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INTEGRATING WILDLAND RECREATION RESEARCH INTO DECISION MAKING: PITFALLS AND PROMISES

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INTRODUCTION

The scope of wildland research is wide, ranging from investigations of use measurement methodologies (e.g. James and Schreuder 1972) to studies of methods to modify littering behavior (Muth and Clark 1978). A major effort to better assess the direction of future research was reported by Shafer and Lucas (1978). This project attempted to calculate both the probable worth of solving selected dispersed recreation problems and the likelihood of successful completion or solution of the problem within ten years. By arraying those problems with both high management value and high probablility of research solution, it was possible to establish a logical and meaningful agenda of research priorities.

However, the question remains as to how useful recreation research has been to decision makers. There is, of course, the matter of measuring usefulness. What criteria ought to be used? Should usefulness be measured against managerial or scientific criteria? Both? Or, is usefulness simply measured as the extent to which information helped prevent management from being sued?

The appraisal of usefulness also needs to consider the expectations of managers and researchers. Frequently, the expectations managers hold for research are not met. Yet, it is difficult to know whether this is a significant measure of research value or not. If the expectations were realistic, then researchers must ask themselves why they were unable to

meet them. On the other hand, if the expectations were unrealistic, then we need to consider why this was so.

The answer to the question of research usefulness is clearly complex. Answers vary according to whom you talk. But, just as clearly, the relationship between management and research is not always smooth and charges of unfilled promises and unrealistic expectations all too often occur.

It is the contention of this paper that the utility of research is highly dependent on the presence of a framework that integrates decision making information needs for management and planning with the research process. Both researchers and decision makers must have a clear understanding of what can be delivered and how it is to be used. Within this broad collaborative setting, research can play a significant role in contributing information pertaining to decision maker needs as well as means of integrating that information into the decision making process.

Perhaps one of the major areas of interest to both wildland recreation managers and applied researchers has been the topic of carrying capacity. In the following discussion, we will focus on this issue as an example of both the promises and pitfalls associated with applied research in wildland recreation.

THE PROBLEM OF CARRYING CAPACITY

The problem of defining carrying capacities for wildland recreation areas is one of long standing to both managers and researchers. As cited in Hendee et al. (1978), as early as 1936, Lowell Sumner, a National Park Service technician, raised the question. "How large a crowd can be turned loose in a wilderness without destroying its essential qualities?" Later, in 1942, he urged that use of wilderness be kept "within the carrying

recreational saturation point", a point Sumner considered as the "maximum permissible use, short of impairment." In 1957, in his seminal statement on forest recreation research needs, Samual T. Dana called for investigations to determine carrying capacity, a problem he deemed comparable to that of sustained yield in timber management. How much use, he questioned, can a given area stand without physical deterioration of the site or impairment of aesthetic and spiritual values?

Both of these early appraisals of the carrying capacity problem conceived of it as substantially one determined by physical-biological parameters; i.e., the critical level of impairment was a function of the physical-biological system's capacity to withstand use. Furthermore, at least implicitly, it was presumed this capacity was an inherent feature of the system, subject to direct and relatively unequivocal measurement.

This biological deterministic nature of carrying capacity underlaid one of the early empirical studies of the topic. Wagar (1964) investigated some of the biological effects of trampling, seeking to clarify the relationship between recreation use and ecological impacts. In the preface to his report, he noted, "The study reported here was initiated with the view that the carrying capacity of recreation lands could be determined primarily in terms of ecology and the deterioration of areas." However, his principal conclusion, after completion of the study, was that '*recreational carrying capacity is not an absolute value inherent solely in the ecology and original characteristics of each land area." The emphasis on carrying capacity as an ecological problem, he wrote, has unfortunately detracted from a view of the problem primarily as one of a psychological nature, with the quality of experience independent of resource conditions.

Lucas (1964) also conducted a major carrying capacity investigation in the early 1960's. Like Wagar, he concluded, "Capacity--the number of visitors and their degree of satisfaction--seemed to be more a function of

attitudes than of physical factors." He also documented that capacity was a function of more than simply the amount of use an individual encountered; the type of use involved, for example, was more important in explaining satisfaction than use levels.

