

QUARTERLY REPORT OF PROGRESS

July 1, 1985 to September 30, 1985

Prepared Pursuant to the Cooperative Agreement

between the

Department of the Interior
Bureau of Land Management, Safford District, Arizona

and the

University of Arizona, College of Agriculture
School of Renewable Natural Resources

Social Carrying Capacity Research
for Aravaipa Canyon Wilderness

Agreement No. AZ040-CA5-001

This first quarterly report is submitted pursuant to the Study Progress Reporting requirements of Cooperative Agreement No. AZ040-CA5-001, "Social Carrying Research for Aravaipa Canyon Wilderness." The purpose of this document is to provide the Bureau of Land Management, Safford (BLM), with a brief overview of research activities undertaken by the University of Arizona (UA) in fulfillment of the above cooperative agreement.

Progress Overview:

The UA engaged in six research activities during this quarter. All activities were oriented toward the general planning purpose of Phase I (see the Cooperative Agreement for further information). First, three field reconnaissance trips to Aravaipa Canyon were made during April, May, and July, 1985. Second, a draft study plan was developed for BLM review. Third, in conjunction with development of the study plan, a detailed study schedule was developed. Fourth, a review of literature relevant to the study was initiated. Fifth, a meeting was held with the BLM in September, 1985 to review BLM record files and to discuss recreational carrying capacity issues related to Aravaipa Canyon Wilderness. Sixth, a draft document of key social carrying capacity issues was developed for BLM review.

Field Reconnaissance:

Reconnaissance of Aravaipa Canyon Wilderness initiated before the cooperative agreement was signed in July. Two trips, one during April 4-5, 1985, and one during May 25-27, 1985, were taken. Another trip was taken July 4-6, 1985. These trips

acquainted researchers with Aravaipa Canyon and its major side canyons. Current resource conditions were documented through personal observations and photographs, visitor activities were noted, and critical social issues were identified during interviews with visitors and on-site BLM personnel. The May and July trips were scheduled so that researchers could experience peak visitor demand periods forecasted by BLM personnel. An additional reconnaissance trip is scheduled for October 4-6, 1985.

Study Process:

A preliminary study plan (fig. 1) was formulated. The design suggests a sequence of steps required to plan, conduct and finalize the study. As the study progresses, these steps will be modified to reflect changing research needs, identification of new issues, and further specification of research techniques. For example, as Phase I progresses, the research steps necessary to accomplish Phase II will be clarified.

Study Schedule:

A study schedule (fig. 2) was fitted to the study process described above. The first five pages of the study schedule each cover a six month planning period; page six covers the final two months of the study. Deadlines proposed in the schedule are subject to modification as the study plan is amended.

Literature Review:

An exhaustive, review of multidisciplinary literature related to social carrying capacity research was initiated in

July, and will be an ongoing process for the remainder of the study. Literature from the social, behavioral, and natural sciences, historical accounts, newspaper and magazine articles, state and federal publications, and agency documents have been reviewed. Also, a computer based cataloging system was designed and implemented for systematic filing of and quick access to literature deposited in an in-house library developed for the study.

Meeting:

On September 11, 1985 the UA met with the BLM in Safford to discuss various issues pertaining to Aravaipa Canyon Wilderness and to review BLM record files. The UA requested and received copies of many documents pertinent to the study. Future visits to the BLM will be required in order to more fully review and extract data from BLM files.

Issues Document:

The UA recently completed a draft document of social carrying capacity research issues for ACW. This document, soon to be reviewed by the BLM, covers research issues identified by the UA from interviews with visitors and BLM personnel, field reconnaissance trips, and the literature review.

FIG. 1

SOCIAL CARRYING CAPACITY RESEARCH
FOR ARIZONA CANYON WILDERNESS:
STUDY PROCES

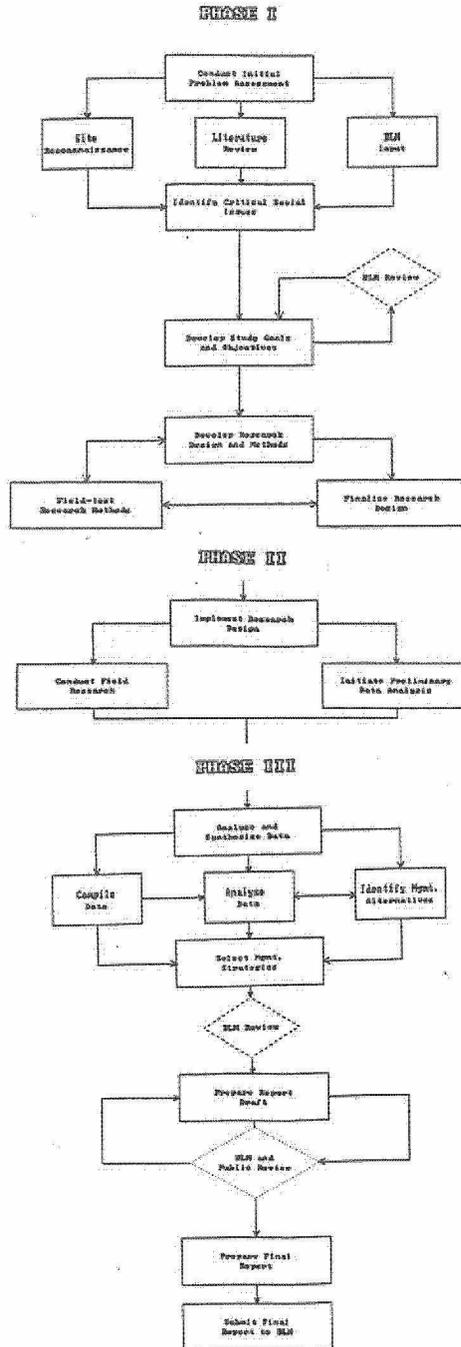


FIG. 2

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAUÁIPA CANYON WILDERNESS:
SCHEDULE**

