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**GET THE FACTS, AND PUT THEM TO WORK**  
**Comprehensive Natural History Research Program**  
**For the National Parks**  
**Howard R. Stagner**

**T**he National Parks contain the largest and best preserved examples of the original American landscape. They constitute a resource affording outstanding opportunity for basic natural history research. Moreover, the National Park Service requires from research a continuous flow of precise knowledge about the nature and composition of this resource, and about the people who use it. The need is more critical than at any time in the past, and will intensify. The reasons are clearly evident:

*Congress has directed that the National Parks be safeguarded and preserved as complete, natural communities of life.*

Maintenance of the integrity of these natural properties is a practical requirement for their proper use. Their value for wilderness based recreation, for organized and avocational education in the fields of natural history and conservation, and as a theater for basic research by scientists depends upon the maintenance of the unchanged natural environments contained therein. Each unnatural change or impairment destroys a part of their capacity to serve these purposes.

*The National Parks are complex organisms.*

The National Parks are extremely varied in geologic, plant, animal, and other natural features contained in them. Moreover, the ecological patterns continuously develop and change under the influence of both nature and man caused factors. The interrelations, interdependence and interactions among elements of the environments, and of the forces at work within them, are exceedingly complex, frequently obscure, and incompletely understood. The results are seldom dramatic and obvious. More often they are insidious, and obscure. Unless under study by trained observers, unnatural changes can approach an irreversible stage before being recognized.

*The National Parks are rapidly becoming islands, bounded on all sides by lands ever more intensively managed and manipulated for other purposes.*

The Parks are increasingly subjected to adverse influences arising around their borders. Unless recognized and neutralized the inevitable consequence is damage or disturbance of the forests, wildlife, soil, and water relationships, frequently of such scope as to threaten

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the natural integrity of the whole environment, and in some cases the very existence of some Parks.

*Each year, additional millions of people seek recreation in the National Parks.*

In their varied pursuits, and in the facilities which they require for access, accommodation and safety, they, too, impose an even heavier impact on the natural environment.

*Thus, the first essential task is to manage these properties so as to neutralize, to the greatest degree possible, all unnatural influences, whether arising from unbalanced natural conditions and public use within, or whether invading the Parks from without.*

To do so means that the Service must understand, much more completely than it now does, the natural characteristics of these properties, the nature of the normal processes at work within them, the unnatural forces imposed upon them, and, as well, the relationships of Park visitors to the natural environments. If the Service is to protect and preserve, it must know what it is protecting, and what it must protect against. It is the function of research to get at the truth, to develop the fund of knowledge necessary for intelligent and effective management.

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Truth is both a weapon and a shield.

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*Concurrently, research is essential to public enjoyment and appreciation of Park values. It maintains the vigor and gives substance to the Park interpretive program.*

Research, which contributes to preservation and management, has an additional and equally important collateral product. One of the most far reaching benefits of National Parks derives from their capacity to stimulate Park visitors to a greater interest and awareness of the natural world of which they are a part. The same research program which directly supports management, also supplies data, presented through the interpretive programs, to enhance such appreciation and enjoyment, and to influence the visitor's better use of the National Parks. Some research projects are necessary to undergird the interpretive program. The research program feeds the interpretive program and maintains its vigor and substance.

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*But, in a broader sense, National Parks are important research theaters--places where superlative materials in natural history may be studied to advance knowledge.*

Through research on natural environments, primitive soils and life forms, science has contributed much to agriculture, forestry, medicine, and other practical pursuits. There is still much knowledge to gain through basic research in natural history, and more and more, science goes back to the original life communities to discover new products, to devise better ways to manage and care for producing lands, and to increase general knowledge.

Outside the National Parks, there are few places where studies of the original environments are still possible. These places are fast disappearing, and the National Parks may well offer the only opportunity in this country, if not the world, for such basic and perhaps essential, research in the future.

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The responsibilities of the National Park Service are to preserve the resource so that the research opportunity is perpetuated, to encourage and to facilitate independent research, and to pursue its own research program, dictated primarily by Park preservation and interpretive needs, so that it too contributes to the broad fund of scientific knowledge.

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### **A Look at the Record**

A substantial amount of research has been accomplished in the National Parks--far more than the meager natural history research budget of the past few years would indicate. In general, present knowledge about the Parks has accumulated through:

Independent research by scientists and universities.

Research by other government agencies, both as a part of their own program, and sometimes for and at the request of the National Park Service.

Research financed by outside organizations for the National Park Service.

Observations and research by field personnel of the National Park Service, related to or incidental to other functions.

