



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE  
WASHINGTON 25, D.C.

IN REPLY REFER TO:

SEP 16 1963

Memorandum

To: Secretary of the Interior

From: Director, National Park Service

Subject: Report of the National Academy of Sciences Advisory  
Committee to the National Park Service on Natural History  
Research.

We like the report of the Academy Committee very much. It is what we expected from the Academy, and hoped for. Comments on each of the 20 recommendations are enclosed with this memorandum.

In its total context the report points out the values of National Parks nationally and internationally, emphasizes the importance of preserving their ecological integrity, and makes clear that scientific knowledge is essential to effective management, preservation, and use.

The findings are consistent with those of your Committee on Wildlife Management. Both reports clearly express the need for a mission-oriented natural history research program by the National Park Service. The Academy report indicates the direction we must go, and provides guidelines regarding the nature and scope of the natural history research program and of methods for carrying it out.

In establishing its primary thesis, the report points out weaknesses that have marked the Service's natural history research program in the past. These we have recognized. Those relating to organizational deficiencies will be corrected by the reorganization proposals now pending. The remaining difficulties, involving funding, will be corrected, insofar as possible, within the resources available to us.

The beginning of this study was announced in the press release of July 11, 1962, copy enclosed. We now have the question of announcing the completed study, and of releasing the findings. We believe this should be done, and that the release should be closely coordinated with a program to remedy situations identified in the report. It does not seem necessary, however, to reproduce the full report for general distribution. While it contains much interesting historical data and other supplemental information, the sense of the findings is fully stated in the recommendations and comments, pages 64 through 75 of the printed version. It is suggested that our general distribution include these recommendations and comments in full, augmented by a statement of our position on each recommendation.

This report, as well as the Leopold Report, should be useful to us in justifying our research needs before the Bureau of the Budget. In this connection, we believe it would be extremely helpful and desirable if a statement on the significance of the National Parks for research and the need for scientific knowledge about them were included in the President's budget message.

Enclosures 2

## RESEARCH IN THE NATIONAL PARKS

### Comments on the Recommendations of The National Academy of Sciences Advisory Committee

A Committee of the National Academy of Sciences, appointed at the request of the Secretary of the Interior, was instructed to report on the natural history research needs and opportunities in the National Parks. On August 1, 1963, the Committee submitted its report.

As a preliminary to its recommendations, the Committee stated that " \* \* \* in its opinion the National Park Service must manage to some degree the lands which fall within the National Park System. The Committee has stated further that the management of any enterprise cannot be effective unless the objectives of the enterprise are clearly defined and well understood, and plans are devised to accomplish the objectives.

"Plans must be based on information of the resources (inventory) of the activity, on its problems, and on its relation with other similar activities; and they must be implemented by adequate and competent personnel, properly organized, motivated, and supported financially.

"Research is an essential part of the program outlined \* \* \* and its use a necessity in each of the steps. These elementary principles apply to the national parks as well as to a business or any other organized activity."

There follows the recommendations of the Committee, the Committee comments on its recommendations, and the comments of the National Park Service on the recommendations.

1. Academy Committee Recommendation: The objectives or purposes of each national park should be defined.

Academy Committee Comment: Each national park was established because of the potential esthetic, educational, scientific and cultural values of its natural history and/or its human history. The features of a park which make the values possible of attainment should be carefully defined to serve as the basis for operational management. They should be preserved and restored, where necessary, and provisions made for their proper enjoyment and use by the people. The objectives should exclude the use of the national parks for amusement or such mass recreation as requires elaborate facilities or extensive and/or artificial modification of the natural features of a park. The Committee endorses, in this respect, the conclusion of the report: "Wildlife Management in the National Parks." Zoning of a national park into, for example, natural undisturbed areas, naturalistic areas, public use areas and Park Service facility areas is suggested.

National Park Service Comment: Significantly, the Leopold Report (Advisory Board on Wildlife Management) also directed attention to this matter and suggested that our objectives should be to maintain or restore ecological conditions as they were when first seen by white man.

