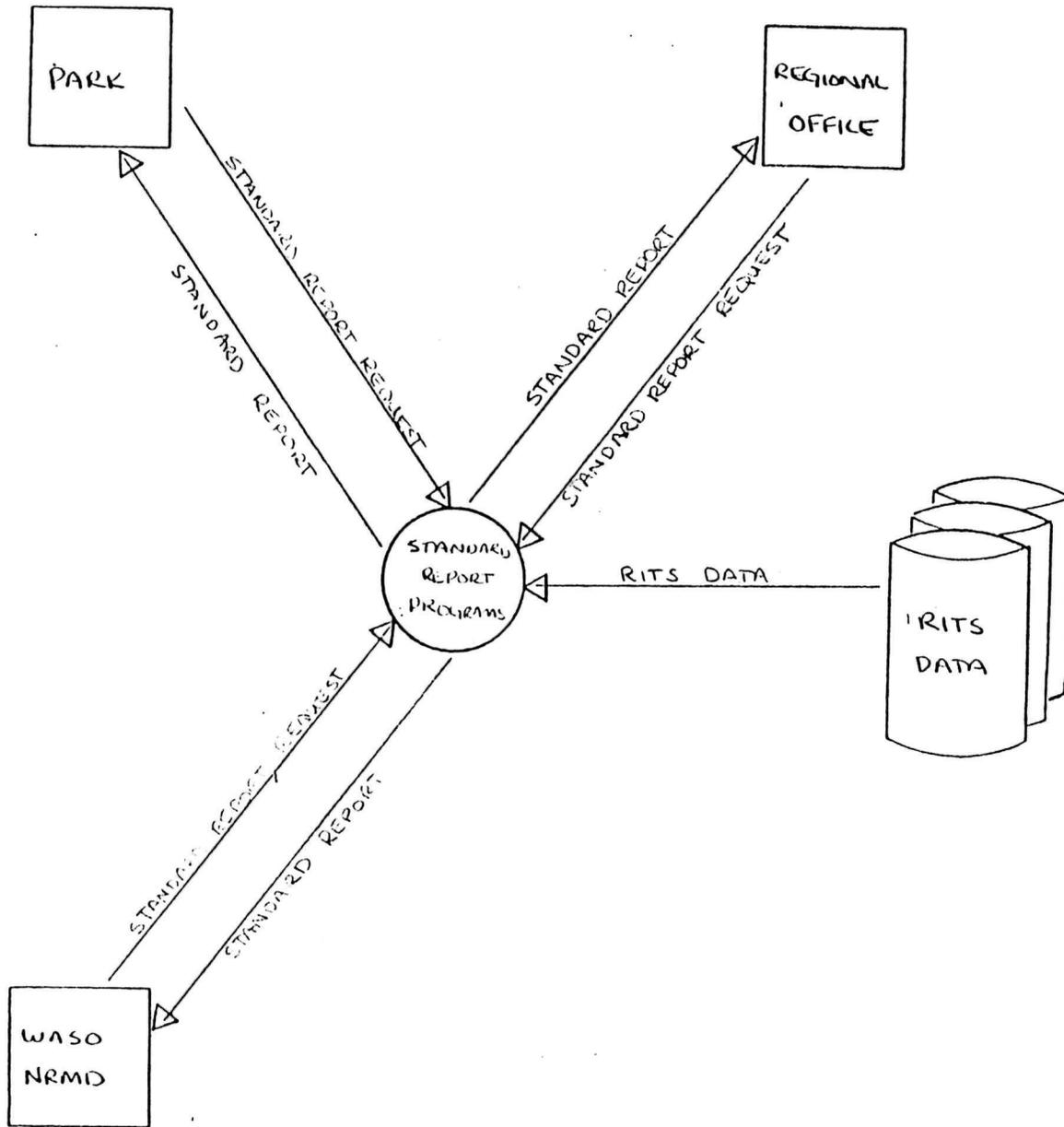


Figure 2.9 STANDARD REPORTS

RESPONSIBILITIES

The ultimate effectiveness of RITS will depend primarily on the quality of the information provided by and available to individuals and organizational units considered on the preceding pages. Each participant in the resource planning and management process, then, must assume the responsibility for providing complete and accurate information in a timely manner. An itemization of the specific responsibilities of the principal participants follows and includes consideration of both automated and manual functions.

NPS and Non-NPS Investigators:

- will apply for a Research Activity Permit (RAP) before beginning research and monitoring activities and will reapply for a new Permit for each year the study remains active. *
- will provide a RAP Report each year a permit is issued.
- will furnish bibliographic abstracts of reports and publications directly resulting from the work performed in a particular activity.

