

DOCUMENT RESUME

ED 027 045

LI 001 337

Baltimore Metropolitan Area Library Study, Short Range Work Program: Tasks, Schedule, and Methods.

CONSAD Research Corp., Pittsburgh, Pa.

Spons Agency-Librarian's Technical Steering Committee, Baltimore, Md.; Regional Planning Council, Baltimore, Md.

Pub Date 16 Jul 68

Note-31p.

EDRS Price MF-\$0.25 HC-\$1.65

Descriptors-Administration, Costs, Decision Making, Evaluation Methods, Geographic Location, Library Cooperation, Library Facilities, *Library Networks, *Library Planning, *Library Services, Library Surveys, Metropolitan Areas, *Public Libraries, *Systems Analysis, Use Studies

Identifiers-Ann Arundel County, *Baltimore, Baltimore County

Described is a six-month work program, financed with Library Service and Construction Act funds, which applies systems analysis to public library organization, services, and facilities. The three public library systems of Baltimore City (Enoch Pratt Free Library), Baltimore County, and Anne Arundel County, Maryland are to be studied. Investigated will be the decision process relating to library services. The location of a single branch facility near common jurisdictional borders is to be examined to determine how changes in branch services or facilities would significantly alter overall library service. The problem is structured within the framework of a multi-facility (total region) evaluation process. Work tasks are described, the evaluation process flow is charted, and the short-range work program is related to the concurrent development of a multi-year schedule of studies for library planning. (Author/JB)

ED0 27045

**BALTIMORE METROPOLITAN AREA
LIBRARY STUDY**

SHORT RANGE WORK PROGRAM:

TASKS, SCHEDULE AND METHODS

CONSAD Research Corporation

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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LIBRARY STUDY

SHORT RANGE WORK PROGRAM:

TASKS, SCHEDULE AND METHODS

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July 16, 1968

The preparation of this report was financially aided through a federal grant from the Department of Health, Education and Welfare under the Library Service Construction Act of 1966; Title I, Library Services; and Title III, Inter-Library Cooperation.

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I. INTRODUCTION

The rapid growth of American cities has in many ways strained the capacities of those cities to provide services to their residents. At the same time, however, the stress of burgeoning population has led to development of new and/or improved techniques for providing -- for planning and administering -- those same services.

With growth, the public demand for education, knowledge, and leisure pursuits has increased. A traditional urban service, the public library, straining to answer this demand, has responded to the competition of other urban services for scarce urban resources. Seeking to better serve library users, library planners and administrators are producing and implementing new concepts of library service.

These new concepts include urban and regional library systems wherein the collections and clientele of individual facilities cooperate to produce more efficient use of resources -- to more surely and economically put the right book in the right place at the right time. Similarly, it is increasingly possible to picture area-wide networks of information services, increased use of computers for planning and operations, greater coordination and cooperation among all types of libraries and library systems, and faster access to quality collections and services. All attest to the growth of urban and suburban demand

for continuously better and more sophisticated library services.

Federal, state, and private financial support, when added to local financing for libraries, poses questions of "fair" cost-sharing and of the ability to pay as opposed to the need for service. These questions are not unique to libraries, but exist with respect to all types of services and public investment. The same may be said of the need for a clearer definition of the responsibilities of political jurisdictions and for the provision of better methods for resolving differences among jurisdictions. For libraries to adequately respond, an assessment must be made of available library resources of all relevant types; and these resources must be compared to the needs of the general public and of specific sub-populations. *

To better determine justifiable levels and locations of library resources and information services, substantial research must be conducted in:

1. Existing and potential user needs.
2. Levels of service as determined by facility staff, collection, and location.
3. Assessment of available resources.

* In the case of library service, resources include collections, staffs, buildings, and degrees of locational efficiency (Is the library in the right place, relative to potential users?), while the subpopulations include students, children, the retired, businessmen, industrial and government researchers, and housewives.

4. Operational procedures and service patterns, to determine if their diversity impedes application of uniform administration.

5. Library finance, including the role of state and Federal governments.

6. Staffing patterns, personnel requirements and employee working conditions.

7. The design of a program that will produce solutions or lead to solutions within the framework of library cooperation.

It is against this background that the library systems of three neighboring jurisdictions in the Baltimore region, Anne Arundel County, Baltimore City, and Baltimore County, have expressed interest in improving the planning and decision processes by which public library informational resources are allocated. Specifically, their administrators are aware that there can be developed better plans for locating new library facilities, as well as for making improved use of resources in existing facilities. They recognize that the interdependence of library facilities offers opportunities for better service but, at the same time, tends to complicate any decision to locate new facilities. They also believe that their separate library systems can be made more effective and efficient by reducing the inhibiting effects of political boundaries on library programs, facility utilization, and facility location.