The objectives and purposes of national parks are set forth in the basic National Park Act of 1916, and in the Acts establishing each park. They are further defined in the Master Plans for each park. What is needed are more specific statements of the objectives and purposes of each individual park, based on its individual ecology. We intend to implement this recommendation as rapidly as resources permit. In these more definitive statements, the Superintendent, the interpreter, the advance planner, and others are concerned. The ecologist or other scientist needs to become involved early in the planning process so that the ecological characteristics and requirements of the park can be taken into account from the beginning, and given proper perspective with reference to public use objectives.

A first task of the field research man should be to assemble the data necessary so that such an ecological statement of objective and purpose can be written. Considerable progress also can be made on the basis of present knowledge, recognizing that the ecological statement may be modified from time to time as new data are developed through research. (See also comments under recommendation 2)

As a further adaptation of the Master Plan to the requirements of use and preservation, and in accord with this recommendation of the Academy Committee, procedures for more definitive zoning of the parks are now being developed.

2. Academy Committee Recommendation: Inventory and mapping of the natural history resources of each park should be made.

Academy Committee Comment: Such an inventory should cover the past as well as the present, and include information on topography, geology, climate, water regime, soil types, flora and fauna, and natural communities. Mapping, including aerial maps, should cover species distributions, natural communities, land use, archeology and such other mappable features as may be of importance in the park.

An inventory serves as a basis for judging changes, good or bad, in the condition of a park, supplies the information necessary for interpreting the area to the public, and is essential for proper operational management, as well as for further research.

National Park Service Comment: This is a basic recommendation, and will be implemented as rapidly as possible. The collection of data thus called for, some of which is now available, and its analysis, is prerequisite to (1) a more precise definition of the purpose and objective of the individual park, (2) the recognition of incipient problems and methods of forestalling them, (3) the formulation of a research plan for the area, (4) the identification of specific research studies needed, and (5) the establishment of management guidelines and programs. Such data are most usefully recorded on geologic, vegetation, and faunal maps, and in published descriptions of the natural features.

In general, the research process provides a description of conditions as they exist, and an approximate description of

conditions formerly existing (when discovered by white man). This provides the basis for the definition of the park objective in terms of ecological significance, and of the management objective in terms of the ecological situation to be restored and/or maintained.

3. Academy Committee Recommendation: A distinction should be made between administration, operational management, and research management.

Academy Committee Comment: Research is essential to solve problems of operational management whether the latter concerns preservation, restoration, interpretation or the use of the parks by the public. Administration, the management of research and the management of operations require somewhat different though well recognized administrative procedures. In most situations, the following steps are involved:

- 1) Identification and definition of the problem or situation;
- 2) Research, or fact finding, based on observation and/or experimentation;
- 3) Administrative action which involves decision on a course of action, grounded on the findings and recommendations of research and such other considerations as may be involved; and
- 4) Operational management, which means the implementation of the decisions by the appropriate operational division.

National Park Service Comment: The Committee's discussion is quite clear on this. The setting up of a research organization responsible for all research, as we have proposed, is in line with this recommendation. The research organization must itself recognize that its basic responsibility is met in submitting

recommendations based on scientific evidence; and that it is advisory in that it does not make decisions, nor give orders pursuant to putting recommendations into effect. The research findings should be "clean-cut" and objective. Research will become stronger thereby and thus be a more useful tool to the administrator and to operating personnel.

4. Academy Committee Recommendation: A permanent, independent, identifiable research unit should be established within the National Park Service to conduct and supervise research in natural history in the national parks, and to serve as consultant on natural history problems for the entire National Park System.

Academy Committee Comment: In order to maintain objectivity, the principal research organization should be independent of operational management. It should provide knowledge which would allow predictions of the consequences of alternate lines of action or inaction. Close liaison should be maintained between the research unit and the administrative and operating divisions in order that the results of research may be adequately applied. All branches of the service should participate fully in identifying problems and in preparing programs and budgets for research. The research staff should have complete freedom in the execution of an approved research program, in evaluating the results, in reporting the findings and in making recommendations based on the findings. There should be free communication on research ideas and research accomplishment from anywhere in the National Park Service to and from the top research staff. Provision should be made to enable the research staff to maintain close association with other scientists.

National Park Service Comment: The proposed plan of reorganization will establish research as an identifiable unit, with close liaison with administration and operating arms of the Service, but with freedom of communication on professional matters.