* Those monitoring programs documented within RMP's, considered part of the regular resource management schedule and performed by NPS personnel will not require permits.

Superintendents:

- will prepare RMP updates compatible with RITS-related guidelines.
- will approve or disapprove RAP applications and forward copies of completed RAP's to the regional office.
- will prepare, and submit to the Regional Director, annual RMP updates to reflect the parks' evolving resource management needs.
- will review RAP Reports, utilize the information supplied when revising RMP's, and forward copies of RAP Reports to the Regional Office for data entry.

Regional Directors:

- will review and approve or disapprove the RMP updates supplied by the Superintendents.
- will provide staff support for data entry of approved RMP updates, RAP's, and Abstracts.

Natural Resources Management Division
and Cultural Resources Management Directorate:

- will review existing RMP's and modify existing guidelines for their preparation. These modifications will promote a uniform understanding of the information required for more effective and comprehensive resource management programs.
- will supervise the initial load of RMP data whether that load is performed by student interns, a contractor or regional office personnel.
- will develop (with input from each regional office) and maintain a list of keywords that will guide the selection of particular RITS information for reporting in the interactive query sessions.

Data Systems Division:

- will furnish the technical support necessary to maintain the software developed.
- will regularly backup the database(s) developed.

IMFACTS

Although the implementation of RITS will entail procedural, personnel, and equipment impacts, it will also yield a significant improvement in the amount and quality of information available and used for NPS resource planning and management. The following pages consider both these positive and negative impacts.

Impacts of information transfer

The most important benefit of RITS is the availability of a massive amount of information previously limited to a few individuals and offices. The abundant reports and publications already completed on hundreds of natural and cultural resource topics will become accessible to RITS users servicewide. In addition, new reports relating to park resources will be continuously added to the abstract database. Additional information about the more than 13,000 ongoing and anticipated projects, including management, monitoring, and research activities, will become readily available as well. The use of this new data should reduce redundancies in expense and effort. Furthermore, the readily accessible information on natural and cultural resources will permit managers to make decisions faster and with greater confidence.

Although the primary use of RITS will involve resource manager's and researcher's ad hoc queries for information concerning resource issues, the system will also produce summary reports useful at the

regional and Washington offices. As an example, RITS will provide the data required to compile the Park Service's response to the National Science Foundation's Annual Survey of Federal Funds for Research and Development.

Developmental impacts

Two types of developmental impact will occur. First, guidelines for RMP preparation will require modification to accommodate RITS data requirements. Another, more serious impact will involve the effort required to load the initial RMP database. Each RMP contains approximately 40 project statements that consider an ongoing program or special problem and a series of activities directed towards accomplishing the project's objectives. The activities include resource management underway and/or planned, monitoring by park personnel or outside scientists, and research studies underway or planned to provide information useful for decision-making. These descriptions address the objectives, techniques, timeframe and other pertinent information. Given the volume of this information, data entry for one plan will require an estimated four to seven days. For 333 parks, this would entail 1300-2300 work days, not an insignificant task. Although a contractual arrangement may most quickly fulfill this requirement, the participation of the regional office staff deserves particular consideration, as previously discussed. Whoever performs this initial

load, a considerable personnel and/or financial impact must be anticipated.

Procedural impacts

Procedural impacts stem from the increased obligations resulting from the addition of abstract reporting and from the broadening of the Collection Permit into the Resource Activity Permit, but the NRMD expects such impacts to be minimal. With RAP's, both NPS and non-NPS investigators will need permits for all research and most monitoring activities. This will probably result in an increased number of permit applications processed. Furthermore, the third part of the Resource Activity Permit (the RAP Report) will necessitate a broadening of the information currently supplied on the Investigator's Annual Report. In addition to requiring the investigators to provide additional information, some NPS personnel will now also have to supply this information (originally only required of researchers).

Study abstracts, submitted as part of the RAP reporting process, will also require an increased emphasis. Abstract preparation, distribution, and data entry will impact the investigator, the park staff, and regional office data entry personnel, although this impact is expected to be relatively small.

The negative impacts of abstract and RAP reporting requirements

will be largely offset by the elimination of the Annual Investigator's Report and the Superintendent's Annual Research Report, tasks that require a considerable amount of effort each November through January. RMP, RAP, and Abstract data will be immediately available through the RITS database interrogation facility.

Personnel responsibility and training

A previous section outlined the specific responsibilities for individuals in various positions. The following list details which of these responsibilities represents changed demands for the individuals involved.