For these reasons, the Regional Planning Council, at the request of the three jurisdictions and the Division of Library Extension (State Department of Education), has asked CONSAD Research Corporation to undertake a study applying systems analysis to public library organization, services, and facilities.

Library consultants are John and James Humphry of New York. Direction for the study issues from a Technical Steering Committee comprised of the directors of the three library systems (Annapolis and Anne Arundel County Library, Enoch Pratt Free Library, and Baltimore County Public Library), the Director of the Division of Library Extension of the State Department of Education, and a representative of the faculty of the University of Maryland's School of Library and Information Services.

The study has two complementary work flows.

1. The Short-Range Work Program (SRWP) is to provide a basis for immediate decisions on public library branch location in, and public library service to, communities near the common jurisdictional boundaries of Baltimore City, Anne Arundel County, and Baltimore County. Primarily, the concern is with branch-library service areas that include users from more than one jurisdiction. In addition to providing certain types of information that can immediately be used by librarians and other decision-makers, the SRWP is to aid in determining

those questions that will need answering over the coming years. The SRWP is to serve as a basis for future studies and to provide insight into study methodologies.

2. Concurrent with the SRWP will be the development of a balanced research program aimed at providing all of the region's public libraries with the knowledge necessary for continuous planning of services and facilities. Termed the Long-Range Study Design (LRSD), it will outline studies for a two-to-three-year period and include the library systems of Carroll, Howard, Harford Counties. Details of the LRSD will be covered in another report.

In order to assure that this Short-Range Work Program contributes to the Long-Range Study Design and produces information that corresponds and is compatible with the method to be employed in the LRSD, it is important that both methods be so designed as to express findings in consistent form.

II. OVERVIEW OF THE SHORT RANGE WORK PROGRAM

The Short-Range Work Program (SRWP) is intended to achieve the following overall objectives:

1. Study and evaluation of the existing library system in Baltimore City, Baltimore County, and Anne Arundel County.
2. Evaluation of alternative facility types, scales, and collection and service mixes at a proposed location near common jurisdictional boundaries.
3. Study of the Interjurisdictional Decision Process.
4. Development of a file of information for planning future studies of the library system of the Baltimore region (Baltimore City and Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties), to the end of creating a continuing process for the multi-year planning of library facilities and services.

This schedule of activities places the development of methods for system-wide (multi-facility, multi-jurisdiction) decision-making in the Long-Range Study Design (LRSD).

The development of a method for library-system planning entails a series of tasks, including development of ways to assess changing user needs as based upon the values of those users; identification of non-users and understanding of their non-use; specification and refine-

ment of the goals and objectives of the decision-makers of the several jurisdictions; estimation of facility costs, resources, and financing mechanisms; and evaluation of the costs and the contributions to achieving objectives of alternative library plans. To varying degrees, and with the exception of the non-users studies, each of these is also involved in achieving the objectives of the SRWP. For example, the evaluation of the existing library system structure depends upon an identification of user needs and evaluation of the adequacy of the existing structure to serve those needs. Similarly, the evaluation of alternative facilities at a single site near common jurisdictional borders requires a method for estimating the effects of alternative library scales, locations, services and collections upon library use.

The SRWP is limited to an examination of a single locational problem to determine how changes in branch services or facilities would significantly alter overall library service. Examination of even a single facility is, however, strongly influenced by the fact that the number of users who travel to any new or changed facility depends upon the quality of alternative facilities that are already available at other, and perhaps nearer, locations. Therefore, the single facility must be evaluated in the context of the multi-facility system of which it is a part. Since the evaluation method for the LRSD requires a multi-facility systems design, and since commensurability of long-range and short-range methodologies is required,

the methods for overall (multi-facility) evaluation must be developed prior to the SRWP.

For these reasons, the development of the Short-Range Work Program has included the development of certain aspects of the Long-Range Study Design. Figure 1 provides an overview of both long- and short-range concerns. The tasks of the SRWP (scheduled as in Figure 2) are as follows:

1. Review of literature.
2. Development of a general framework for multi-facility evaluation.
3. Development of a single-facility evaluation method.
4. Analysis of behavioral relationships.
 - a. Collection type and service mix.
 - b. Use frequency.
 - c. Facility location and size.
 - d. User socio-economic characteristics.
 - e. User travel behavior.
 - f. Residence patterns.
5. Service area and travel barriers.
6. User needs study: Phase I.
7. Analysis of library services and costs.
8. Analysis of goals and decision criteria: Phase I.