5. Academy Committee Recommendation: The research unit in natural history in the National Park Service should be organized as a line arrangement with an "Assistant Director for Research in the Natural Sciences" reporting to the Director of the National Park Service.

Academy Committee Comment: A nucleus of highly competent scientists headed by a Chief Scientist should be assembled in the headquarters of the National Park Service. This nucleus should comprise at least 10 individuals -- including the present staff. The scientific group in Washington should be supported by an appropriate staff of natural history specialists available for field assignments and other research. The committee emphasizes that quality is more important than numbers and that a selective and flexible approach to research problems is likely to be most profitable in the long term. Field research personnel should report directly to the Washington staff, and should be administered by personnel management policies compatible with their responsibilities.

National Park Service Comment: An Assistant Director for all research is proposed in our reorganization plan. Natural History Research would be a Division of the Research Activity reporting to the Assistant Director for Research who would report to the Associate Director and the Director.

6. Academy Committee Recommendation: Most of the research by the National Park Service should be mission-oriented.

Academy Committee Comment: The National Park Service should direct its in-service research mainly toward the problems involved in the preservation and/or restoration of the national parks for the esthetic, educational and scientific values and toward the adequate interpretation of these values. The solution of some of the problems may extend beyond the conventional bounds of natural history and involve, at least temporarily, contributions by, for example, economists, social scientists, and engineers. The problem should be emphasized and assistance for its solution sought wherever competence may be found. When appropriate, mission-oriented research should be carried out on a contract basis with universities or private research organizations.

National Park Service Comment: We agree. The amount of research needed to undergird the Service's management, development, preservation, and interpretive programs is so great as to require all our research effort. "Pure" research can more properly be done by outside scientists, and such research should be clearly recognized as a proper Park use. It should be pointed out, however, that non mission-oriented research is quite often extremely valuable for facts it may be able to contribute to mission-oriented research projects. This, in addition to other reasons, makes it imperative that this type of research in the National Parks be avidly encouraged.

7. Academy Committee Recommendation: The National Park Service should itself plan and administer its own mission-oriented research program directed toward the preservation, restoration, and interpretation of the National Parks.

Academy Committee Comment: The mission of the Service in the preservation of the total environment is a unique responsibility. The research program necessary to support this objective is of a scope and character different from that of any other institution or land management agency. The Service must therefore accept the responsibility for the planning, administration and conduct of its own research program. While it may, and is encouraged to utilize the specialized services of other agencies and institutions, it cannot abrogate its responsibilities for the direction and execution of its own mission-oriented research program.

National Park Service Comment: We agree. The proposed basic staff of the National Park Service will plan, direct, and conduct a mission-oriented research program.

The Chief functions of the Staff are: (1) To plan the research program, (2) To secure the highest competence, wherever found, for the indicated studies, (3) To conduct such research as lies within the competence of the staff, and long-term studies, and (4) To provide consultive service to the entire National Park Service.

We expect to make full use of the Bureau of Sport Fisheries and Wildlife, the Geological Survey, and other agencies, and contracts with research institutions, to conduct specific research projects when this appears to be the most effective way to get the job done.

8. Academy Committee Recommendation: Research should be designed to anticipate and prevent problems in operational management as well as to meet those which have already developed.

Academy Committee Comment: A limited staff which has inadequate support can deal only with immediate "brush fire" problems; that is to say, it can deal only with situations which have already become critical and perhaps irreparable. A research staff adequate in competence and numbers can conduct research from long-term considerations, detect problems before they become critical and offer alternate choices of action for their solution.

National Park Service Comment: We agree. See comment on Recommendation No. 2. A thorough ecological understanding of

each area, gained through research, will allow detection and correction of environmental degradation before serious situations develop.

9. Academy Committee Recommendation: A research program should be prepared for each park.

Academy Committee Comment: A basic goal of management should be to perpetuate and where necessary restore the values which justified the parks' creation and maintenance. A program of research studies needed to provide management with the information required to reach this goal should be established and implemented with the requisite funds and personnel.

National Park Service Comment: We agree. See comment on Recommendation No. 2. It will take some time to accomplish this task. It requires the presence of a qualified research man on the ground because personal, professional familiarity with the park ecological pattern is indispensable.