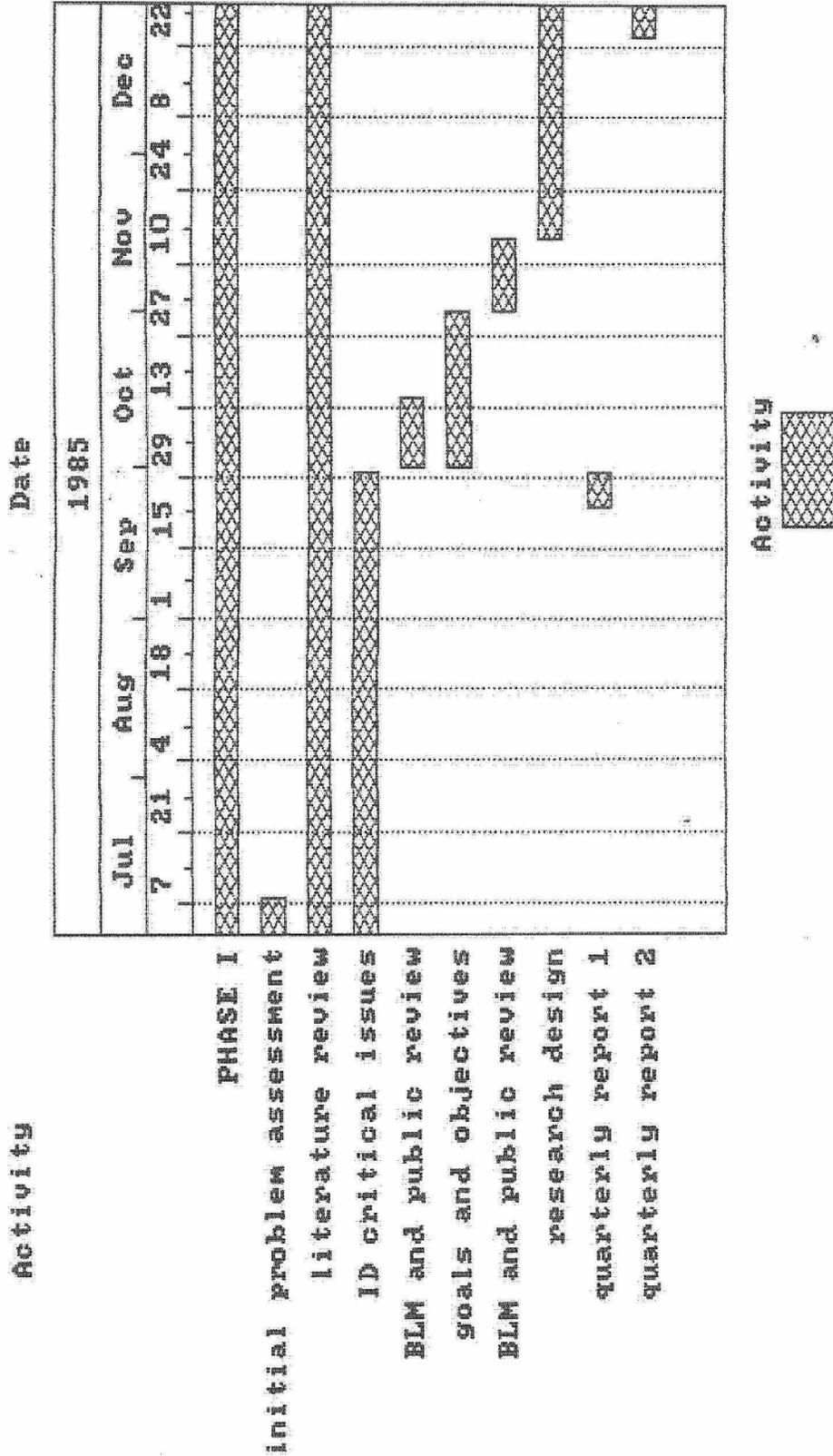


CHART I
(six month increment)
prepared 09/23/85

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAVAIPA CANYON WILDERNESS:
SCHEDULE**