- Expanding the requirements for a Resource Activity Permit to include all research and monitoring activities will require most NPS personnel to begin obtaining permits.
- NPS and non-NPS investigators will now have to submit RAP Reports in place of the Investigator's Annual Report.
- Superintendents will have to review more permit applications and will also have to allocate staff resources to process more information flow from the increased number of permits and the addition of RAP Reports and abstracts. As previously mentioned, however, they will benefit from the automation of the Superintendents Annual Research Report.
- The various data entry functions (i.e. for RMP updates, RAP applications and reports, and Abstracts) will demand a fairly significant amount of Regional office staff time.

In addition to these impacts, successful operation of RITS will depend, among other things, on the ability of RITS users to easily and

accurately interrogate the databases and perform data entry, if appropriate. While conversational, 'user-friendly' software will contribute much towards this end, some training will undoubtedly be necessary. Regional office personnel will require instruction about RIIS data entry and users at all levels would benefit from a workshop aimed at efficient and accurate database interrogation. It is anticipated that regional office personnel will attend a training session for data entry in the Washington office. Database interrogation workshops will probably occur in each regional office.

Equipment impacts

Details regarding the frequency of data entry and querying as well as the volume of data storage is discussed in a later section. Although an exact quantification of these requirements can, at best, be only roughly estimated, the demands in terms of both data storage and processing time are not trivial.

In addition, seasonal processing merits consideration. Although database interrogation queries and data entry for RAP's and Abstracts will occur throughout the year, RMP data updating will occur primarily between October 1 and January 1.

One other equipment consideration concerns the terminals used. Although the querying facility design (i.e. line-formatted) should

function on most types of terminals, the plans for screen-oriented data entry dictates the location of identical system-compatible terminals in the regional offices.

SYSTEM REQUIREMENTS

FUNCTIONS

Data storage

An earlier section defined three logically-determined groups of data. RITS must contain a suitable database or multiple database structure that preserves the logical relationships of these groups and the specific data elements within them. This structure must allow for simple yet efficient data retrieval and accommodate keyed access obviating the need for serial reads (sequential scans). In addition, the desirability of codifying several variables dictates a decoding facility, preferably handled by the database system rather than through hardcoding individual application programs.

Data entry

The following types of data entry will occur:

- RMP initial load and update
- Resource Activity Permit (RAP)
- RAP Report
- Abstracts

While RMP updating will probably occur independent of the other types of data entry, it is quite likely that RAP Report and Abstract data entry for a given activity might occur at the same time. Furthermore, it is conceivable that an investigator would submit a new RAP application at the same time she/he furnishes the previous year's RAP Report. A flexible RITS design, therefore, will enable data

entry personnel to quickly shift back and forth between different types of entry.

All data entry will require formatted-screen procedures which include some field validity checking.

Structured conversational database interrogation

As previously mentioned, the most important application of RITS information will involve a conversational, user-friendly database querying facility. This facility will guide the user through selection of records and provide a choice of one or more output formats. The selection criteria will be driven by a specification of some combination of keywords, NPS regions, park codes, and fiscal years. The user will have the option of having the reports printed at the terminal or directed to a high speed printer (especially useful for queries involving the selection of many records).

Other outputs

Several reports may be produced annually that summarize and tabulate information pertinent to the projects, activities, permits, and abstracts contained in the system. These reports will occur infrequently, however, relative to the structured conversational facility.

Finally some of the more knowledgeable users of RITS will employ the database management system's user language to interrogate the database(s) for more complex and ad hoc reports. Again, such use should represent an insignificant portion of the overall volume of RITS functions.

DATA REQUIREMENTS

Figure 3.1 exhibits a general conception of the three logical groups of data outlined in preceding sections. The diagram displays the linking data elements that reflect relationships between records found in each logical group. Collection of data elements has not been meant to suggest a specific database structure for implementation but does indicate the logical relationships to be preserved. A more detailed consideration of the individual data elements occurs in Appendix 1.

To determine the probable number of records in each group, certain underlying estimates regarding the frequency of certain events has been necessary (Table 3.1). Based on these estimates and subsequent calculations, Tables 3.2 and 3.3 project the number of records in each data group. Note that as many of the RITS procedures do not currently have pre-automated counterparts, many of these estimates have had to be partially based on intuition.

Table 3.2 considers the initial load of data from existing sources. For these estimates, RMP data has been subdivided into projects and activities and the table also reflects the anticipated load of existing abstracts. Table 3.3 lists the expected annual increase in records in each of the different groups based on the estimates in Table 3.1 and an assumption of 333 parks.

Figure 3.1 Logical data groups and their links

* Indicates the field or group of fields may repeat.