10. Academy Committee Recommendation: Consultation with the research unit in natural history of the National Park Service should precede all decisions on management operations involving preservation, restoration, development, protection and interpretation, and the public use of a park.

Academy Committee Comment: The Committee discovered or had its attention called to numerous instances in which consultation with qualified scientists would have prevented or modified a development or operation which had harmful effects on a park or required expensive changes to prevent or correct such effects. Operational management is sensible of this need, as judged by frequent unsolicited comments to the Committee, but is handicapped by limited research staff available for consultation or by failures in communication.

National Park Service Comment: We agree that this is a desirable goal. This again points up the necessity of research early enough to influence planning, development, management, and use policies. It will take time to achieve this ideal situation. Essential is an adequate scientific staff in the field for consultive purposes, active participation in the Master Planning process, and the early completion of step 1 (Leopold Report) in the research process, namely: historical research. See also our comments on Recommendation 2.

11. Academy Committee Recommendation: Research on aquatic life, as well as on that existing on and above the land, should be pursued to assist in determining general policies for the maintenance of natural conditions for their scientific, educational, and cultural values.

Academy Committee Comment: The Committee recognizes that serious management problems for the preservation and restoration of aquatic life in the parks exist and that research is needed to arrive at rational decisions on these problems. They arise in part from the use of rotenone or other poisons as a fish management tool, the effects on aquatic life of motorboat traffic, sport fishing, the introduction of exotic forms and their effects on native aquatic life. The so-called "barren" lakes and streams are devoid of game fish but are of considerable scientific interest because of that fact. Each of these raise questions which can be properly settled only through the results of research.

National Park Service Comment: We agree.

12. Academy Committee Recommendation: Research should include specific attention to significant changes in land and other natural resource use, or in other economic activities on areas adjacent to national parks, and likely to affect the parks.

Academy Committee Comment: The problems of operating a park to meet objectives given the National Park Service by legislation are closely related to events in areas surrounding each of the parks. Effective, economical administration of each park could be materially aided by timely research of a modest extent on resource use in such surrounding areas. This research could be carried on jointly with the other agencies directly concerned.

National Park Service Comment: This is a desirable objective.

As the National Parks tend more and more to become "islands" of natural ecological environments surrounded by lands subject to manmade changes, it becomes increasingly difficult to preserve the integrity of the natural scene. Recognition of, and concern with, these influences from without are, indeed, important to the research effort. Close cooperation with other agencies directly concerned is essential.

13. Academy Committee Recommendation: Research laboratories or centers should be established for a national park when justified by the nature of the park and the importance of the research.

Academy Committee Comment: Such research laboratories or centers should not only serve the staff of the National Park Service but also scientists from universities and independent research organizations. Control of such centers should remain with the National Park Service. The location of such centers, and access to them, should be such as will not destroy other values of a park nor interfere with the proper use and enjoyment of a park by the public. Consideration should be given to establishing research centers, whenever possible, outside the limits of a park in some instances supported, administered and used jointly with other agencies or organizations.

National Park Service Comment: Such a center at Mammoth Cave is in the 1965 F.Y. program. Others should be established as the need justifies them. In general, we see these as "research stations" with facilities to support field work, and housing, rather than as full-fledged research centers with elaborate laboratories and libraries.

14. Academy Committee Recommendation: The results of research undertaken by the National Park Service should be publishable and should be published.

Academy Committee Comment: Research in natural history carried out by the National Park Service should be of such quality that the results are worthy of publication and should be published. Although the research conducted by the National Park Service should be directed primarily toward park problems, it is in the public interest that the results be made available through publication, either in established journals or in a series sponsored by the National Park Service. It is recognized that on occasion research may be undertaken the results of which are not of general interest and do not require publication. Such investigations should be exceptions and not the rule.

National Park Service Comment: We agree. The Service has published a number of reports on the results of research.

Examples are The Wolves of Mount McKinley and The Bighorn of Death Valley. We will review the research reports now on file to see which of them are suitable for publication or reproduction. As a comprehensive research program gets under way, the publications program should be expanded accordingly.

15. Academy Committee Recommendation: Additional substantial financial support should be furnished the National Park Service for research in the national parks.