Staff research, or contract projects initiated and supported by the National Park Service, chiefly to meet immediate, critical problems.

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The National Park Service has been the fortuitous beneficiary of much excellent research performed by others. But, the research attack of the past has lacked continuity, coordination, and depth. Inadequately financed, research has relied largely upon voluntary contributed aid. Quite properly, such research is most frequently oriented toward the researcher's interests, and only incidentally toward Service needs. Research that the Service has supported of necessity, has been directed in piecemeal fashion toward solving immediate problems. Most research has been descriptive and of an inventory nature, rather than analytical. It has identified and catalogued, but provides a very inadequate account of how all elements of the Park scene fit and work together as an ecological whole. Understanding of the how and why and when of the processes operating within these natural environments is the pressing need today.

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To safeguard the National Parks,  
and to enhance their scientific  
and educational values, the re-  
search program must enter a new  
dimension.

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### **Comprehensive Research Program—The Pattern for the Future**

The proposed natural history research program, in contrast to the year-by-year, piecemeal endeavors of the past, is long-range, comprehensive and continuous. It projects into the future as far as can be reasonably planned. It draws upon all appropriate sciences in describing and appraising the conditions existing in the individual Parks. It contemplates reorientation and strengthening of staff to do the job, and relies heavily upon securing the most capable research people available in universities and other government agencies to conduct specific research projects. It contains the machinery for the direct application of the research findings to Park problems. Its major elements are as follows:

*Develop a comprehensive research plan for each Park or research unit in the System.*

Based upon the significant natural values of each Park, and upon the factors, known and anticipated, that threaten its natural economy, research master plans will be developed. Each master plan will establish the research objectives and the sequence of the research attack, and will define the specific research projects calculated to develop the required data most quickly, economically, and effectively. In brief, the master plan will establish the framework within which specific research projects will be programmed so as to get the most from each project, and to multiply the value of the succession of

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studies. Each study builds upon completed ones, points the way and forms the base for those that follow.

*Start on a scale practical of accomplishment, and progress into the full scale program in five years.*

It will take time to do the basic planning job, to enlist the services of universities and agencies for their part of the task, and to develop the organizational procedures to handle the program effectively. Consequently, it is proposed to move by stages into the full program, reaching full scale by 1967. The comprehensive plan will thus be put into effect progressively in all natural areas over a five-year period. For example, the master plan for Everglades, Isle Royale, Rocky Mountain, Grand Teton, Olympic, Sequoia and Kings Canyon, the Grand Canyon-Zion-Bryce Complex, and perhaps Virgin Islands, Big Bend, Death Valley, and Channel Islands might be undertaken in fiscal year 1963. Project research, within the framework of the plan, will start immediately thereafter. Similarly, additional parks will be brought into the new procedure in successive years, and by 1967 all natural history research will be carried out within the framework of the comprehensive program.

*Collaborate with research institutions in developing the basic plan.*

The master plan will be developed by the Service, collaborating with representatives of universities, research institutions, and other government agencies. Thus, the highest competence will be put to work in developing the strategy of the research attack. Moreover, the scientists who later will be enlisted to conduct much of the research will have a clear understanding of the purpose, scope, and guidelines governing the program.

(Research people who have been consulted, agree that the comprehensive approach is a logical and efficient one, well adapted to Service needs, and advantageous to the universities. With a knowledge of the Park research objectives, and of the plan to carry it out, and with reasonable assurance of continued support, the universities can better plan and strengthen their own research programs in consonance with the plan. Much of the research will have practical use as well as academic purpose--an added stimulus for the researcher. It can be expected that additional research, supported from other sources, will be attracted to the Parks through interest generated by the master plan, and by the vigorous pursuit of research by the Service.)

*Program research in logical sequence, and secure the most competent research teams for the work.*

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Within the framework of the master plan, the research will be carried out as studies sharply focused upon specific subjects. These will be undertaken in the order calculated to yield useful data rapidly, and to provide the best support for the projects which follow.

Most of the project work will be carried out under contract with universities and other research institutions, and by reimbursement to other government agencies, such as the U. S. Geological Survey, and the Bureau of Sport Fisheries and Wildlife. The objective is to enlist the highest competence, wherever found, for each project.

Problems of immediate urgency will be attacked immediately. Problem-oriented research arising from "crises" will, however, be absorbed into the comprehensive program as it develops. Thereafter, "crises" should not develop, because the unfolding comprehensive program will recognize incipient problems and provide the guidance for their solution.