9. Analysis of interjurisdictional decision processes.

10. Evaluation of a single facility located near common jurisdictional borders.

SHORT-RANGE WORK PROGRAM

LONG-RANGE STUDY DESIGN

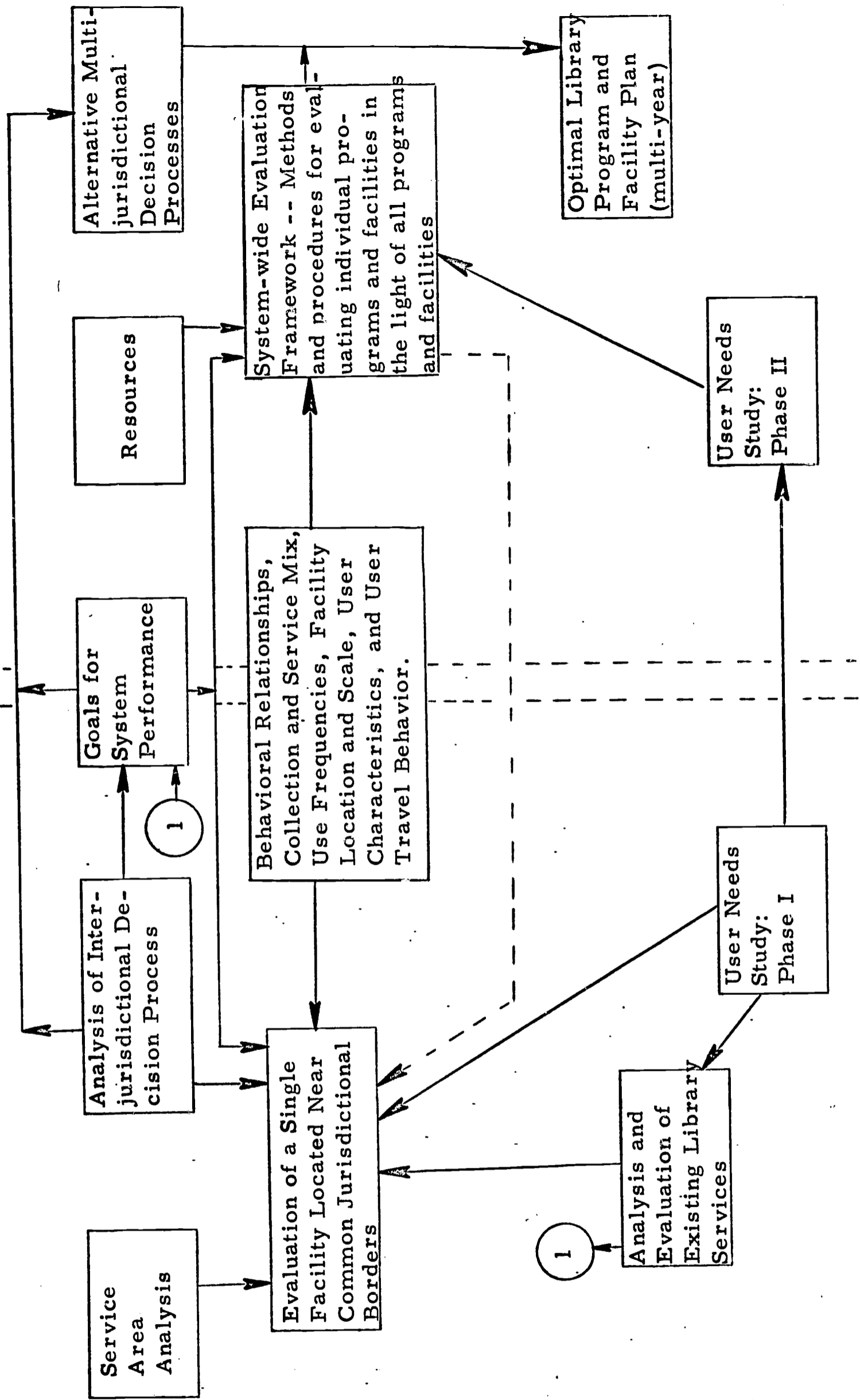
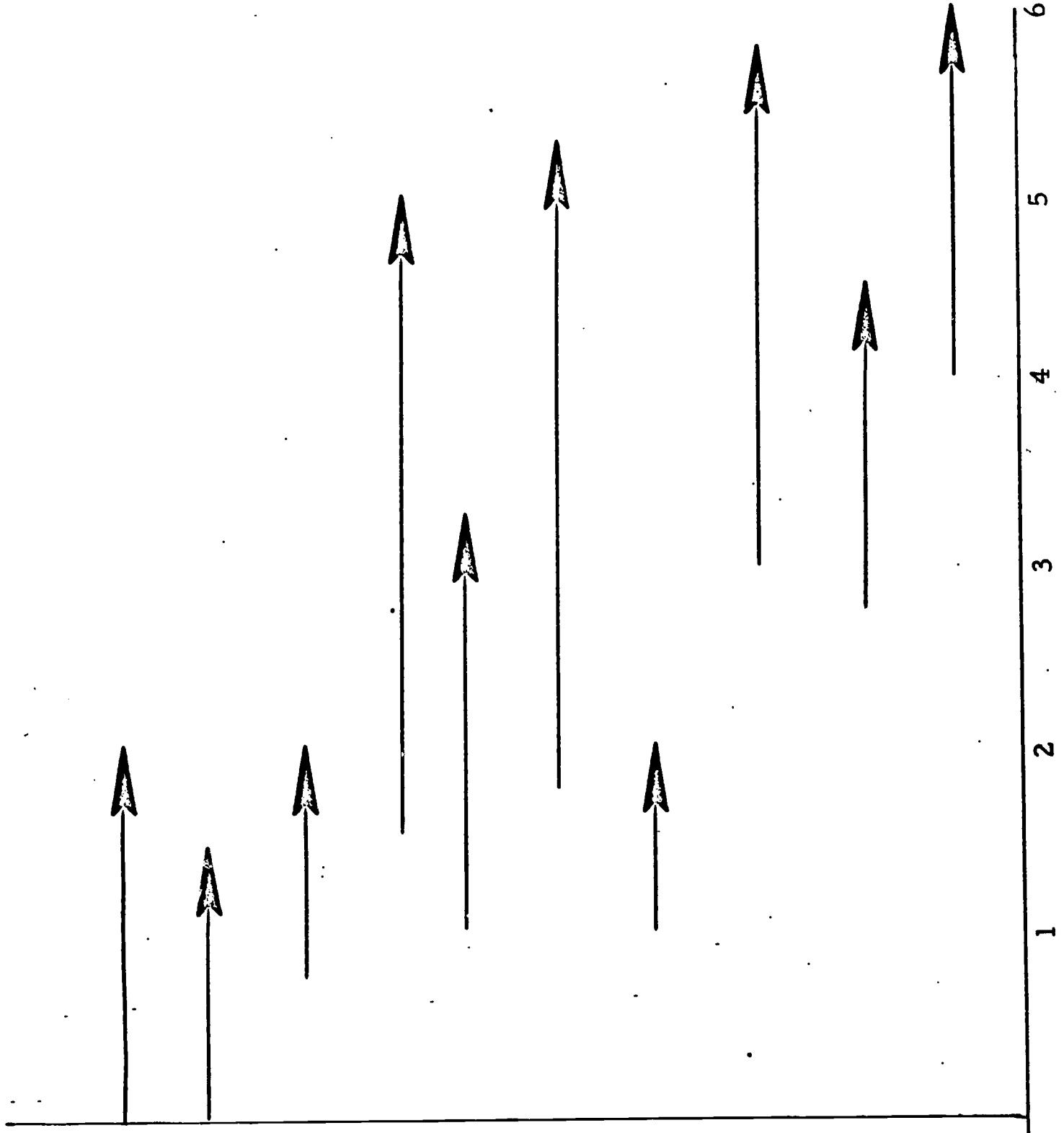