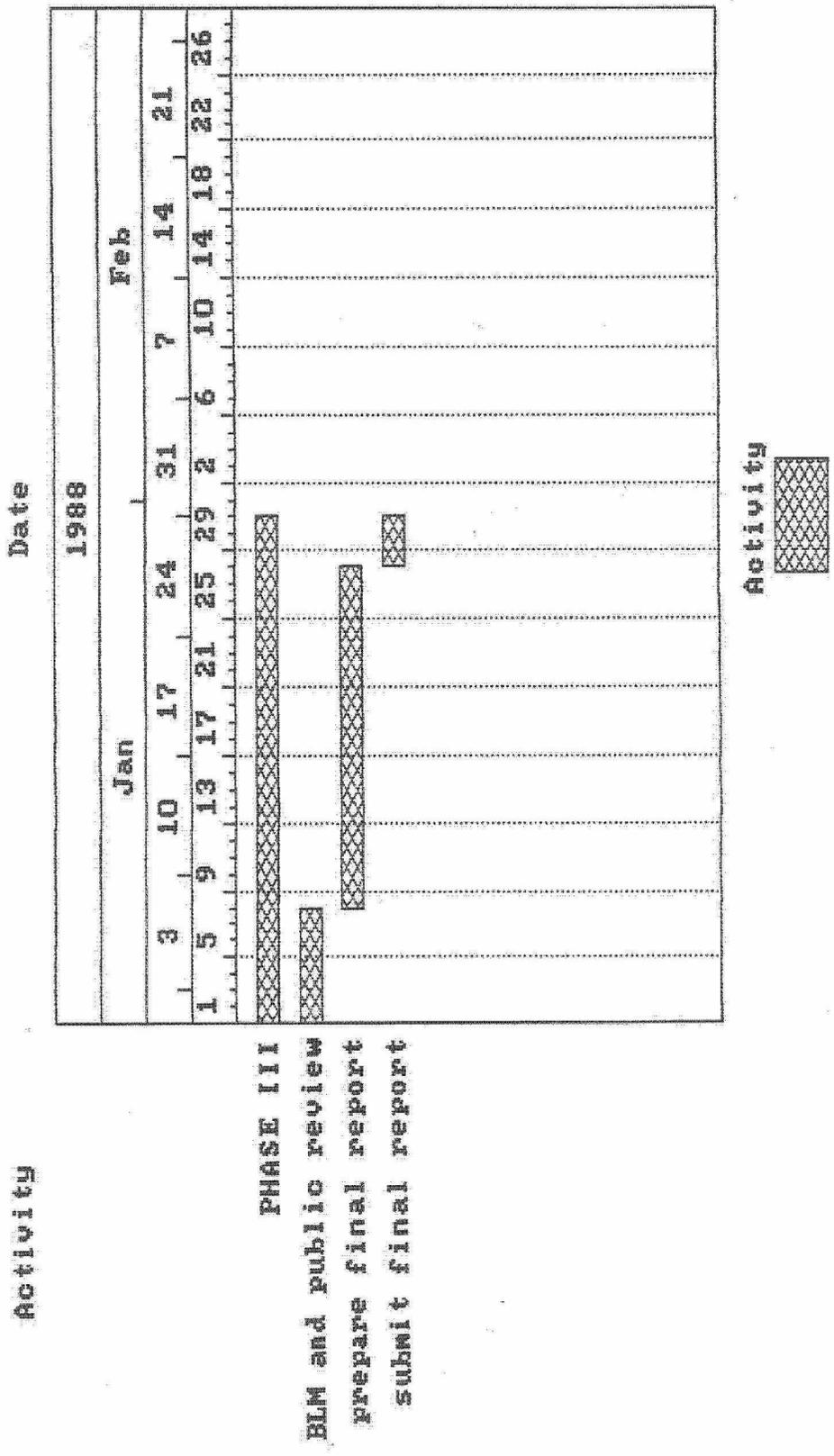


CHART UI
(two month increment)
prepared 09/23/85

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAVAIPA CANYON WILDERNESS:
SCHEDULE**

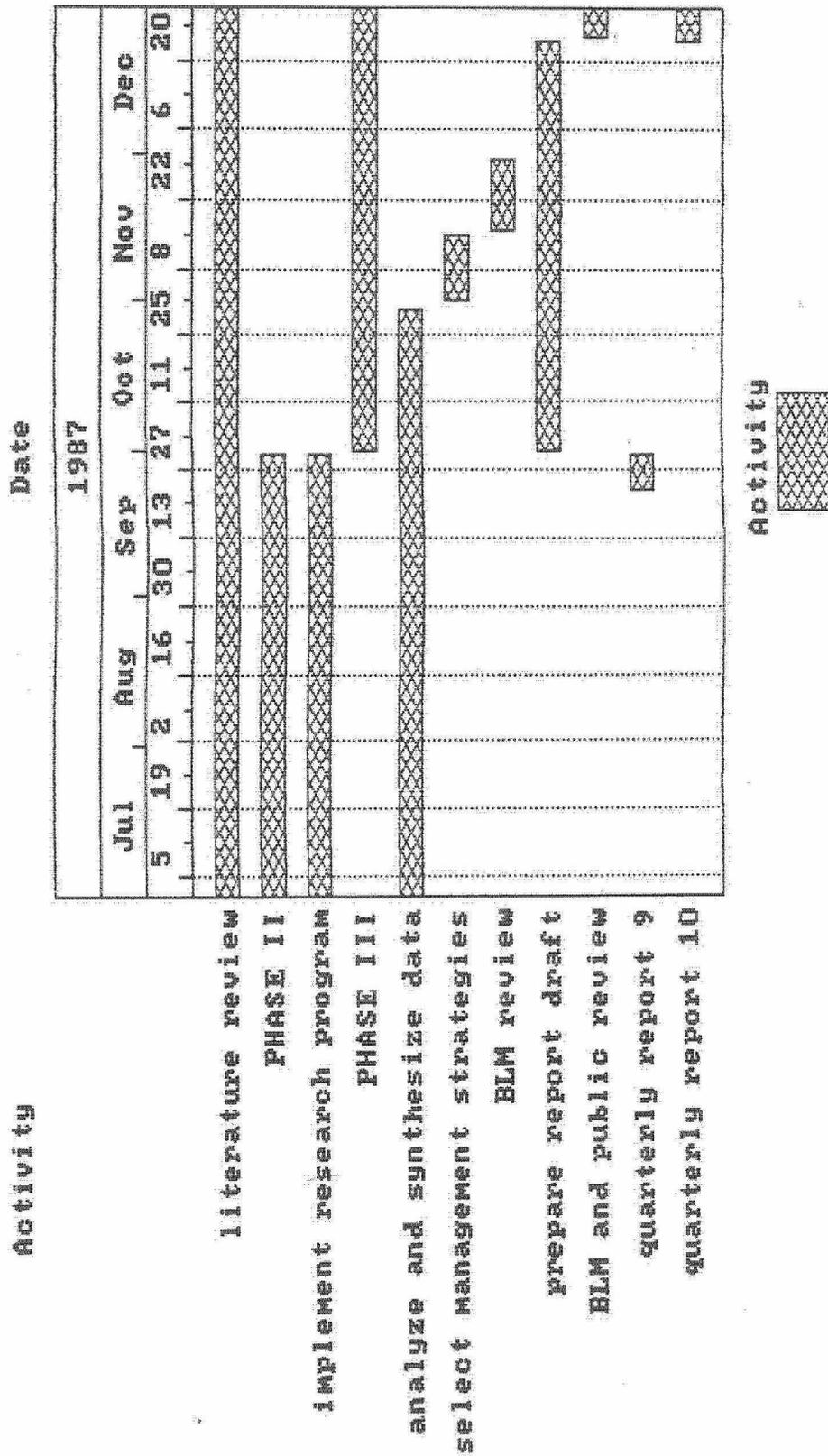


CHART U
(six month increment)
prepared on 09/23/85

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAVAIPA CANYON WILDERNESS:
SCHEDULE**

