INTRODUCTION

COOPERATIVE PARK STUDIES UNITS: UNIVERSITY-BASED SCIENCE PROGRAMS IN THE NATIONAL PARK SERVICE

The role of science in the National Park Service has stimulated much discussion about how such programs should be organized to best meet the objectives of the Service. Up through the 1960's, most scientists were stationed in National Park Service areas, but in 1970 a new concept emerged: the Cooperative Park Studies Unit (CPSU). Park Service scientists were stationed at NPS research centers on university campuses. The CPSU concept is one which embraces the functions of teaching, research, and extension on a sustained cooperative basis between universities and the Park Service. These university-based science programs serve more than one park and often interact at a national level to integrate scientific activities for park management programs. They have proven beneficial in several respects for both the universities involved and the National Park Service.

Evolution of the Concept

The idea for university-based research programs grew from dissatisfaction with the existing network of park-based scientists. While there were undeniable advantages to being stationed at a research site, there were also a host of disadvantages. National parks are usually in isolated areas, without access to laboratories, libraries, computer facilities, and other support services necessary for the conduct of science. The typical scientist was stationed singly in a park, limiting peer contact, and forcing the scientist to be a generalist rather than a specialist. The overall effect was isolation, and some scientists were eventually assigned responsibilities other than research, due to their availability and lack of research productivity.

The problem was distressing for managers and scientists alike. How could a park obtain its needed natural and social sciences information in a more efficient way? The solution began with an agreement between the National Park Service and the University of Washington in 1970 to establish the first Cooperative Park Studies Unit.

Growth of CPSU Programs

In the past ten years, 35 university-based science programs serving the National Park System have been established. Each program is specific to the needs of the parks to be served and the academic institutions involved. In some cases, single NPS scientists have been stationed at universities as coordinators; in others, several NPS scientists are stationed at the CPSU. Occasionally, the programs are coordinated by one or more scientists employed by the university, whose salary may be partially or totally contributed by the National Park Service. Programs are usually associated with professional schools or departments which emphasize the application of science to a problem-solving situation. From rather modest beginnings, the programs have grown to where they now average over a million dollars a year nationwide. Most of the research is oriented to specific single park problems, but some of it is directed to park problems that are regional or national in extent. Many CPSU programs have freely directed their research across regional boundaries when a multi-regional problem has surfaced.

Symbiosis: the Key to Success

The success of the CPSU concept has very simply been that both parties to the agreement have benefited from the relationship. NPS scientists have been more productive due to better facilities, and easy access to peer discussion and review of research problems. They can apply their specialized training to problems in several parks, and utilize their generalist talents to coordinate research contracts with other faculty members. CPSU scientists act as brokers between the scientific expertise of the university and park managers, making available specialists who would not otherwise be easily accessible.

The CPSU's have generally been quite cost-effective, in part due to increased scientist productivity and in part to agreements which have reduced or eliminated overhead costs on funds transferred to the university. The interaction of NPS scientists with other faculty has also increased the amount of outside research support (such as National Science Foundation grants) for parks.

University-based research programs have assisted in the training of park-based research and resources management staff, either with degree programs or non-degree short courses. They have provided training aids, interpretive programs, and pamphlets on applications of science to the field. However, these benefits are not just a one way street. The universities also gain from this exchange.

The most obvious benefit for the university is a source of research money. However, if this were the only benefit of significance the CPSU

program would not differ from other sources of research money. NPS scientists are usually adjunct or regular faculty members, and assume teaching and student advising responsibilities, as well as serving on faculty committees. Extension work is an emphasis of many academic institutions and is very complementary to park training opportunities. CPSU publications often receive wide distribution and provide indirect but effective public service for the university as well as the National Park Service.

Research Function

The primary justification from the National Park Service for CPSU establishment is the research support it can provide. Some have referred to individual university CPSU programs as science staffs of 200, reflecting the talents of a university available on call on a regular basis. Together with the advantages to the NPS scientists stationed at the CPSU, these units are productive, cost-effective, and responsive.