Figure 1
THE RELATIONSHIP OF THE SHORT-RANGE WORK PROGRAM
TO THE LONG-RANGE STUDY DESIGN

TASKS:

1. Review of Literature
2. Rationale for Multi- Facility Evaluation
3. Single Facility Evaluation Methodology
4. Behavioral Analysis
5. Service Area Analysis
6. User Needs Study: Phase I.
7. Analysis and Evaluation of Library Service
8. Interjurisdictional Decision Service
9. Goals and Decision Criteria: Phase I
10. Proposed Single Location Evaluation



Months:

Figure 2: WORK SCHEDULE

III. TASKS

1. Review of Literature.

A short review of the literature will cover studies and policies relating specifically to the library systems of the three jurisdictions, studies performed for other library systems, and applicable techniques originally developed in different, but related, areas.

The literature review will provide documentation of the background against which this study is undertaken. As such, it will include other studies similar to this one, but will not attempt to provide an exhaustive bibliography.

2. Development of a General Framework for Multi-Facility Evaluation.

The evaluation of alternative multi-facility development plans will require a method for determining how alternative patterns of facilities influence total library use and use of specific services, as well as the frequency with which specific socio-economic user groups travel to libraries. In addition, evaluation will eventually require a clear definition of the goals of the library development program by library decision-makers. This is necessary so that a value may be attached to each alternative facility pattern, according to its contribution to achieving these goals.

An overall evaluation framework is to be developed in this task. It will serve as the basis for Task 3, Development and Implementation of a Single-Facility Evaluation Method, and for Task 9, Analysis of Goals and Decision Criteria.

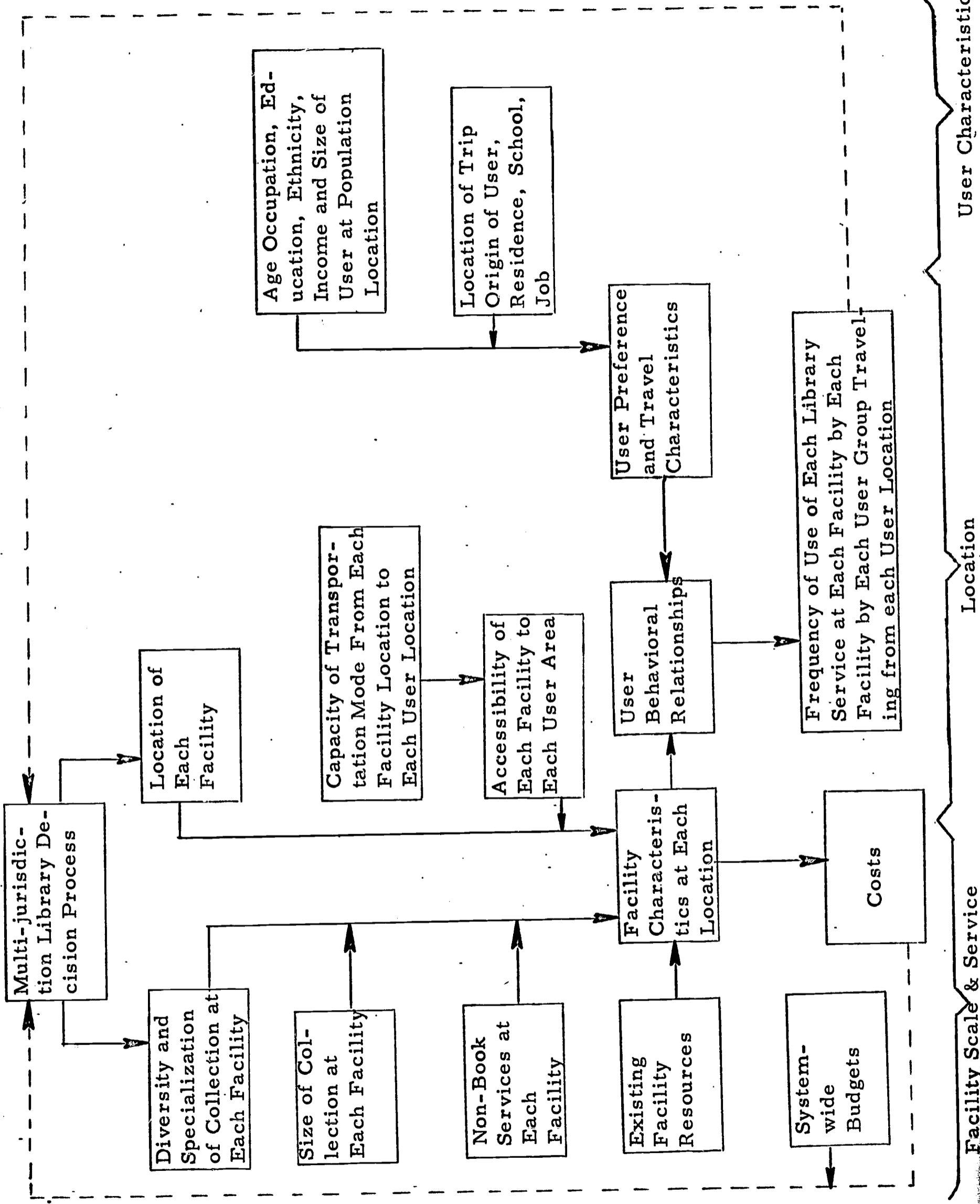
The requirements for testing the effects of alternative library facility configurations are as follows (see Figure 3):

- a. The effectiveness of a library configuration should be measured by results (system outputs) such as frequency of use of books, and not by resource inputs, such as number of books available per capita;
- b. Library system effectiveness should be testable using a method whereby policy decisions affecting facility characteristics as perceived by users can be altered including number and type of books available at a given location, scale of facility, and location and accessibility of facilities;
- c. The method for testing effects should be sensitive to behavioral factors such as preferences and travel behavior;
- d. Costs estimates should be dependent upon facility characteristics.