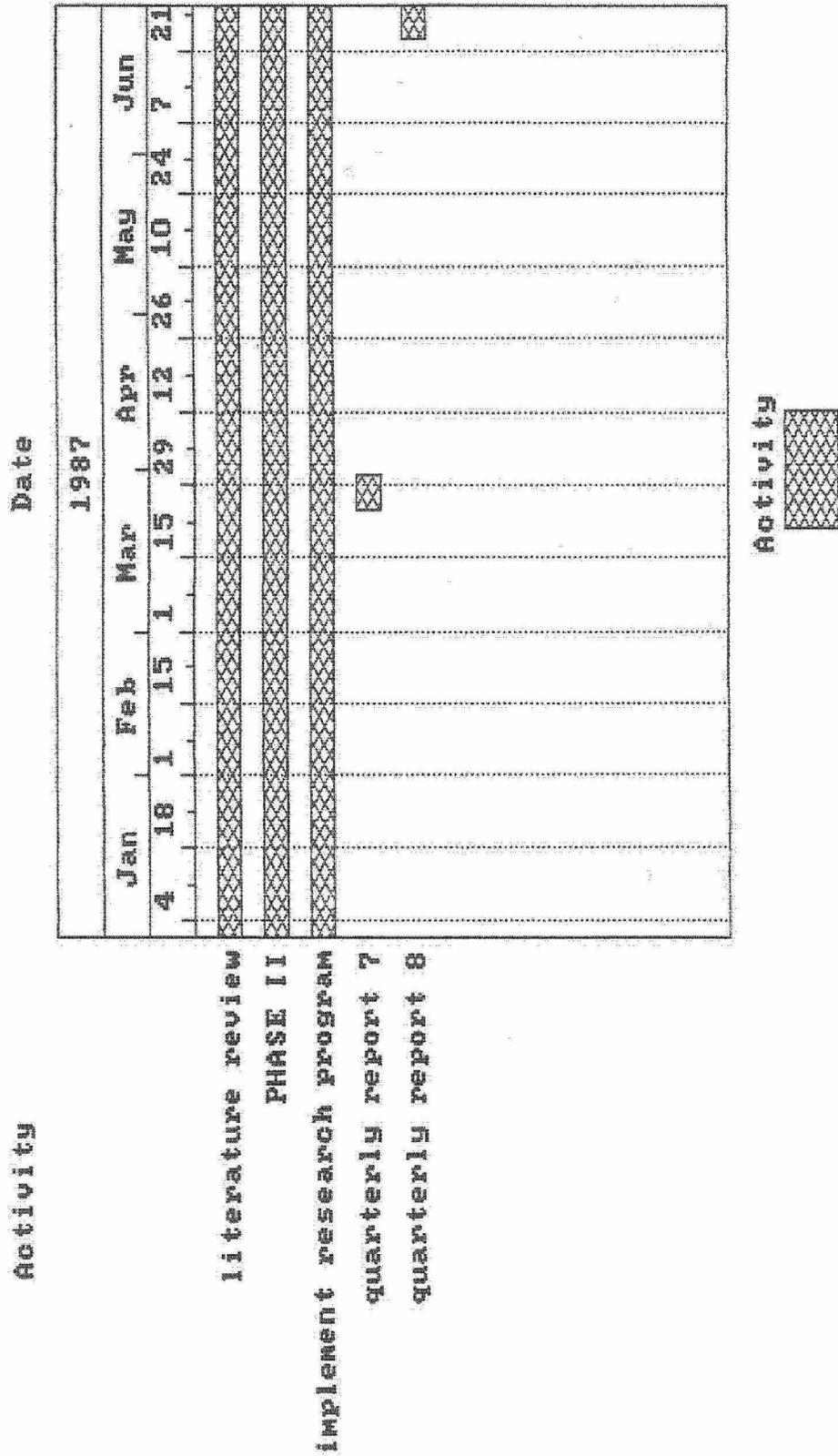


CHART IV
(six month increment)
prepared 09/23/85

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAUAIIPA CANYON WILDERNESS:
SCHEDULE**