One advantage of the CPSU programs is that the business of the university is to undertake scientific inquiry. The universities have the libraries, laboratories, computer facilities and other support services for undertaking research in the National Park System. The availability of these services to NPS scientists located at universities tends to stimulate the individual's research productivity. The CPSU scientist, within a milieu specifically directed towards research, interacts with other scientists who provide ideas, reviews and criticism of current research.

Parks served by the CPSU benefit from the availability of specialized help, both from the NPS scientist and the university faculty. The NPS scientist can apply specialized training and experience in wildlife science, forest fire management, or sociology of leisure and human ecology in several park areas. Other faculty members from one or more CPSU's can also be called upon for other research needs. The advantage over a park-based program is that CPSU scientists can use their skills easily in more than one park (especially in small parks which cannot afford any direct research staff) and have direct accessibility to potential contract researchers.

The research assistance for park staff is not limited to the nearest CPSU. The primary field units served by each CPSU are those nearest to it, but intra-and-interegional cooperation is common. For example, the Pacific Northwest Region's science program, which supports CPSU's at the University of Washington, University of Idaho, University of Alaska, and Oregon State University, currently provides assistance to both the Western Region in California and Hawaii and the Rocky Mountain Region in Montana. This interaction between regions allows the best expertise on a given problem to be utilized where required.

Interagency cooperation can and has been facilitated through the use of CPSU's. For example, cooperative agreements with the research arm of the Forest Service have allowed the National Park Service, through its university programs, to share staff and the cost of research on common problems. This is but another way that access to experts is increased through CPSU programs.

Extension Function

Reaching out to the parks on issues not directly related to research is an important element of CPSU activities. These issues include training, publications, and review of various park action plans.

Training opportunities are provided by CPSU scientists acting as instructors, by hosting park management related workshops, and by providing opportunities for advanced degree training. As a spinoff from the regular educational responsibilities at the university, the CPSU scientist has current teaching experience and specialized knowledge which can be used in NPS programs such as the Albright Training Center at Grand Canyon, or in interagency programs such as the Interagency Fire Training Center at Marana, Arizona. Over the past seven years, CPSU staff from the University of Washington and the University of Idaho have been instructors in the basic ranger and basic interpretation skills courses at Albright. One recent session of the Full Spectrum Visitor course was designed and conducted through the University of Washington CPSU working with Albright staff.

Local training opportunities are also made available for park personnel and people in park-related disciplines. Some CPSU's host annual science/resources management workshops that discuss research and its application in parks. These workshops can serve as short courses for park-based management specialists. Other local opportunities are provided by "road shows", when a CPSU scientist travels to various field areas to present short courses.

The presence of a CPSU at a university also makes the regular academic program more available to park-based people. The CPSU scientist can advise these people of upcoming opportunities in degree or non-degree programs. At a CPSU, a temporary assignment for a park-based scientist provides excellent facilities for course work on advanced techniques and a good atmosphere for report writing.

Publications serve to extend the technical results of research into application. CPSU staff have developed motion picture, slide tape programs, and pamphlets on science findings. Pamphlets provide an outlet for material worthy of publication, of significance to other researchers, managers, interpreters, etc., and for which other publishing avenues are not available. In the last 2 years, the University of

Washington CPSU has published two pamphlets that have generated servicewide interest. In 1979, Dr. Bruce Kilgore's perceptive views on the relationships between scientists and resource managers was published, and this was followed in 1980 by Roland Wauer's discussion of the role of the NPS natural resources manager. Material which should be published in refereed journals is normally excluded from consideration as extension material. Most publication material is intended to aid the often difficult process of translating research results into managerial applications.

The review of park plans is another valuable extension function of the CPSU. CPSU scientists and other university specialists can often provide useful comments and amendments to proposed natural resource or visitor management plans. Often, such plans are an outgrowth of research done through the CPSU, and the scientists involved have a very good working knowledge of the research base for the plan.