3. Development of a Single-Facility Evaluation Method.

Drawing upon Task 2, a cost-effectiveness methodology will be developed in Task 3 for evaluating a proposed single facility to be located near common jurisdictional boundaries. The systems framework developed in Task 2 will be adapted with the assumption that all

Figure 3: FLOW DIAGRAM OF MULTI-FACILITY EVALUATION PROCESS



existing facility scales and locations are held constant; and, within this context, alternative facility scales at a single new location will be tested to determine their costs and effects.

Following this adaptation of the framework, the methodology will be implemented using statistical techniques to identify the behavioral relationships underlying user preferences and travel behavior and will draw heavily upon the findings of Task 4, Analysis of Behavioral Relationships, and Task 6, Phase I of the User Needs Study.

4. Analysis of Behavioral Relationships.

Although each individual acts for his own peculiar reasons, large groups of people tend (fortunately for statisticians) to behave in fairly regular patterns. The analysis of behavioral relationships will attempt to identify these patterns.

Consider a hypothetical case in which a large number of people with equal amounts of time, money, and interest in reading are evenly scattered over a large area. If a single library were placed in this area, it would be expected, on the basis of previous studies, that the people nearest the library would use it most and that use would fall off with distance from the library. However, it may be that this hypothesis cannot be directly tested since there are, in fact, many libraries in the area; and the existence of alternative facilities may change the behavior of people.

Why should people travel long distances to a particular library when another is nearer them? Some people may always return to the place to which they have become accustomed, even after moving away. Some may prefer the service of the staff. Some may go to the library nearest work or school. However, it may be hypothesized that the major reason is the size and quality of the book collection. This hypothesis can be tested to see how far people do travel to libraries of different sizes and offering different types of books. Of course, library half-a-mile distant on the map may, in fact, be across a river, and travel to the nearest bridge may make the journey very long, so that time is often preferable to simple distance as measure of the amount of travel.

To return to the original example, it is known that, in addition to differences in the characteristics of libraries, there are differences in the characteristics of users which must be taken into account in analyzing their travel behavior. It is necessary, therefore, to test the hypothesis that people who have special needs, more time, or more education will tend to use a library most. This may mean that different patterns exist for students, housewives, retired people, and certain occupational groups. In addition, the fact that people tend to live in communities leads to the hypothesis that the number of users which a library can expect will depend, other things being equal, on how many people actually live near it. Although other things are rarely equal, statistical methods do exist

for holding constant the type of library and the characteristics of the people, in order to test this hypothesis. This type of reasoning leads to examination of behavioral relationships between the following variables:

- a. Collection type and service mix.
- b. Use frequency.
- c. Facility location and size.
- d. User socio-economic characteristics.
- e. User travel behavior and travel barriers.
- f. Residence patterns.

In order to discover behavioral relationships, however, it is necessary to impose some order on the mass of data that exists and to distinguish relevant differences in behavior from those which are irrelevant. This involves developing systematic descriptions of the more complicated variables. The form of analysis is described in the sections which follow.

5. Service Area and Travel Barriers.

One of the most important aspects of the decision to locate a new library branch in a given area, rather than in any other, is the estimation of how many people the branch will serve and how far they will be prepared to travel to it. To estimate these figures, it is

necessary to analyze existing service areas and their population.

The Bundy study* gives the users of each library by their travel distance and travel time; however, it does not show user origins in specific areas, data which are important to spatial analysis. It is proposed, therefore, to obtain data on the home addresses of users directly from the branches. While none of the three systems keep data on the home addresses of registrants, each registrant does have a library card with his home address printed on it and, each time a book is borrowed, the user's card is photographed onto a film similar to microfilm. User addresses can thus be sampled from filmed borrowing records. In addition, the film contains a record of the title and classification number of each book borrowed, and this information will be recorded for potential use to the service analysis and model-building phases.