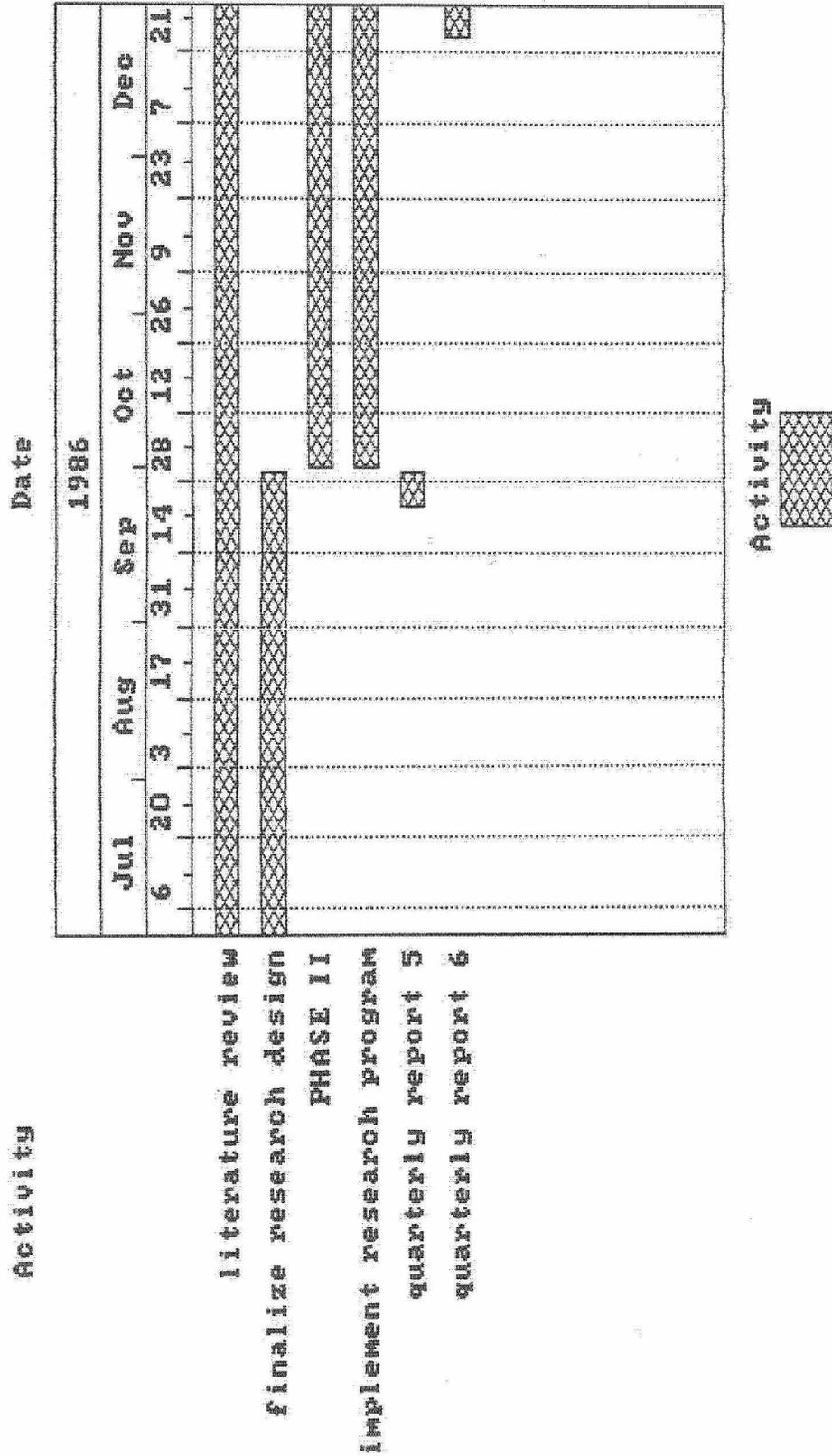


CHART III
(six month increment)
prepared 09/23/85

**SOCIAL CARRYING CAPACITY RESEARCH
FOR ARAVAIPA CANYON WILDERNESS:
SCHEDULE**

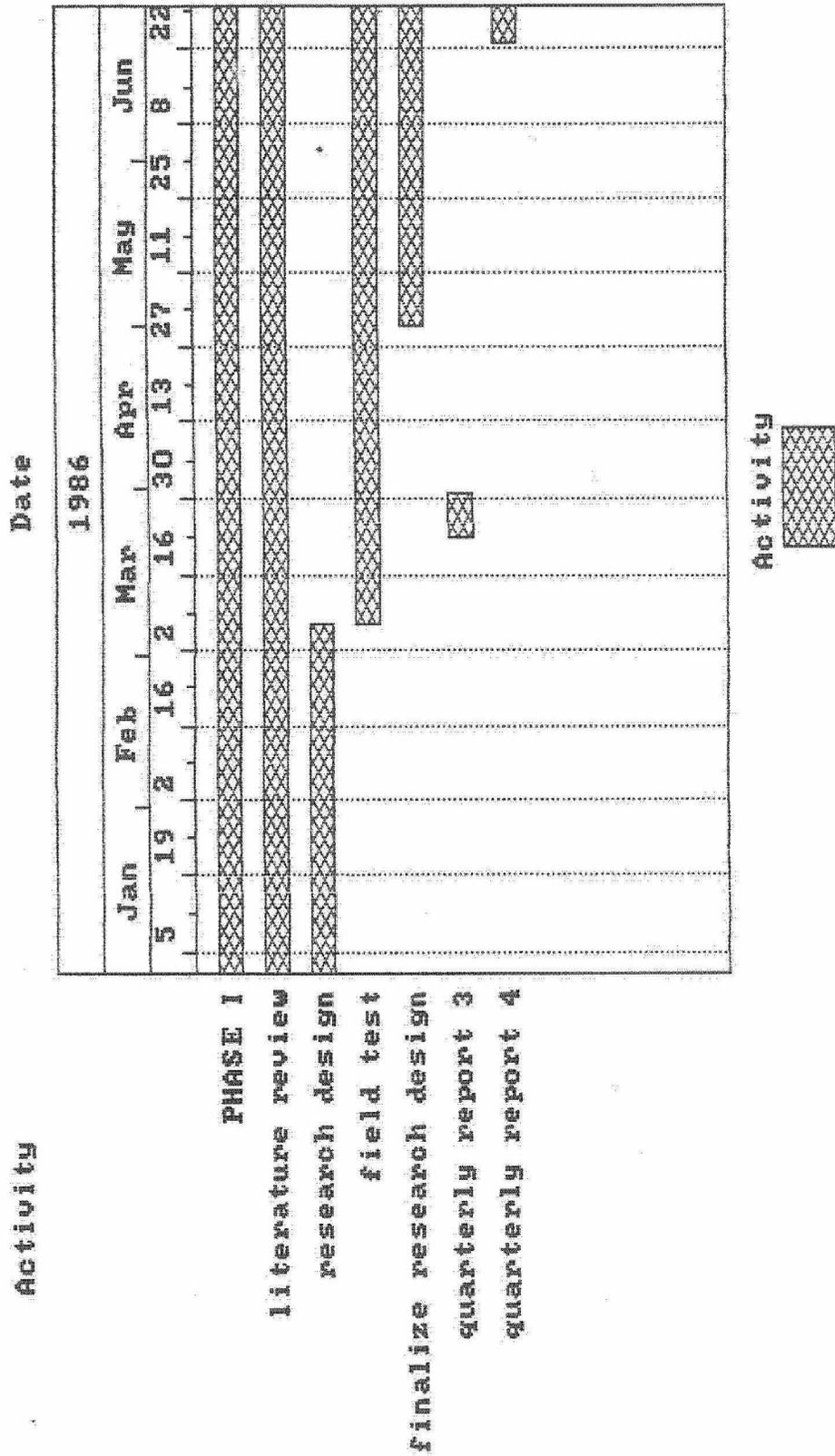


CHART II
(six month increments)
prepared 09/23/85

ADDENDUM TO PROPOSED COOPERATIVE AGREEMENT

ARAVAIPA CANYON WILDERNESS SOCIAL CARRYING CAPACITY STUDY

The University of Arizona, a public, land-grant institution, serves a variety of purposes to its students and to the general public welfare. The Graduate College, the College of Agriculture, and the School of Renewable Natural Resources, as subdivisions of the UA, uphold the general purposes of the UA and pursue other more specific purposes. The following describes three primary purposes of the UA and its subdivisions, and the benefits that would accrue to these entities from the proposed CA.