The theoretical and empirical work by Lucas, Wagar, and others provided major insights as to the nature of the carrying capacity issue. The notion of an "inherent" capacity, determined by biological parameters, was dispelled. Most importantly, the judgemental nature of the carrying capacity issue was documented. Again quoting Wagar (1964), "Ecological studies can show how biotic communities...change with use, but someone must decide how much change is acceptable." Lucas similarly concluded, "This study has suggested -tentatively the levels of satisfaction associated with different amounts of use... but it does not indicate which level...should be the goal... The decision must be subjective."

Today, despite the long record of research, carrying capacity remains a troublesome and complex issue. There are probably many reasons why this is so. Wagar (1968) lists four common misconceptions that cloud the issue. These include: (1) that the responsibility of management is the resource rather than the provision of long-term benefits to society; (2) that each acre of recreation land has an inherent level of productivity that determines carrying capacity; (3) that quality recreation is equivalent to natural conditions; and (4) that management of recreation areas would be easier if only their carrying capacities were known.

These misconceptions are further confounded by a general failure to recognize carrying capacity as a prescriptive concept. This relates to Wagar's second misconception above, and probably derives from the biological origins of the capacity model. Carrying capacity is a means to an end, with the end being a set of ecological and social conditions defined as desirable. Those desired conditions, in turn, are not defined

by any inherent feature of the physical setting or deterministic notion of "highest and best use." Rather, they are a product of a complex prescriptive process that involves participation by the citizenry, resource managers, and researchers, and are specified in area management objectives.

The process of formulating carrying capacities remains a pressing and significant problem for managers. Growing use pressures and conflicts among competing uses will make the issue even more critical. For example, final regulations recently issued by the U.S. Forest Service to implement the National Forest Management Act of 1976 instruct land managers to:

> Provide for limiting and distributing visitor use of specific portions in accord with periodic estimates of the maximum levels of use that allow natural processes to operate freely and that do not impair the values for which wilderness areas were created. (Emphasis added).

Thus, the question we face is, "Given that carrying capacity remains a significant management issue, how can researchers and managers best join their efforts?" It seems to us that several discrete stages in which the roles of the manager and applied researcher vary can be identified.

CONCENSUS ON PROBLEM DEFINITION

Although agreement on what the problem is seems an obvious first step, the lack of clear problem definition is probably responsible for more difficulty than any other step. This step needs to be characterized as an interactive, educational, and participatory phase. That is, managers are the ones who have the problems for which applied research is needed. Applied research without the active involvement of both managers and researchers is almost a contradiction in terms. Yet, we do not suggest

that this phase is simply a matter of managers telling researchers what the problem is. For a variety of reasons (e.g., time pressures, other duties, lack of specialized training, etc.), managers may not he able to define the problem in researchable terms (Schweitzer and Randall, 1974). Or, critical elements may not be included in their definition of the problem. Thus, researchers have an opportunity and an obligation to respond to management's perceived problems and to assist them in arriving at a researchable definition as to the specific nature of the problem and its constituent parts.

The carrying capacity issue is a good illustration of the difficulties associated with poor problem definition. Commonly, the problem is defined strictly in terms of "how much use is too much use." From the manager's perspective, it would be nice if the problem could be adequately encompassed in these terms, but it is much more complex than this. For example, the numbers of people involved may he the least important variable in terms of controlling either ecological or social impacts. On the other hand, other variables, such as the timing and spatial distribution of use or an improved understanding of the behavioural norms that prevail at a location, may be much more useful.

It is also important to determine the full nature of a problem in order that the complete range of management solutions may be considered. For example, if the carrying capacity problem is defined solely in terms of use level, management solutions to contend with conditions in excess of capacity are limited to the control of use numbers (e.g., rationing). If, however, the problem is defined in broader terms, encompassing such elements as conflicts and behavior, then a much broader range of management options is available.

CONSENSUS ON RESEARCH ROLE

Matching the importance of careful elaboration of the research problem is the need for detailed discussion regarding the potential contributions and limitations of research. At the outset, it needs to be understood that, with few exceptions, research is a source of information, not answers (Stankey 1979). Researchers are probably as guilty as anyone in promoting the idea that research can produce answers to complex issues of wildland management. But, in fact, answers are a management responsibility. In only rare circumstances do data contain clear and unequivocal direction about the appropriate policy solution to a problem. More commonly, data are subject to varying interpretations based on various considerations, including policy and legal constraints, public opinion, and budget.

But research does have a critical role to play. Its principal responsibility is providing management with accurate information on relevant variables so that intelligent decisions can be considered and that the probable consequences of alternative decisions are known. By offering management information about the consequences of a given or possible set of actions, the researcher enables decision makers to consider how those likely outcomes mesh with other decision influences (e.g. policy, budget, etc.) that they must consider.