Several computerized data management programs for park management have emerged through CPSU efforts. Programs for analyzing backcountry use permits and computerized bibliographies have been initiated at the University of Washington, and a comprehensive computerized bibliography on bears was developed at the University of Alaska. These have been used Servicewide in recent years.

Teaching Function

Participation in the educational programs of the university is one of the ways the university benefits from these cooperative agreements. Involvement with teaching brings the CPSU scientist into the same sphere of responsibilities expected of other faculty members, whether the appointment is regular, affiliate, or adjunct faculty (all of these options are exercised in CPSU's).

Teaching responsibilities of CPSU scientists are usually about one-half or less that of other faculty members, because of expanded extension and research contract administration duties of CPSU program leaders. The teaching function includes classroom teaching, student advisory and thesis committees, and university-wide committees. Classroom teaching is usually oriented around upper division and graduate courses. Park issues can often be introduced into such courses as examples of the principles being discussed.

Student committee assignments involve the CPSU scientist in graduate level education and research. CPSU scientists serve as chairpersons of committees, as members of committees chaired by colleagues, and occasionally as the graduate faculty representative for student committees in other departments.

Risks of the CPSU Approach

Most of this discussion has centered around the advantages of the CPSU; there are also certain risks involved, primarily due to the organizational isolation of the CPSU scientist. One concern is the possible lack of responsiveness to park needs from the scientist who is physically removed from the park. A second concern is that CPSU scientists will develop a stronger allegiance to university or educational concerns than to the National Park Service management objectives.

A third risk is potential ambiguity with respect to accountability. While a park-based scientist may be directly accountable to the Superintendent, a university-based scientist may appear accountable to everyone in general and no one in particular.

Two steps are essential to avoid these problems. The first is to define the proportions of time to be spent on direct research, extension, contract coordination, and educational affairs. Both the CPSU scientist and the university should be advised by the supervisory scientist what the relative proportions are. This research supervisor must also keep contact with field area managers to assure that proper accountability is maintained.

Looking to the Future

The short history of Cooperative Park Studies Units indicates a definite trend towards increasing reliance on university-based research in the National Park Service. However, the strong growth pattern of the last decade must be tempered against the historic instability of research organization in the agency. To continue their success to date, CPSU's will have to maintain the support of the two institutions with which they interact: the administrations of the National Park Service and the cooperating universities. CPSU scientists must understand and be sensitive to the constraints faced by colleagues in both institutions, and work effectively in both "worlds". This approach has worked very well in the past, and will allow the CPSU to continue its research/extension role in the perpetuation of our national park resources.

DEVELOPING RESEARCH CONTRACTS FOR PARKS IN PACIFIC NORTHWEST REGION

There are several basic steps involved in developing research contracts funded through the Pacific Northwest Region, National Park Service:

1. Definition of the problem, its scope, and the desired product;
2. Arranging proper financing;
3. Obtaining the research proposal;
4. Writing the contract.

The definition of the problem, its scope, and the desired product are developed in a draft Request for Proposal that may be written by a member of the park, CPSU, or regional staffs. The Request for Proposal (RFP) includes: (1) research topic; (2) length of proposed contract; (3) estimated cost; (4) purpose; (5) work to be performed; and (6) additional guidelines. An expanded discussion of the RFP is included in this section as Appendix A.

The arranging of financing is an important step in the contracting process. Research funds are potentially available from several sources, as indicated in Figure 1. An individual contract can be funded from the park, the regional science budget, or indirectly from the region through a university-based Cooperative Park Studies Unit. In the past, some projects have received funding from more than one of these sources and this pattern is expected to continue. Neither the regional nor the CPSU budgets are large enough to sustain needed park research without support from park-based research funds.

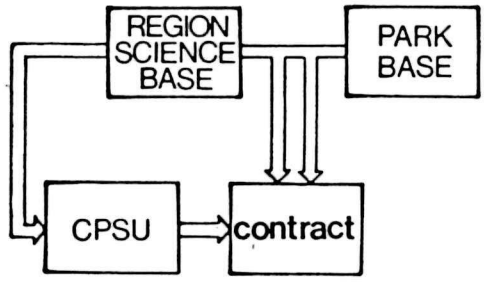

Figure 1. Sources of research funds.