Graduate Education: The fundamental purpose of the Graduate College of the University of Arizona is to "encourage each graduate student to demonstrate excellent standards of scholarship and to produce high quality, original research." The Social Carrying Capacity Study as proposed in the CA would facilitate the UA in attaining this goal. By providing a challenging topic on the cutting edge of wilderness management research, the study would greatly enrich the educational backgrounds of the graduate students involved. Faculty, as well, would benefit from their involvement in the study and would bring new insights into their instruction of graduate and undergraduate students.

Extension: A primary purpose the University of Arizona, the College of Agriculture, and the School of Renewable Natural Resources is extension. Through extension programs such as the Agricultural Experiment Station, the Arizona Cooperative National

Park Resources Study Unit, and the Arizona Cooperative Wildlife Research Unit, the UA disseminates timely research information to state and federal agencies, private concerns, non-profit institutions, and the general public. The CA, by providing an outlet for the university's expertise in resources management, would facilitate the UA in providing extension services to the community.

Research: Possibly one of the highest purposes of the UA is "the pursuit of truth." A public university has an inherent responsibility to explore new areas of inquiry and contribute to the general body of scientific knowledge. The Social Carrying Capacity Study offers one such new area. Wilderness management is a continually evolving science. As demands increase on the nation's wilderness resources, new techniques and knowledge must be developed to assist land managers in meeting such challenges. Aravaipa Canyon Wilderness offers a unique situation for wilderness management research. New knowledge is required to determine how the BLM can manage recreational use of the canyon in deference to its management goals, objectives and strategies. Original research on the social carrying of Aravaipa Canyon Wilderness would greatly enhance the current understanding of management issues surrounding such resources.



The University of Arizona

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BUREAU OF LAND MANAGEMENT				
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SAFFORD DISTRICT				
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P. J. O.				
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1885

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A Proud Beginning

April 1, 1985

Mr. Steve Knox
Bureau of Land Management
425 East 4th Street
Safford, AZ 85546

Dear Steve:

We have reviewed your draft CA for the Aravaipa Canyon Wilderness Visitor Carrying Capacity Study and have made revisions on various portions of the text. In order to make our revisions more readable, we have prepared a new document for your review.

Our revisions changed some nomenclature, redefined the purpose of the study, and amended the timing, and thus budgeting, proposed in your draft. First, the three phases of the study as presented in your draft (pre-planning, data collection, and reporting), have been renamed Phase 1, Phase 2, and Phase 3. This nomenclatural change simplifies reference to the three study phases.

Second, our draft "Purpose and Need for the Study" has narrowed the purpose of the study to reflect the salient carrying capacity issue for ACW, social carrying capacity. As discussed in our February meeting, BLM has not observed any unacceptable resource impacts from current recreational use levels. Social dimensions of ACW recreational use, however, remain unstudied and unknown. Thus, our draft proposes to concentrate study efforts and resources on evaluating social carrying capacity, rather than on performing detailed assessments of biological and physical impacts from past use. Our draft also re-emphasizes the active role that BLM will take in the assessment of ACW social carrying capacity limits through the inclusion of BLM management goals, objectives, and strategies as central components of the study process.

Third, the time schedule and budgets of your draft have been revised to reflect a starting date of June 1, 1985. The time schedule as proposed in our draft allows the study team three full summers during Phases 1 and 2. Since summers are major use periods at ACW, it is imperative that the duration of the study overlaps as many summer periods as possible. With the proposed schedule, more time would be available for field testing of study methods and data collection.

Mr. Steve Knox

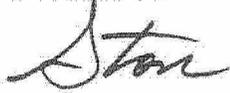
2

April 1, 1985

Fourth, your draft time schedule has also been revised to allow a January 31, 1988 completion date. The original draft showed completion of Phases 2 and 3 simultaneously on September 30, 1987. Since data collection would be ongoing during the summer of 1987, a reporting date of September 30 would be unmanageably close to the completion of Phase 2. The revised schedule provides a short, but workable, amount of time in which to perform data analysis, develop conclusions, and draft the final report.

The AWC trip planned for this week should offer ample time for us to discuss these revisions and any other thought you may have concerning the study. If you should have questions concerning the document, feel free to call.

Sincerely,



Stanley K. Brickler, Ph.D.
Associate Professor

SKB:nl

COOPERATIVE AGREEMENT

BETWEEN THE

DEPARTMENT OF INTERIOR

BUREAU OF LAND MANAGEMENT, SAFFORD DISTRICT, ARIZONA

AND THE

UNIVERSITY OF ARIZONA, COLLEGE OF AGRICULTURE

SCHOOL OF RENEWABLE NATURAL RESOURCES

ARAVAIPA CANYON WILDERNESS

VISITOR CARRYING CAPACITY STUDY

Agreement No. AZ040-CA5-

USAV-00005509

INTRODUCTION

Aravaipa Canyon is a rare desert canyon of exceptional natural beauty that provides an outstanding opportunity for primitive recreation. The 11 mile long canyon supports a perennial stream, uncommon in a desert environment. Aravaipa Canyon has long been recognized for its natural qualities and as a significant ecological area. The canyon and its water supports lush riparian vegetation and is home for 25 mammal, 35 reptile, nine fish, six amphibian and 202 bird species. Three threatened and endangered species also occur in the canyon: southern bald eagle, peregrine falcon, and Gila topminnow.