Academy Committee Comment: The Committee could not in the time available and from the data at hand, estimate the total cost of research, based upon the needs of each park. The Committee noted, however, that on the average, approximately 10 per cent of the annual budget was devoted in 1962 to research and development by those government agencies comparable to the National Park Service. The Committee considers this to be a reasonable basis for establishing a research budget and recommends that research in the National Park Service be supported at a level consistent with that of comparable agencies.

The Committee strongly urges that in future research appropriations and allotments within the National Park Service natural history research be given support commensurate with the key position of natural history in the preservation, restoration and interpretation of the parks. The number, variety and extent of the national parks, their unique character and international significance, as well as the complexity of their problems suggest that the allotment of money to research be of the order recommended above.

National Park Service Comment: We agree. We shall continue our efforts to fund a significant research program.

16. Academy Committee Recommendation: Cooperative planning as a result of research should be fostered with other agencies which administer public and private lands devoted to conservation and to recreation.

Academy Committee Comment: Various agencies in the federal government, the states, municipalities, universities, and other private or public organizations administer lands devoted to conservation and to recreation of one type or another. The National Park Service should be fully cognizant of the resources, objectives, and activities of these areas, and cooperate fully with those responsible for their administration, especially as related to natural history research.

National Park Service Comment: Certainly this is an important objective. Such relations now exist and are reasonably effective in certain areas. We plan to continue to work toward this goal with increased vigor. It is particularly important that we step up our cooperative efforts with regard to other state and federal agencies administering lands adjacent to the parks and who share responsibility for migratory animals. Other aspects are important as well, such as land use practices, use of insecticides, recreation and other management problems, and the like.

17. Academy Committee Recommendation: Universities, private research institutions, and qualified independent investigators should be encouraged to use the national parks in teaching and research.

Academy Committee Comment: The national parks are a national and international scientific resource. In some respects, their natural history is unique or nearly so. They are outdoor laboratories of great scientific value and should be made available to independent investigators when the research work does not threaten deterioration of the park or interfere with its appropriate use by the public and when it can be effectively facilitated by the staff of the National Park Service.

National Park Service Comment: This is certainly to be recognized and promoted as a legitimate, valuable use of park resources. This type of use has grown substantially in the past two decades. "Outside" research should be encouraged also because much data developed thereby is pertinent to the Service's mission-oriented studies.

18. Academy Committee Recommendation: Consideration should be given to including in the budget of the National Park Service an item for aid to advanced students who wish to conduct research in the national parks.

Academy Committee Comment: A program of this character should be considered in part a training program and a practical source of future personnel. Support for field work by advanced students is frequently inadequate, especially in natural history. It is recognized that the supervision of students places responsibilities on park personnel, and that provision for adequate supervision should be a part of any plan of the nature recommended. An expansion of those aspects of the Student Conservation Program concerned with the support of advanced students as Assistant Ranger Naturalists should be considered.

National Park Service Comment: This is a desirable objective.

A start can be made now through the recruitment of research assistants on a seasonal basis. As the research program becomes established, a grants system can also be considered.

19. Academy Committee Recommendation: A Scientific Advisory Committee for the National Park Service should be established, and Scientific Advisory Committees for individual parks are desirable.

Academy Committee Comment: Such Advisory Committees should be working committees concerned with park problems. It should be clearly understood, however, that advisory committees are advisory, not decision-making bodies. The practice of engaging the assistance of ad hoc committees for special park problems should be continued.

National Park Service Comment: In developing the proposed research organization and program, and in implementing the recommendations of the Academy Report, we will seek the advice and guidance of the Secretary's Science Advisor and the Interior Committee on Research and Development, look to such men as Dr. Stanley Cain and Dr. A. Starker Leopold, for assistance,

and act upon the invitation of the Academy to consult further with the Committee. As the program develops, the matter of establishment of a research advisory committee will be further explored.

20. Academy Committee Recommendation: Action in implementing the recommendations of this Committee's report should be taken promptly.

Academy Committee Comment: Time is an essential factor in dealing with forces that threaten the existence of certain indigenous animal and plant species and threaten or otherwise degrade park values, in some instances beyond the possibility of restoration. Among these factors are excessive human use, overgrazing, the invasion of park areas by aggressive exotic flora and fauna and interference with water supply. Studies are urgently needed to provide the basis for prompt action.

National Park Service Comment: We propose implementation as noted above.