While it is important to determine what it is research can offer, it is perhaps even more important to identify what Lies beyond research. Unfulfilled promises, either real or imagined, probably have contributed to many of the disputes between managers and researchers. Researchers have a major responsibility to provide managers with the equivalent of “truth in packaging” in their proposals. Grand promises of what will be provided may lead to financial support Initially, hut when these promises are unmet, the entire research effort suffers. Conversely, unrealistic expectations by managers can lead to unfounded dissatisfaction with the research results,

and possibly a discarding of them, even though they may represent the very best data possible.

Carrying capacity research exemplifies these problems well. The pressure to establish capacities has led to a variety of proposals offering mechanistic or quasi-quantitative calculations to establish what is inherently a prescriptive estimate (even though they will yield a number). By the same token, it is still common to have managers request a research project that will determine what the carrying capacity of such and such an area is, or how many people can come before it is crowded, or how much soil erosion constitutes "damage".

Research is primarily a means through which the magnitude or extent of a phenomenon can be assessed. It can also assess the relative importance assigned to some phenomenon by managers or users, but it cannot specify what importance ought to be assigned. Importance is a reflection of values and varies widely through space, time and individuals (Clark and Stankey 1979a). It is the business of management to make value judgements and it is a value judgement that is the fundamental and ultimate base of any capacity decision.

The value-based nature of many decisions, such as carrying capacity, must be recognized. There appears to be a strong tendency to view decisions as though there is a clear and best answer. In fact, most decisions have many "best" answers, depending upon the values defined as important by decision makers. Yet, probably as a way of attempting to cope with the complexity and frustration of these decisions, many decision makers yearn for a "hard", unequivocal answer to their questions. "What is the capacity?" they ask. And research responds, "Well, it depends". As frustrating a response as that might seem, it is correct. It depends on what it is we are trying to do, and no amount of wishful thinking will change that. Decisions that are ultimately value-based cannot be made more easy by recasting them as deterministic or mechanistic questions.

A DECISION MAKING FRAMEWORK

In addition to improved problem definition and a clearer understanding of the role of research, greater emphasis needs to be given to development of a framework within which data are to be evaluated. As noted above, data seldom yield self-evident answers to problems. Rather, they provide information about the phenomena under study.

The need for such a framework underlies the concern of the researcher for theory. Theory helps provide the "scaffolding" within which data are arrayed, relationships studied, and interpretations and conclusions reached. Applied research, with its problem orientation, often doe6 not rest upon a clearly formulated theoretical framework. (Nevertheless, results from applied research often feed back into more theoretical structures as empirical evidence.) But the need for an organizing framework remains. Again, we can look at the carrying capacity issue for an example of such a need.

One approach to providing such a framework is offered by the Recreation Opportunity Spectrum (Clark and Stankey 1979b). This framework rests on the assumption that the broadest public good is served through provision of a diversity of recreation opportunities. The spectrum is operationalized as the condition of six management-relevant factors, such as access, facilities, and density.

As managers strive to manage an area within the capacity limits established in the management objectives, they need to be concerned with how specific actions initiated to contend with a specific problem might lead to alterations in the nature of the entire opportunity. There is an interdependency between the various factors of a recreation setting. Change6 in one factor can lead to changes in another; e.g., improved access can lead to greater need for facilities, more regulation, greater levels of impact, etc. These secondary changes are especially serious because they of ten are unanticipated. As they occur, the kind of recreation place

gradually changes into something quite different than before.

The recreation opportunity spectrum provides a framework within which managers can review the potential impact of any given change (e.g. change in access) and anticipate these secondary changes. By conceiving opportunities as being composed of a combination of manageable factors, managers can also specify the desired conditions or states for each. Thus, if change in one is necessary, standards are available to protect the condition of the others, thereby protecting the nature of the opportunity. The spectrum thus helps assure that a diversity of recreation opportunities is not lost through gradual and perhaps even unnoticed attrition.