Once the cost-share or other financing arrangement is agreed upon, the RFP can be finalized. It should be accompanied by a Requisition (DI-1) and an Advance Procurement Form (PNR-6) if the latter document was not submitted at the beginning of the fiscal year. All three documents are processed through the Regional Chief, Division of Contracting and Property Management. A formal RFP is then issued by that office and may be sent to a CPSU within the region or put out for competitive bid. In unusual cases, a CPSU outside of the region may receive the RFP if specialized assistance is available there.

The response to the RFP is a Research Proposal. The proposal builds on the framework of the RFP and specific Research Proposal Guidelines are included in this section as Appendix B. Because they are sent out with the RFP, Research Proposal Guidelines are the format standards by which research proposals are evaluated in the Pacific Northwest Region.

The actual contract is a technical document negotiated between the National Park Service and the contractor. It specifies a number of general contracting provisions and makes reference to the appended RFP and Research Proposal, which are part of the formalized contract. A contracting officer's representative, often from the regional science staff, is identified in the contract and is responsible for the evaluation of the technical merit of the final report. The Regional Chief, Division of Contracting and Property Management, is the primary officer relative to all other aspects of contract compliance.

Each of these steps depends on adequate completion of the previous one. The RFP may be a short document but it is the foundation for all the subsequent steps through the final report. Therefore, it is essential that the RFP be carefully thought out and designed as the initial step in the development of a research contract. Assistance in this process is available by contacting the Associate Regional Director, Pacific Northwest Region, 601 Fourth and Pike Building, Seattle, 98101 (telephone 206-442-1355, FTS 8-399-1355).

APPENDICES

APPENDIX A

RESEARCH REQUEST FOR PROPOSAL GUIDELINES
PACIFIC NORTHWEST REGION, NATIONAL PARK SERVICE

A Request for Proposal is a short, succinct definition of a problem, its scope, and the desired product. Most research problems can be covered in a 2-3 page Request for Proposal which includes:

1. Research topic
2. Length of proposed contract
3. Estimated cost
4. Purpose
5. Work to be performed
6. Guidelines for interaction with NPS staff, budgeting, and reporting.

1. Research topic. The topic is usually generated through a formalized planning process, such as a natural resource management plan. It may also have arisen from another planning process or a more immediate crisis in a park. The topic should be a mini-abstract of the entire problem; it should be as specific as possible in terms of the problem and it geographical scope.

2. Length of proposal contract. Project length should be defined as a balance between the needs of management and the capability of any contractor to obtain the needed information. Many research problems are postponed for years until adequate funding is available. In defining project length, it should be recognized that those delays are not the fault of the potential contractor and that he/she may require one to several years to produce the desired product. On the other hand, a project that is not adequately marked for a cutoff date may not result in a timely final report. Considerable care must be exercised in defining project length.

3. Estimated cost. This figure is a "total not to exceed"; research proposals may respond with any amount up to this maximum. If the project funding is to be spread over more than one fiscal year, such a breakdown should be noted in this section. The potential contractor will be using the estimated cost to develop the intensity of the research (from survey level to very intensive); therefore, a good, firm figure should be defined.

4. Purpose. The purpose of the research is a short discussion of the problem, the reasons why the research is needed, and the nature of the final product. One short paragraph will usually suffice, but it must give the potential contractor a capsulized idea of why the research is being funded and to what use the park will put the final report.

5. Work to be performed. This section must define specifically the information needed in the final report. It need not delve into methods unless there are specific reasons to do so, but should state the elements to be included in the Research Proposal. In this section lies the opportunity to provide guidance for how the research is to be structured. Specific elements can be listed as a, b, c . . . so that the contractor can similarly structure the proposal and eventually the final report.