#### *Plan, Administer, and Coordinate.*

Most of the project research will be done by others. However, the National Park Service must administer, monitor, and coordinate the whole, conduct such studies as are appropriate to its staff, provide continuity, assess the need for additional research, and apply the results. The Natural History staff is being regrouped to focus directly upon this program. (Research staff functions are described later, under the heading "National Park Service Research Staff.")

#### *Followup of the research with periodic inspections, appraisals, and diagnosis of ecological conditions.*

Accomplished research has both immediate and long-range aspects. The full value is realized as the knowledge obtained forms the basis for continuous diagnosis of the ecological "health" of Park environments. Consequently, the active intense research projects must phase into complimentary programs of periodic inspection of wildlife, forest and meadow, soils and water, and other ecological situations.

As the program develops, both the research staff and field personnel will be increasingly occupied in such periodic inspections and appraisals. The Service must know at all times what is happening, what needs to be corrected, and how to go about it expeditiously.

#### *Put research results to work.*

Research must not culminate in reports reposing in forgotten files. The Service has two obligations in this respect: to translate research results into policy and actions,

and to make the results available to other conservation agencies and to science.

The research staff will translate reports of completed projects, and of periodic followup inspections, into specific recommendations applicable to use, and interpretive programs. Decisions and actions based thereon represent the immediate product of the research program.

The Service will arrange for the publication of important research reports. The Service is the immediate beneficiary of the research program, but the product of the over-all program will be of value to science, and to other land management agencies.

*Stimulate and support the use of National Park natural areas for independent basic research.*

The National Parks will afford increasing opportunities for basic research in the future, much of it extending beyond the immediate intent of the comprehensive plan. This is to be encouraged, insofar as is consistent with the maintenance of the natural environment.

The following chart identifies the major elements of the research program, illustrates the character of its development, and estimates its scope over the 5-year period. Figures are in thousands of dollars.

Comprehensive 5-year Program	1963	1964	1965	1966	1967
Emergency Problem Research Projects including projects in progress	125	125	100	50	0
Comprehensive Planning	17.5	50	50	50	25
Comprehensive Research Projects	65	300	500	750	1000
Publication	13.9	50	75	75	100
NPS Research Staff and Administration	31.6	75	150	175	225
<b>TOTALS</b>	<b>253</b>	<b>600</b>	<b>875</b>	<b>1100</b>	<b>1350</b>

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The Service can no longer rely upon fragmented, problem oriented, piecemeal, stop-and-go research of limited scope to support management, preservation, planning and interpretive decisions and actions. A planned, comprehensive attack, approached from a long-range, ecological viewpoint, bringing into play all related natural science disciplines, is indicated. This will enable the Service to meet its problem in stride, and to provide the broad base for handling future needs before they become critical. A comprehensive attack, and reinforced through periodic inspection, the whole being translated into appropriate action, is the pattern for the future.

### **Immediate Action Research--The Program for FY 1963**

Past experience proves that Park protection, planning and development cannot stand still. These phases of Park operation and management never remain fixed because the factors on which they are based experience constant change. To solve existing critical problems, and to permit planning and use programs to go forward, certain specific knowledge is needed at once.

Certain research projects now in progress must be completed, and others must be undertaken even before the formulation of the comprehensive master plan. Projects of immediate urgency constitute the greater part of the 1963 program, and substantial parts of those of the following three years. A few examples of such projects follow:

(1) Imbalances among elements of the environments within the areas themselves, coupled with adverse influences from the outside, have created and intensified the over-population of elk in Yellowstone and Grand Teton National Parks. Effects on both the elk and the vegetative cover on which they depend for food, have reached disastrous proportions. The situation is highly dynamic in that drastic change can occur within relatively short periods of time.

This is an over-all ecological problem for it involves, not only population dynamics, migrations, and other factors pertaining to the elk directly, but plant and soil conditions over the entire range utilized throughout the year, relation to deer, antelope, bison, beaver and other animals coexisting with the elk, the predators, climatic and weather conditions, hunting and other influences outside the Park, and other factors.

While direct measures and expedients may be required to stem the deterioration, and to effect a degree of recovery, the ultimate objective is to attain a self-sustaining relationship among all elements of the environment. The application of corrective measures, and the restoration and maintenance of natural balances, can succeed only if backed-up by complete and accurate knowledge, and continuous appraisal of the ecology of these environments.



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(2) Everglades National Park is without doubt the most critical area in the System in its dependence upon exterior factors. The problem here is to determine the water requirements necessary to maintain the fresh, brackish, and salt water environments that characterize this Park, and thus to support claims for the release of water from conservation projects above the Park. These engineering works have the capacity to shutoff all surface water flow into the Park. Unless the supporting data are developed and properly applied there is real danger that the Everglades may vanish as a sample of distinctive environmental types. The necessary data can be obtained most rapidly through intensive research focused upon requirements of the specific elements of these environments.