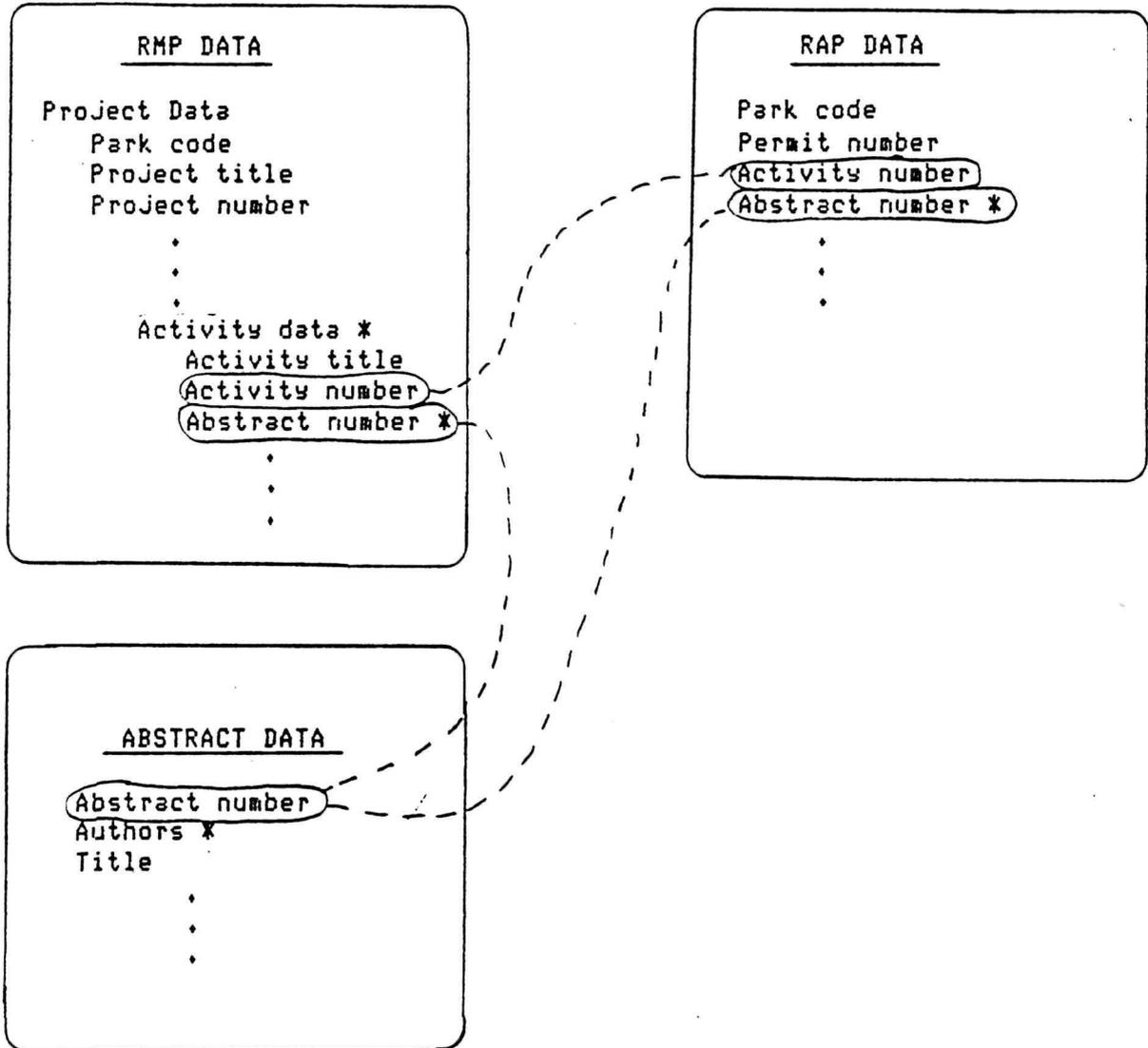


Table 3.1 Estimates of resource activities affecting
RITS data entry requirements

	Number -----
Number of cultural/natural resource projects in initial RMP load	6500/6500
Number of cultural/natural activities per project	2/5
Number of cultural/natural projects added per park in annual RMP update	1/1
Number of cultural/natural activities added per park in annual RMP update	8/20
Number of cultural/natural activities in progress per park in an average year	9/27
Number of research and monitoring activities in progress per park (cultural/natural)	6/15
Number of RAPS issued per park per year	15
Abstracts per active activity per year	.33
Abstracts per park per year (0.33 x (15+6))	7

Table 3.2 Estimates of initial volume of data
load by logical data group

Group	Number
-----	-----
RMP -- cultural resource projects	6,500
-- natural resource projects	6,500
-- cultural resource activities	13,000
-- natural resource activities	32,500
 RAP	 none
 Abstracts	 5000 *

* assumes 1000 per year loaded from 1977 through 1981
loaded from Investigator's Annual Reports

Table 3.3 Estimated annual addition of RITS records in each data group (assuming 333 parks).