In 1969, the Secretary of Interior designated 3,957 acres of public land in Aravaipa Canyon as a primitive area. The purpose of the designation was to protect and preserve this significant ecological area and the outstanding recreation opportunities it provides. Management of the Primitive Area emphasized recreation, scenic, scientific, educational, conservation and historic uses and protection of the canyon for future use and enjoyment. In 1971, the Primitive Area was expanded to 4,044 acres to enhance management of the special values of the canyon. In 1984, Congress designated Aravaipa Canyon Primitive Area and 2,626 contiguous acres as wilderness.

Because Aravaipa Canyon was so popular with recreationists, a permit system was implemented in 1973 limiting the daily use of the canyon to 50 people. To enhance the visitor's experience by dispersing use, 30 people, daily, were permitted to enter from the

west end and 20 people from the east. This action was taken to protect and preserve both the natural environment and the recreation experience.

The permit system has been in effect for 12 years, and has generally accomplished its intended objectives. As demands for wilderness recreation opportunities increase, however, this objective must be re-evaluated to determine the capacity of Aravaipa Canyon to support increased use. The daily limit on visitor use has been working on a trial and error basis since its implementation in 1973. No significant ecological impacts have been observed. However, no formal study of visitor impacts on the canyon or recreation user perceptions and behavior patterns has been conducted. A study is needed to systematically examine the recreational carrying capacity of the canyon.

Recreational carrying capacity is an integration of physical, biological, and social carrying capacity elements. While physical and biological components are key factors in the assessment of carrying capacity, management has not observed any unacceptable resource impacts from current use levels. Therefore, biological and physical measurements will not be emphasized in the ACW study. What is unknown is the variation of user perceptions, attitudes, and behavior patterns in response to those user limits. This study will focus on social carrying capacity, assessing the visitor's perception of ACW, management strategies currently used, including user limits, and visitor patterns and their apparent impacts on key areas.

PURPOSE AND NEED FOR THE STUDY

The purpose of the study is twofold: first, to develop methods for measuring social carrying capacity for ACW; and second, using those methods, to recommend a visitor carrying capacity for Aravaipa Canyon Wilderness (ACW) corresponding to Bureau of Land Management (BLM) goals, objectives, and strategies. Visitor activities and related impacts on ACW resources such as camping areas, and interactions between visitors competing for the same or related experiences will, as well, be analyzed and measured.

This study is necessary for the Bureau of Land Management (BLM) to meet its wilderness management responsibilities in ACW. However, study design, methods, and findings will have direct implications and provide guidance for other BLM wilderness managers in the preservation of wilderness values as required by agency policy and public law.

AUTHORIZATION

This cooperative agreement (CA) is authorized by the Federal Grants and Cooperative Agreement Act of 1977 (Public Law 95-224) and the Federal Land Policy and Management Act of 1976 (Public Law 94-579). These laws provide the Secretary of Interior, through the BLM, the authority to enter into cooperative agreements for management and protection of public lands.

DEFINITIONS

1. BLM: Means the Bureau of Land Management, Safford District.

2. UA: Means Dr. Stanley K. Brickler, Associate Professor, School of Renewable Natural Resources, College of Agriculture, University of Arizona.
3. Project Manager: Means Dr. Stanley K. Brickler.
4. Contracting Officer: Means the BLM contracting officer.
5. COAR: Means the BLM's contracting officer's authorized representative.
6. Cooperators: Means the employees of the UA and BLM involved in the Aravaipa Canyon Wilderness Carrying Capacity Study.
7. Statement of Work (SOW): Means the detailed description of the work to be accomplished under this cooperative agreement.
8. ACW: Means the Aravaipa Canyon Wilderness.
9. CA: Means this cooperative agreement.

STATEMENT OF WORK

The development of methods to determine social carrying capacity and the subsequent determination of carrying capacity for ACW will require a three phase study, outlined below:

Phase I

Phase I activities will include development of the research design, testing of techniques, and evaluation of field procedures

to be used in the assessment of social carrying capacity for ACW. This planning, testing, and evaluation stage will guide and direct methods incorporated into the next step, Phase II. BLM will participate in this phase by establishing the agency management goals, objectives, and strategies that will form the basis of this carrying capacity evaluation. Phase I will begin June 1, 1985 and continue through September 30, 1986.

Phase II

Phase II activities will include the field application of research methods developed in Phase I, and focus on data collection. During this phase, BLM participation and assistance in field and data collection activities will be an important component of the research process. Phase II will begin October 1, 1986, and continue through September 30, 1987. Since the development Phase II activities is dependent upon completion of Phase I, details of Phase II cannot be appropriately outlined at this time. Thus, this CA will not attempt to discuss those details now, but will be amended and agreed upon, prior to initiation of Phase II.

Phase III

Phase III will include data analyses and preparation of the final report. The final report will be transmitted to the BLM for review, comment, and concurrence. Phase III will begin October 1, 1987 and continue through January 31, 1988.

Period of Agreement

This agreement will become effective upon signature of the BLM

contracting officer and the UA and shall remain in effect until January 31, 1988. The CA may be amended upon concurrence of the BLM and UA. The CA may also be terminated by either party upon receipt of a written 90-day termination notice.

Coordination

The COAR will work directly with the Project Manager to carry out the terms of this CA. They will be authorized to clarify technical requirements and to review the work within the scope of this CA. The COAR and the Project Manager will negotiate any changes to the CA and these changes will be effective upon agreement of the BLM and the UA.

Work Schedule

The study will be completed by January 31, 1988 according to the following schedule:

A. Phase I: This phase will be initiated in FY 85 and will be complete by September 30, 1986. Specific work items and deadlines are:

1. Determine the methods to be used to establish visitor carrying capacity. Research and select possible methods to conduct the carrying capacity study.

Deadline: December 31, 1985.

2. Field test alternative study methods to determine which are most appropriate for use in ACW.

Deadline: September 30, 1986.

3. Select the method to be used in determining carrying capacity for ACW.

Deadline: September 30, 1986.