(3) The science of geology is fundamental to an understanding of many of the areas of the National Park System. Not only do the Parks exemplify some of the most dramatic manifestations of geological forces, and require study to support Park interpretive programs, and for preservation purposes, but the science of geology provides the logical and necessary base for the further study of the organic environment. In many cases, specific geologic data are required for planning and development purposes. In a larger sense, the National Parks should tell the basic geologic story of the United States. To do so will require not only certain specific geologic studies in existing Parks so as to take full advantage of geologic interpretive resources now within the System, but as well to identify other natural geologic exhibits to complete the story either as such exhibits may be included in future parks, or encompassed through other means of identification, use, and preservation. This aspect of National Park Geology merits separate attention through library research, and field studies to result in a comprehensive report for the guidance of the Service, and for educational and scientific purposes.

### **National Park Service Research Staff**

While much of the research will be carried out by other agencies and institutions, the administration of the program and the basic planning, and the translation of research results into appropriate action must remain responsibilities of the National Park Service. As the program develops, staff responsibilities will increase, a circumstance taken into full account in the phasing schedule (see preceding chart) which sets forth the natural history research staff funding requirements.

The major responsibilities of the research staff are as follows:

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*Administration:* establishment of policies, standards, and procedures for research; personnel and fiscal management; maintenance of liaison with research organizations.

*Research Master Planning:* preparation, in collaboration with field and regional personnel, and research institutions, and a long-range plan for the conduct of research in each National Park.

*Field Review of Contract Research:* maintenance of liaison with active research teams to provide continuity, to keep each project on the predetermined course, to coordinate several related projects, and to keep the Service currently informed of new and useful findings.

*Evaluation and Interpretation:* the review and evaluation of project findings to identify and appraise their implications to planning, protection, management, use, and interpretation, and to translate these implications into recommended courses of action.

*Publication and Dissemination of Knowledge:* selection editing, and arranging for publication or reproduction of significant reports; determination and development of other means for disseminating knowledge derived from research.

*Staff Research:* the conduct of studies of an appropriate staff nature, such as: limited-scale, emergency projects and studies involving periodic on-site observations over an extended period of time.

*Reappraisal of Conditions:* conduct periodic observations and reappraisals of conditions in the Parks, following the completion of intensive research projects, to provide continuity, to make current assessments of the status of environments, and, thus, to anticipate changing and adverse conditions before they become serious.

### **National Park Environments--Their Scientific Value to Society**

The National Park Service research program is designed to preserve distinctive natural resources, but science and civilization, through research that goes far beyond the scope of the research program of the Service, will also benefit.

In a truly natural environment, one experiences the culmination of the processes and events that have been unfolding since the beginning of time. It is the story of the evolution of the American land, and of the development of life upon it. It is a never ending story, that will continue to unfold, for the inspiration and general welfare of mankind and the advancement of science, so long as the integrity of these "islands of nature" is maintained.

The importance of basic ecological research is becoming evermore widely recognized. Already the units of our National Park

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System are looked to and sought out by research workers of many countries as unique outdoor laboratories or classrooms where man can obtain a more complete understanding of the natural laws that may govern his future--and possibly his ultimate survival--in lands and environments everywhere.

In 1956 an international symposium of scientists emphasized how profoundly man has changed the face of the Earth. (*Man's Role in Changing the Face of the Earth*. 1956. Edited by W. L. Thomas, Jr.; Chicago: Univ. of Chicago Press. xxxviii-1193 pp.) Man's influence in this respect has attained the magnitude of a major geological-ecological force.

In 1961 a conference of ecologists from 12 countries concluded that the national parks of the world offer the principal future hope of preserving some scattered fragments of primeval nature for fundamental scientific research. The large primeval parks of the U. S. National Park System were declared to be pre-eminent in this respect, and of international significance and value. This idea has been reiterated at other international forums.

As our society continues to increase in complexity and in sheer population size, such an understanding of natural, balanced environments will become increasingly essential for developing ways of living harmoniously, rather than destructively, on our Nation's lands, which are NOT increasing in size.

Science needs these environments as a point of reference and as a yardstick with which to measure man's success or failure in the countless land management programs that he carries out in the rest of his environment.

The concept is gaining worldwide recognition and acceptance that National Parks, preserved as natural ecological entities, will furnish the environments which will supply knowledge that civilization will need in an increasing measure.

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