	Per park -----	Servicewide -----
RMP -- projects	2	666
-- activities	28	9325
RAP	15	4995
Abstracts	10.5	2330

INPUT/OUTPUT REQUIREMENTS

Inputs

Table 3.3 has indicated the estimated number of records for the initial database load. Table 3.4 lists the estimated annual volume of edit/update transactions. These estimates depend on the following assumptions:

- that the number of projects and activities remaining current in RMP's does not change significantly from the estimated initial numbers
- that abstract records are entered once and not updated.
- that RAP Reports are received for each permit issued.
- that although the ability to make editorial updates of spelling errors, typing mistakes, etc. will exist, such transactions are relatively insignificant and have not therefore been counted.

Additions or updates totaling roughly 60,000 annually constitute a significant effort -- approximately 6000 transactions per region given 10 regions. For this reason, data entry software must facilitate the efficient and accurate input of data. It is felt that interactive formatted-screen technology can best fulfill these requirements.

Outputs

The primary application of RITS will involve users' ad hoc interrogation of the databases. A 'friendly' computer program is anticipated that will walk users through a series of questions (menus)

Table 3.4 Estimated annual number of data entry transaction by data group.

	Number

RMP -- projects	13,000
-- activities	32,500
RAP -- applications	4,995
-- reports	4,995
Abstracts	2,330

TOTAL	57,820

that determine both record selection criteria and output formats. Upon completion of this walk-through, the query may be executed immediately or stored for later (batch) processing, an important option given the quantity of RITS information stored and the potential for voluminous output. For immediate execution, the first information output should indicate the number of records selected. The user should then have the option of applying an additional set of selection criteria to the subset of the database selected. Successive refinement in this manner will allow the user to reduce the records selected to a number reasonable for terminal output. If further 'weeding out' is not appropriate and a large number of records still exist in the selected subset, the system should provide the option to spool the output to a high speed printer.

An estimated six to ten standard output formats will be available from which the user will select one or some combination. Line-by-line formats should characterize this facility (rather than screen-formatting) to enable users possessing a variety of types of terminal units to utilize the interactive facility.

NPS personnel in the parks, regional offices, and Washington office will employ this structured, interactive, query software an estimated 20 times per day during the first year of RITS implementation. As both system familiarity and terminal availability increase in subsequent years, this usage is expected to increase to about 100 queries per day.

Although use of the query facility described above will constitute the vast majority of RITS application, two other types of output will occur. First, as the standard interactive reports won't accommodate unique or complex reports, NPS personnel will eventually have to do some ad hoc query development. Assuming implementation will utilize some data base management system (DBMS), that system's user language will be employed occasionally to produce these special reports.

The second additional type of output will consist of several administratively-oriented reports produced infrequently - usually only once per year. A report designed to provide the data necessary to respond to the National Science Foundation's (NSF) annual Research Survey constitutes one example of this type of application. In addition, the Superintendent's Annual Research Report, a compilation of a park's Investigator's Annual Reports will be replaced by an automated equivalent.

That such reports will be produced infrequently suggests that employing a DBMS user language might represent the best vehicle for this function. Although a procedural language such as Cobol might produce the reports more efficiently, the frequency of application probably won't justify the developmental effort required.

PERFORMANCE

The interactive nature of data entry and database interrogation facilities demands relatively instant data access. Although some delay in querying results may be acceptable (not more than a few minutes), the volume of data entry dictates prompt retrieval of individual records (within a few seconds).

As previously mentioned, responsibility for maintenance of RITS will lie in the Data Systems Division (DSD). If a system user detects a system failure or error, she/he should contact the NRMD or CRMD. They, in turn, will notify the DSD for initiation of corrective action.

SECURITY

Routine database backup should occur routinely as with existing systems supported by the Data Systems Division. The following additional security issues apply:

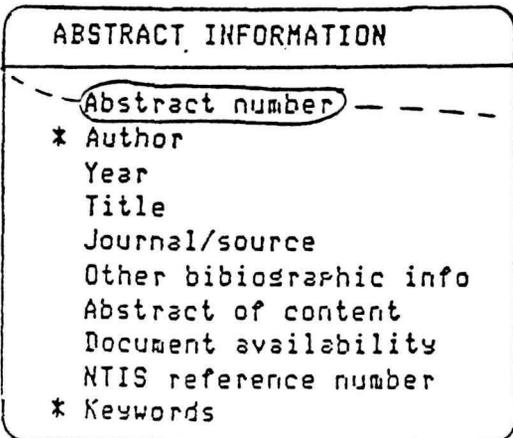
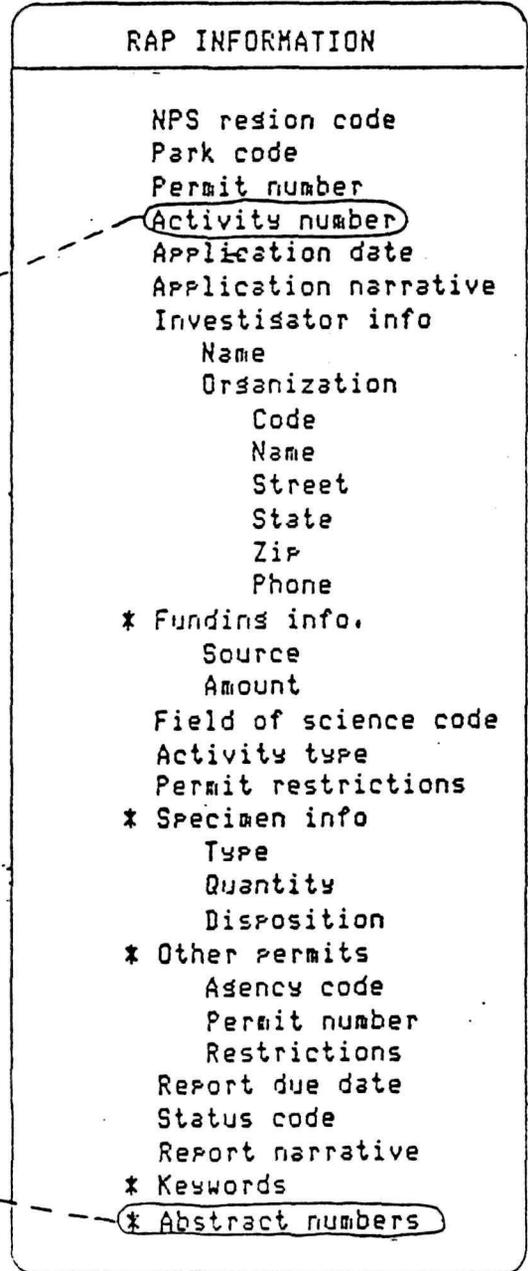
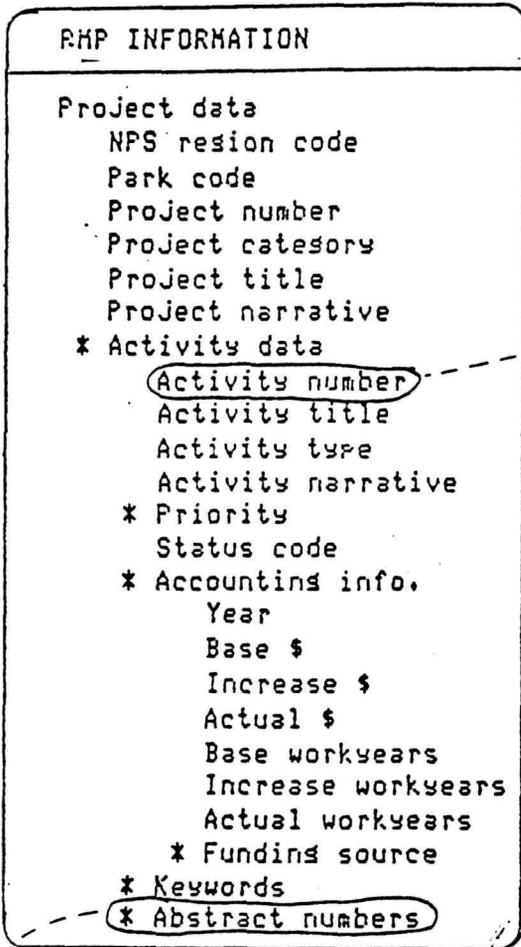
- any valid account holder will have read access for database querying. Financial data elements may be sufficiently sensitive, however, to restrict their access. If so, individual parks may not access other parks financial data elements and regional office access, in turn, should be region specific for this data. DSD, NSD, NRMD, and CRMD would not incur these restrictions.
- write access for database updating shall only occur at the regional offices.
- data entry should also be region specific, that is, error traps should prevent one region from inadvertently writing a record appearing to apply to another region.

APPENDIX 1: DATA ELEMENTS

Figure A.1 displays the logical data groups and the individual data items they're expected to contain. Dashed lines on the figure represent the logical links between each group. The pages that follow provide a brief description of the data elements proposed.