Plotting the data for all branches will require much effort and is thus envisaged only for the LRSD. Analysis of service areas for a smaller number of libraries will, however, be undertaken in the SRWP. These sample libraries will be those located near the common boundaries of Baltimore City, Baltimore County and Anne Arundel County, including

* Bundy, Mary Lee, Metropolitan Library Users: A Report of a Survey of Adult Library Use in the Maryland and Baltimore-Washington Metropolitan Area (Preliminary Report), University of Maryland, January, 1968.

three in Baltimore County, five in Baltimore City, and three in Anne Arundel County. The plotting of service areas will be undertaken in Baltimore by the RPC staff.

The home addresses will be plotted on a large scale map to permit delineation of a user service area for each branch. Such use requires a strictly random sample. Also, for modeling purposes, it will be necessary to have a sample sufficient to permit analysis of each transportation zone,* and this may require stratified sampling. Initially, a sample of 100 cards per branch will be used to plot service areas, and further sampling will be based on the results of service area analysis.

From the mapping of service areas, preliminary conclusions may also be drawn on the extent to which travel to libraries is inhibited by such tangible travel barriers as railroad tracks and rivers and also by such intangible barriers as jurisdictional boundaries.

6. User Needs Study: Phase I.

It was suggested above that one should expect to find a dropping-off of library use as distance from the library increases. This suggests that some people who are not using the library might do so if it were

* Certain current and forecast data already exist for the system of areal units called transportation zones, and this system will continue to be used for most analysis.

nearer. It is necessary, therefore, to consider two types of demand for libraries: First, the actual observed demand, which is determined in part by the characteristics of the population and also by the type of library and the existing spatial pattern of libraries; and, second, the demand that would exist if libraries were located in a spatial pattern more desirable to all potential users.

In considering the location of a new library it is important to consider the latter concept -- that people who do not at present use libraries may be people who never do so, or they may be people who cannot or do not because of distance. This means that the available data, which is based on information about users, must be carefully interpreted to avoid the implicit assumption that all non-users are of the first type. Eventually, it will be necessary to sample non-users and thus discover the extent of potential library use frustrated by distance. This will be part of the LRSD.

User needs may be thought of as the range of services which the population as a whole would like the libraries to perform. By comparing user needs with available services, a "gap" between the two may be defined. Policy decisions may then be directed to filling this gap.

It is possible to approach the problem of defining user needs in three ways:

- a. The study of behavioral relations should permit the drawing of certain conclusions about the propensities of certain population groups to use certain library services when distance is no barrier.
- b. There could be drawn up from the Bundy survey*, a table of service-type by user-type showing the extent to which present services are used by different population groups.
- c. A more sophisticated study must, however, take into account the reasons of non-users for not using the library. This may involve a population survey in the LRSD, wherein may also be developed a simple method for keeping a continuous catalog of user needs, so that the library system can swiftly respond to demand changes.

7. Analysis of Library Services and Costs.

The library-service-analysis component of the SRWP will seek to clarify the structure of library services by identifying components of service for libraries in each jurisdiction, the relative levels at which they are offered, and their hierarchical relationship. A detailed cost analysis will not be undertaken in the SRWP, but a foundation will be laid for such in the definition and analysis of costable service concepts.

Examples of services to be examined are:

- Size of collection
- Reading room space and personnel
- Accessibility of stacks or other non-circulating material
- Provision of meeting rooms
- Degree of direction provided for user guidance
- Opening hours

* Bundy, op. cit.

- Type of collection:

Dewey classification
Duplicates
Magazines and journals
Textbooks
Clusters and specialization
Disposal and acquisition
Phonograph records
Reference collection
Films

- Liaison with schools
- General information function

In the SRWP, library services will be described, which will serve to clarify the service priorities implicitly recognized by the present library system.

8. Analysis of Goals and Decision Criteria: Phase I.

All individuals and systems develop goals and values (or decision criteria); but, in many cases, they never make them explicit. Goals for an individual may include making money, leading a quiet life, having a happy family. At a more specific level he may include among his goals getting a promotion, taking a vacation, earning a black belt in judo. He thus poses a hierarchy of goals which, hopefully, are complementary and not in conflict with each other. He faces, however, certain restraints on achieving the goals. He may not be strong enough,

wise enough, or rich enough to accomplish them all, and such restraints may cause him to reassess his situation. In doing so, he may keep his original system of priorities but restrict his goals somewhat; or he may accept the restraints on certain of his goals and accordingly rearrange the order of priorities, so that the overall structure remains at least feasible. This process is not for the most part explicit, and it generally makes itself felt by influencing the decision criteria (or rules of thumb) according to which people act. That these decision criteria are thus eventually related to goals makes it possible to infer goals from actions.