- B. Phase II: This second phase will be initiated in FY 87 and will be complete by September 30, 1987. The purpose of Phase II is to assess user attitudes, perceptions, and behavior patterns, and to determine the number of visitors appropriate for ACW based upon BLM wilderness management goals, objectives, and strategies. It is not possible to discuss the details of the work to be performed during Phase II until Phase I has been completed. At or near the end of Phase I work, this CA will be amended to include a detailed work statement of the Phase II carrying capacity study. Upon agreement by the BLM and UA, the amended CA will become effective and the study will continue.

Deadline: September 30, 1987.

- C. Phase III: Submission and acceptance of the final report will conclude the CA. Upon completion of Phase III, UA will prepare a technical report identifying visitor carrying capacity alternatives that respond to the wilderness management goals, objectives, and strategies developed by BLM. The report will also document carrying capacity methods used in ACW and discuss procedures for adaptation of such methods for use by managers in other

BLM wilderness areas.

Deadline: January 31, 1988.

Study Progress Reporting

The UA will submit quarterly reports of progress regarding the status of the study. The reports will be submitted to the BLM and will detail progress made by UA in meeting the terms of the CA. These reports will serve as the basis for payment to the UA as agreed upon in the Billing and Payment Section of the CA. Upon completion of the study, the UA will prepare a final technical report detailing the results of the study and carrying capacity methods developed that may be used by other BLM wilderness managers.

Costs

Phase I Budgets for FY 85 and FY 86

I. Budget 1 FY 85:

Period 1, June 85-September 30, 1985.

A. Personnel

Ph.D. Graduate Research Assistant

1. Salary (four months)	\$1,874
2. Fringe Benefits	22

B. Operations

1. Communications	100
2. Data Processing	600
3. Materials and Supplies	1,000
4. Publications/Reproductions	500

C. Travel

1. Domestic	1,500
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Subtotal 5,196

D. Indirect Costs @ 24.5% 1,371

Total \$6,567

Costs, (cont.)

II. Budget 2 FY 86

Period 2, October 1, 1986-September 30, 1987

A. Personnel

Ph.D. Graduate Research Assistant

1. Salary (12 months)	\$7,098
2. Fringe Benefits @ 1.2%	85
3. Wages (technician)	800
4. Fringe Benefits (technician) @ 1.2%	10
Subtotal	<u>\$7,993</u>

B. Indirect Costs @ 24.5%	1,958
Total	<u><u>\$9,951</u></u>

Phase II and Phase III Budgets

The exact cost of these two phases cannot be accurately displayed at this time. Depending on the methods selected to determine carrying capacity and the complexity of those methods, costs will vary. Prior to initiation of Phases I and II, this CA will be amended to include both a detailed discussion of the work items to be accomplished and the cost of the remainder of the study. It is understood that completion of the study will depend on the availability of funding for the second year. The second year of the study is estimated to cost up to \$50,000.

Billing and Payment

The BLM agrees to pay the UA a sum of \$16,518 for Phase I spanning FY 85-FY 86 as follows: \$6,567 to be paid at the

initiation of the study for the FY 85 work; \$2,500 to be paid October 1, 1985 for initiation of FY 86 work; and \$2,500 to be paid quarterly thereafter with a balance of \$2,451 to be paid on July 1, 1986. Payment will be based upon receipt of quarter progress reports and satisfactory progress in completion of the study (see Study Progress Reporting section of the CA). Payment will be sent to the Director, Sponsored Projects Services, University of Arizona, Babcock No. 3313, Tucson, Arizona 85721.

Payment for Phases II and III of the study will be made subject to modification of the CA. When the CA is amended to incorporate the specific work items and costs for Phases II and III, the BLM will pay the agreed upon sum quarterly as described above. Continuation of the study into Phases II and III will be subject to appropriation of funds through the BLM budget process.

Personnel

It is anticipated that Phase I will be conducted almost exclusively by personnel of the UA. Coordination will be required with the BLM through the COAR and wilderness management personnel of the BLM. In Phase I, one faculty member, one graduate student and one technician from the UA will conduct the study working with the BLM as required to meet the terms of the CA.

During Phases II and III, BLM involvement in the study will intensify. It is anticipated that the UA will utilize

three faculty members, two graduate students, and two technicians. Because BLM policy requires significant participation of BLM employees in cooperative agreements, BLM personnel (probably the two wilderness rangers stationed at ACW) will be directly involved as support technicians in the operation of the study. Coordination with the COAR and other wilderness management personnel of the BLM will continue during the Study and Reporting Phases. The details of BLM involvement will be identified when the CA is amended to address the specific work items and cost of the Study and Reporting Phases.

Utilization of additional UA personnel beyond those initially identified is acceptable as long as they can be accommodated within the cost agreed upon in the CA.

Use of Facilities and Equipment

The UA will furnish all facilities and equipment necessary to complete the study as agreed upon in the CA. BLM facilities and equipment will be made available as required for use in this study. Normal access to files, plans, maps, drafts, and other information pertinent to ACW, will be provided to the UA as required.

Publication of Reports

After the study is completed, the UA will submit to the BLM a detailed technical report identifying the results of the study (social carrying capacity), methods used in the study, and its applicability for use by BLM wilderness managers in

assessing carrying capacity at other wilderness areas. The BLM will have 45 days to review the report and furnish comments. Should differences of viewpoint occur, every effort will be made to reconcile them. Both the BLM and UA may use or reproduce the report at their discretion providing appropriate credit is given to the other party.

Insurance and Liability

BLM personnel working under the terms of this CA are covered under the Federal Tort Claims Act (28 USC 2671). The UA will maintain General Liability Insurance (as required by State law and Federal, procurement regulations) that pertains to this CA. The UA will maintain a minimum of _____

_____, naming the BLM as co-insured.

Cancellation of the CA

This agreement may be cancelled by either party upon receipt of a written 90-day cancellation notice. Payment will be made by the BLM for all work satisfactorily completed by the UA. The UA will reimburse the BLM for work not completed but for which BLM has made payment.

This agreement is in effect upon signature of the following representatives of the Safford District, Bureau of Land Management, and the University of Arizona.

Bureau of Land Management

University of Arizona

Name

Name

Title

Title

Date

Date