Figure A.1 Data element groups

* indicates either a field or group of fields that repeats



LIST OF PROPOSED DATA ELEMENTS

An asterisk indicates either a field or group of fields that repeats. The number in parenthesis represents the estimated maximum number of characters.

I. RMP DATA

A. PROJECT STATEMENT DATA (for each RMP project statement)

NPS REGION CODE (2)

PARK CODE (4)

PROJECT NUMBER (10) unique to park, probably includes park and/or region codes

PROJECT CATEGORY (3) code for such categories as wildlife management, exotic species, etc.

PROJECT TITLE (<150)

PROJECT NARRATIVE (<1500) description of ongoing management need or special resource problem

* B. ACTIVITY DATA for each activity within a project

ACTIVITY NUMBER (12) perhaps formed by appending extra digits onto the project number

ACTIVITY TITLE (<150)

ACTIVITY TYPE (1) code for mgmt, monitoring, or research

ACTIVITY NARRATIVE (<1500) statement of objectives & methodology

* PRIORITY (3) priority within all of a park's activities; repeats represent a historical record of past years' priorities

STATUS CODE (2) ongoing, proposed, complete, etc.

I. RMP DATA (continued)

B. ACTIVITY DATA (continued)

* ACCOUNTING INFORMATION

repeats for each year. First year is the first year the activity appeared in RITS; last year is current year+5 (to account for 5 year planning period in RMP's)

YEAR (2)
BASE \$ (5)
INCREASE \$ (5)
ACTUAL \$ EXPENDED (5)
BASE WORKYEARS (3)
INCREASE WORKYEARS (3)
ACTUAL WORKYEARS (3)
FUNDING SOURCE (2)

Base and increase figures reflect projections on RMP 5 year programming sheets. Actual figures for a given year reported on that year's RMP update.

funding source for cultural activities

* KEYWORDS (40)

from 'thesaurus' of keywords to be developed by NRMD and CRMD

* ABSTRACT NUMBER (10)

link to pertinent abstract entries

II. RAP DATA

NPS REGION CODE (2)	
PARK CODE (4)	
PERMIT NUMBER (10)	unique number probably includes park code
ACTIVITY NUMBER (12)	link to RMP activities
APPLICATION DATE (6)	
APPLICATION NARRATIVE (<1000)	brief description of objectives, techniques, and time frame
INVESTIGATOR INFORMATION	
NAME (30)	
EMPLOYER CODE (2)	for university, state agency, Federal agency, etc.
EMPLOYER'S:	
NAME (40)	
STREET (30)	
CITY (15)	
STATE (2)	
ZIP (9)	
PHONE (10)	
* FUNDING INFORMATION	repeats allow for multiple sources
SOURCE CODE (3)	probably same as employer code above
AMOUNT (5)	expended to date
FIELD OF SCIENCE (2)	code - necessary for NSF report
ACTIVITY CODE (1)	for mgmt., monitoring, or research
PERMIT RESTRICTIONS (<500)	narrative

II. RAP DATA (continued)

* SPECIMEN INFORMATION

TYPE (20) e.g. oak leaves, rocks, snails, etc.

QUANTITY (4)

DISPOSITION (<100) location of specimens removed from park

* OTHER PERMIT INFORMATION

for permits necessary from other agencies

AGENCY CODE (3)

probably same as employer code above

PERMIT NUMBER (10)

RESTRICTIONS (<400)

REPORT DUE DATE (6)

date RAP report due

STATUS CODE (2)

same as for RMP activity

REPORT NARRATIVE (<1000)

brief description of results and management implications

* KEYWORDS

same as for activity data

* ABSTRACT NUMBERS

same as for activity data

III. ABSTRACT DATA

ABSTRACT NUMBER (10)	
* AUTHOR (30)	allows for multiple authors
YEAR (4)	year of publication
TITLE (<150)	
JOURNAL/SOURCE (75)	or equivalent publication title
OTHER BIBLIOGRAPHIC INFO. (75)	volume, pages, publisher, etc.
ABSTRACT OF CONTENT (<1000)	narrative summary of content
DOCUMENT AVAILABILITY (2)	code for NTIS or similar
NTIS REFERENCE NUMBER (12)	
* KEYWORDS	same as RMP activity

APPENDIX 2: SAMPLE FORMS

United States Department of the Interior
National Park Service, Southwest Region

APPLICATION FOR PERMISSION TO COLLECT
SPECIMENS OF PLANTS, ROCKS, MINERALS, AND ANIMALS

Name of Area		Date
Name of Applicant	Home Address	
Representing (Name of Institution)	Period of Collecting	
	From	To
Specimens to be Collected (Type & Quantity)		
Other Applicable Collection Permits: Federal: State:		
Agency: No: Expir. Date:	Agency: No: Expir. Date:	
Reason for Collecting within this Area		
Place where Specimens are to be Deposited		

I, the applicant, having read the conditions on the reverse of the permit relating to collections within areas administered by the Southwest Region of the National Park Service, agree that, if the permit is granted, I will comply with all the conditions stated therein.