A library system can also be thought of as having a goal hierarchy and a set of restraints which act together to produce a feasible system of priorities. The priorities then dictate decision criteria for action. A library system is not, however, exactly analagous to a person, for the following reasons:

- a. The goals of an individual are generally decided on by one person, although he may take the needs of others into account. The goals of a library system are the product of many people working together, with each committee or board member having a slightly different set of goals for the library. Since the weight of each member's contribution may vary from time to time, the goal structure may be continuously shifting.

- b. The restraints on a library system are perhaps easier to measure than those on a person. They can generally be expressed in terms of budget restraints, perhaps divided into capital and current operating budgets.
- c. The decision criteria, therefore, can be reduced in general to a cost-benefit system. The costs are measured in terms of actual outlays for any particular service. The benefits which do not, as a rule, have any specific money value may be weighted in terms of the goal hierarchy decided by the library boards.

The function of an analysis of goals and decision criteria is to make explicit what has previously been implicit in the decision process.

The purpose of such an analysis is to permit decision-makers to evaluate the consequences of alternative decisions. To be more concrete, the analysis may discover that a particular group of citizens has been preferred over another in terms of library provision, that children perhaps get a better deal than housewives or that serious students of nuclear physics are perhaps better provided for than amateur gardeners. These may have come as the results of conscious decisions, or they have just happened. An analysis of goals looks at what is and also asks decision-makers what they would like it to be, thus drawing a recognizable line between the results of conscious decision and the "just happened."

An analysis of decision criteria then relates goals to restraints, to produce a set of workable rules to guide future decisions. A complete analysis must, therefore, include costs and budgets, investigations of

which are envisaged for the LRSD. The SRWP includes only analysis of goals and description of current decision criteria, as evidenced in the actual decisions of librarians and library boards.

9. Analysis of Interjurisdictional Decision Process.

When single jurisdictions act in isolation, each develops its own sets of goals and takes action in the light of its own budgets. When jurisdictions agree to cooperate, however, it will be found that, in some cases, what is best for the entire system may involve some decisions which are less than the best for a particular jurisdiction when the latter is again viewed in isolation. There generally takes place, however, a bargaining process by which a loss in one respect may be offset by gains in others; and it is generally the case that the total gains of cooperation are great enough for each jurisdiction to gain something -- or at least not to lose -- from the process.

The task of analyzing the Interjurisdictional Decision Process resolves itself into five parts:

- a. A study of past decisions of individual jurisdictions to discover implicit and explicit goals and decision criteria.
- b. A study of past multijurisdictional decisions and decision processes to determine past modes of cooperative decision-making.
- c. A study of financial instruments.

4. Use of the single-facility case study and other SRWP outputs to discover jurisdictional attitudes, objectives, and methods of cooperation.
5. A study of the budgetary allocation process.

These analyses will identify the important elements of the power structure governing multi-jurisdictional agreements. From the analyses can be made a statement of the decision procedure (formal or informal) by which multi-jurisdictional agreements can be reached. These elements hold the key to activation of a desirable library development plan.

10. Evaluation of a Single Facility Located Near Common Jurisdictional Borders.

This task will draw upon all preceding tasks in the SRWP, as shown in Figure 1.

Drawing upon the User Needs Study, there will be selected an area having high needs relative to existing services and located near common jurisdictional borders. Selection will be jointly accomplished through discussions with the libraries from each of the participating jurisdictions, the State Division of Library Extension, and the staff of the Regional Planning Council.

Once a location is agreed upon for study, a range of alternative facility sizes and collection mixes will be established. Then, applying

the evaluation method developed in Task 3, an analysis will be made to determine the degree to which the alternative facilities at the proposed location would satisfy user needs. This analysis will estimate:

- The number of facility users;
- the jurisdictional locations of user travel and distance traveled;
- type of user;
- effects upon use of existing facilities nearby.

These estimates will be prepared for many combinations of facility sizes and collection mixes. These will be related to simple estimates of facility costs, and a set of cost-effectiveness relationships will be presented to library decision-makers. In conjunction with information describing existing goals and decision processes (from Tasks 8 and 9), the alternative facilities at the proposed location will be evaluated in terms of their contributions to the goals of each jurisdiction, and requirements for the interjurisdictional decision process will be introduced. Through discussion with the staffs of CONSAD, RPC, the librarians, and John and James Humphry, alternative decision structures will be evaluated.