6. Additional guidelines. Three common guidelines attached here are for interactions with park staff, budgets, and reports. Contractors should be informed of the need for regular, informal briefings to the park staff on the progress of the research. The budget requirements can be defined here. For example, on a three-year contract, a refined budget may only be required for the first year, with subsequent additional funding contingent on future refinement of the remaining phases of the contract. The timing and number of reports can be specified here, too. Usually a detailed annual report, an annual investigator's report (NPS 10-226), and a final report are required, in specific number and on specified dates.

An example of a recent Request for Proposal that follows these guidelines is included.

REQUEST FOR PROPOSAL

RESEARCH TOPIC: Habitat Impact of Non-Native Mountain Goats in Olympic National Park

LENGTH OF PROPOSED CONTRACT: 3 years

ESTIMATED COST: $80,000 ($30,000 per year for 2 years; $20,000 third year), to be funded in single-year increments.

PURPOSE: The purpose of this contract is to provide park managers with habitat information essential to development of a management plan for non-native mountain goats (Oreamnos americanus). A principal objective is to define the impact of various densities of mountain goats on native plants and soil-rock substrates in the park.

WORK TO BE PERFORMED: A study plan will be detailed in the format of Research Proposal Guidelines (Natural Sciences), Cooperative Park Studies Unit, College of Forest Resources, University of Washington. A copy is enclosed. The Research Proposal can be amended, upon mutual agreement, and will become part of the formal contract.

This work is to be closely coordinated with existing contract CX-9000-7-0065, Terrestrial Baseline Studies, Non-Native Mountain Goats of Olympic National Park, which addresses goat population dynamics and abundance.

A number of specific work elements should be incorporated into the Research Proposal. These should include, but not be limited to, the following characteristics of summer and winter range:

a. Habitat characteristics based on plant, soil and geologic parameters; abundance and availability of preferred and potential, but as yet unused, habitats.

b. Biomass and productivity of plant communities without goats, and with goats at several population levels (simulated where appropriate).

c. Grazing processes, including plant removal, trampling, etc.

d. Plant species sensitivity to grazing and trampling (simulated where appropriate); impact on rare and endemic plant species.

e. Erosion processes initiated or accelerated by grazing, bedding, trampling, etc., and their impact on soil and vegetation.

f. Appropriate rehabilitative techniques for impacted areas.

g. Habitat-population models simulating the impact of different goat population levels on plant-soil relationships; relative effectiveness of various management alternatives in reducing impact.

h. Management units in the park defined by habitat and population characteristics.

i. A habitat monitoring system to detect and evaluate habitat trends, the effectiveness of control actions and site rehabilitation success.

ADDITIONAL GUIDELINES:

1. Interactions with Park staff. Investigators will contribute regular briefings of their activities and progress to ongoing interpretation and management programs. Talks and public workshops in the local community may also be requested on occasion.

2. Budget. The budget guidelines are contained in the attached Research Proposal Guidelines. A complete budget and work plan is required for the first year. Complete budgets and work plans for second and third year will be required as part of the contract extensions.

3. Reports. A series of reports will be required as the products of this contract. Graduate student theses will not, in and of themselves, fulfill report requirements, although they may serve as major support documents.

   a. Two Annual Reports (4 copies each) will be submitted: 1) a brief progress summary by December 15 of each year for inclusion in the Superintendent's and NPS Annual Research Report, and 2) a detailed annual report of progress by April 1 of the following year, to allow a more thorough analysis of the previous year's work.

   b. A Final Report (and 5 copies) shall also be submitted by the expiration date of the contract and shall integrate the technical results of the project.

   c. A Report to Management (and 5 copies) shall also be submitted by the expiration date of the contract and will estimate and summarize the plant-soil impacts of various management alternatives. The alternatives will be prepared by park managers and submitted to the investigators at least four months prior to expiration of the contract.

   d. Investigators may be asked to collaborate with the park staff in preparing interpretation booklets or semi-technical publications about goats and the native ecosystems being affected by them.