Signed _____

TO BE FILLED IN BY ISSUING OFFICE ONLY - DO NOT WRITE BELOW THIS LINE

Approved for Collecting following Specimens (Type & Quantity)		
Locality of Collecting Limited to:		Permit Expiration Date
Report of collection: Due date	Special Conditions or Restrictions:	Copies of this permit sent to appropriate State and other Federal agencies, if applicable? Yes _____ No _____
Recommended by (Signature and Title)	Approved by (Signature of Supt.)	Date Approved

United States Department of the Interior
National Park Service, Southwest Region

COLLECTING PERMIT

In Accordance with the Conditions and Restrictions Appearing on the Back, Permission is Granted:

Name of Collector	To Collect within (Area)	Date Issued
To Collect the following Specimens (Type & Quantity)		
Locality of Collecting Limited to:		Permit Expiration Date
Report of Collection: Due Date	Special Conditions or Restrjctions:	
Approved (Signature)		

Superintendent,

The collecting of rare or endangered natural objects, if permitted at all, will be allowed only when approval has been obtained from the Regional Director of the Southwest Region, National Park Service, Santa Fe, N.M. 87501.

THIS PERMIT MUST BE CARRIED AT ALL TIMES WHILE COLLECTING. SEE REVERSE FOR CONDITIONS AND RESTRICTIONS.

PERMIT STIPULATIONS AND CONDITIONS

It is the intention of the National Park Service to further scientific research within the areas administered by it, and to cooperate with technical workers to the fullest extent compatible with its charge to preserve all species of flora and fauna and all geologic material in a natural state, insofar as possible.

1. This permit applies only to animal life, plants, rocks, minerals, or other natural objects. Archeological and paleontological materials may not be collected under this permit.

2. The collections shall be used for scientific or educational purposes only, shall be dedicated to public benefit, and shall not be used for personal or commercial profit.

3. All collecting must be done away from roads, trails, and developed areas, unless such localities are specified in the permit. The collecting shall be conducted in such a manner as not to attract attention or to cause damage to the environment. Because of the scarcity or importance of some specimens, Service officials may designate the kind, number and sizes of specimens which may be collected, and any other restrictions deemed necessary.

4. The National Park Service reserves the right, in the interest of science, to designate the depository of all specimens removed from its administered areas within the Southwest Region and to approve or restrict transfers of specimens between depositories. The National Park Service also reserves the right to designate the U. S. National Museum as the depository of any type specimen after the collector has made necessary studies and published the results of his research thereon.

5. The Superintendent may require the permittee to furnish an inventory and locality description of any or all specimens proposed to be collected before they are removed and, after the collection is assembled, to submit it for examination.

6. *Use or Disposition of Preserved Specimens:* The collected specimens shall be deposited in a permanent public museum or in the exhibit, study or type collections of scientific or educational institutions. They must be suitably recorded in a permanent file and must be available to the public.

7. A copy of all scientific and other publications resulting entirely or in part from collection activities resulting from the issuance of this permit will be furnished to the Superintendent of the issuing park or other specified official of the National Park Service.

INSTRUCTIONS

INVESTIGATOR'S ANNUAL REPORT (Natural Sciences Research)

This report is to be executed by ALL investigators (or project supervisors) of Service-sponsored projects; and by all independent investigators who INDICATE A WILLINGNESS to file the report. It summarizes project accomplishments; lists financial and completion expectations; and other administrative details that are needed for efficient administration of the research program.

It allows the investigator to summarize the information obtained during the previous "field" (summer) season, and permits him to anticipate his needs beyond the end of the current fiscal year.

1. BLANK FORMS will be sent to each researcher engaged in a going project on October 15 of each year.
2. REPORT FROM RESEARCHER—IN TRIPLICATE—due in the park superintendent's office by January 1 of each year. The superintendent keeps one copy.
3. SUPERINTENDENT'S ANNUAL RESEARCH REPORT (Form 10-225) and the original and one copy of the researcher's report are due in the Washington Office on or before January 15 of each year.

For further clarification, the following comments are offered:

- LINE 1 --- A brief title for the project.
- LINE 3 --- Optional, but useful to the Washington Office.
- LINE 5 --- Approximate percent figure is sufficient.
- LINE 9 --- Enter the RSP number—IMPORTANT for identification.