APPENDIX B

RESEARCH PROPOSAL GUIDELINES
PACIFIC NORTHWEST REGION, NATIONAL PARK SERVICE

A Research Proposal will normally be submitted in response to a formal Request for Proposal (RFP) issued by the National Park Service. Whether or not the proposed contract is on a competitive or non-competitive basis, the proposal must be sufficiently specific to guide the researcher and to allow evaluation of progress by the contractor. It is recognized that individual research projects require flexibility: some are survey projects, others are very specific in focus. Therefore, although each proposal must contain some basic elements, the content of each may vary. An approved, funded proposal becomes part of a contract and should not be confused with grants of one form or another.

A Request for Proposal includes the following:

1. Research topic
2. Length of proposed contract
3. Estimated cost
4. Purpose
5. Work to be performed
6. Guidelines for interactions with park staff, budgeting, and reporting reporting

The Research Proposal must be prepared using information from the RFP, recognizing that the RFP is only a skeleton around which a detailed proposal must be built.

A Research Proposal includes the following elements:

1. Title of project
2. Investigators: Principal(s) and names or number of assistants
3. Project length
4. Statement of problem
5. Literature review
6. Study objectives
7. Methods or procedures
8. Literature cited
9. Budget
10. Reports
11. Curriculum Vitae

Discussion of Elements

1. Title of project. This can normally be transferred or adapted from the RFP.

2. Investigators. The principal investigators and size of the direct research staff should be listed.

3. Project length. This will normally be defined in the RFP, but can be altered if mutually agreed upon.

4. Statement of problem. This will be well defined by the RFP and can usually be taken directly from it.

5. Literature review. A brief synopsis of past work relevent to the current problem with appropriate references should be included here. This review is not expected to be voluminous but should reference relevant and current work in the field.

6. Study objectives. Specific objectives of the study that will provide answers to the problem should be listed. These should not be so broad as to be unattainable. In most projects, they should lead into the formulation of hypotheses that carry clear implications for testing.

7. Methods or procedures. This section should include experimental design, specific techniques for data collection, and methods for data analysis. In a study where statistical analysis is appropriate, the design, variables to be tested, sample sizes, levels of significance, and types of statistical analysis should be described.

8. Literature cited. All literature cited by author and year in the preceding sections should be included in a complete bibliographic listing.

9. Budget. An estimated cost is found in the RFP. A specific total amount should be identified in this section. It should be broken down by project year and include the following categories:

a. Salaries and wages
   - wages, benefits (list for each position; do not list names of assistants)

b. Supplies and services
   - consulting services
   - expendable supplies (list any single item over $50 separately)
   - non-expendable supplies (list each item)
   - data analysis
   - other costs (list as appropriate)

c. Travel (must be very specific; number of trips, destinations required)

d. Publications (page charges for journals, CPSU report costs, etc.)

A total for each year and a grand total should be shown in the budget. Specificity of the budget past the first year will be defined in the RFP. Please note that all capitalized equipment becomes the property of the National Park Service and shall be disposed of as directed by the Service.

10. Reports. A reporting schedule as shown in the RFP or as mutually agreed upon shall be listed in the proposal. This will usually consist of annual reports and a final report, in addition to any scientific publications, journal articles or theses. Periodic meetings with park staff are always essential. Reporting deadlines are important; every effort must be made by the Principal Investigator(s) to meet these deadlines. The deadlines listed in the Research Proposal should therefore be realistic ones; failure to meet report deadlines can cause serious problems for both parties to the contract.

11. Curriculum vitae. In most cases, this will consist only of the principal investigator's affiliation, address, and telephone number. If a full vitae is required, it shall be so stated in the RFP.

The accepted Research Proposal will become the technical part of the formal contract for the project. As such, it will be the principal guide to the conduct of the research and the evaluation of the final product. In some cases, Change Orders to an initial cost-reimbursable contract may be made. However, if the Proposal has been carefully prepared this will not normally be required or allowed. In the case of fixed-price contracts, such change orders are not allowed.