The development of a decision making framework is important because it require6 explicit specification of the assumptions underlying the decision. Often, these assumptions are implicit and severely and unrealistically constrain the range of options available to decision makers. They may also embody value orientations that are assumed to be inherent and given. Socolow (1976) describe6 the evolution of "golden rules" and "golden numbers"--immutable standards that become accepted as real and incontestable, and that shape the entire thinking process despite the fact they may have been originally the most tentative kinds of notions. Yet, they take on an aura of authenticity that is unchallenged despite their frequent lack of foundation. In fact, they are crutches that allow complex phenomena and issues to be viewed in unrealistically simplified terms. However, by adopting a framework that necessitates decision makers to specify what kind of information is needed, as well as why, these "golden rules and golden numbers" can be surfaced for review, testing, and possible reconsideration.

SYSTEMS FOR MONITORING AND EVALUATION

Increasingly, management is advised of the need to monitor and evaluate its program. It is appropriate advice. Almost all decisions are made in the face of at least some uncertainty. Monitoring offers a system

of continuing feedback as to how valid the assumptions were that underlay the decision. It also provides a data base from which decisions to change course can be made.

The evaluative phase is also critical. Too often, the success or failure of a project is left to haphazard and impressionistic review. It should provide a critical analysis and interpretation of program effects for a realistic appraisal of how well the program achieved its intended objectives.

Researchers can play a major role in helping design such systems. For example, what kind of monitoring ought to accompany implementation of a carrying capacity program? We might consider what variables ought to be considered; what measures of biological change are most appropriate. For example, many carrying capacity projects undertake soil surveys. Is this the kind of information managers can best use? If so, what units of measure are more appropriate? What types of analysis (evaluation) should we consider?

In a real sense, good programs of monitoring and evaluation constitute research. It is important to remember that not all problems require research; even if they did, there aren't enough people or money to do it, nor can management wait. But by providing managers assistance in developing a monitoring and evaluation process, and by offering assistance in analysis and interpretation, research can en joy dual benefits. First, they help provide a more rigorous framework to land managers to contend with their problems, and, second, they can broaden the range of data that is of potential research value.

DELIVERY AND APPLICATION OF RESEARCH

Applied research, by its very definition, denotes application. As obvious as this might appear, it is still frequently a missing ingredient. Even the best-developed program of applied research needs the test of

implementation in real-world conditions. The process by which research results are delivered, implemented, and revised (i.e. technology transfer), however, is not well developed.

Although there is clearly no “best” way that technology transfer should occur, we can formulate some basic proposition6 about it.

First, the technology transfer task should not be viewed as a new problem. There is substantial literature and body of experience available on the issue of diffusion and adoption that offer much insight into the problems faced by applied recreation researcher6 and managers. There is little need for “reinventing the wheel”, although peculiar features of this management system may require special attention.

Second, while process is important to any technology transfer effort, the ultimate Success or failure is tied to the commitment of individuals charged with its conduct. This is clearly a lesson from the extensive diffusion experience in agriculture. In attempting to spread a new technique or concept to management, the decision as to who should receive the new idea, at least initially, is critical to its later and broader adoption. This notion of “later diffusion” rests on the premise that adoption works better when the agents of change are one’s peers. Those willing to experiment and try new ideas (“early adopters” in the diffusion lexicon) can also serve as important sources of feedback to research as to needed alterations to make the new product more useful and, thereby, more amenable to wide-scale adoption.

Finally, the process of technology transfer must be characterized by a variety of techniques and information systems. Obviously, journal article6 aren’t a very effective way to tell manager6 about new ideas. Meeting6 of various types broaden the range of audience6 one can reach and also allow a variety of emphases on specific elements of a problem. At a meeting of policy makers from several different agencies, we might be concerned with a discussion of carrying capacity focused on the matter of how the aggregate

effect of the capacities established throughout a region serve equity concerns. A second meeting might focus on systems of prescribing capacities in a single area.

The most direct involvement between managers and researchers would be some type of pilot or demonstration project in which both have responsibilities. A recent project of this nature involved an effort to develop a system for reviewing the consequences of alternative capacities in Yosemite Valley (Frissell et al., forthcoming). National Park Service planners and managers interacted with a team of consultants to review research questions, data availability and needs, the implications of alternative methodologies, and so forth. The collaborative effort made the final product of the consulting team much more compatible with decision maker needs and enabled direct integration of the best knowledge available into the planning system.

By combining these broad strategies and techniques, the flow of research into decision making is greatly facilitated. Under most current organizational structures, both managers and researchers have a responsibility as well as an obligation to make sure these efforts take place. But more attention ought to be placed on development of structures that serve these needs in a more explicit and accountable fashion.

CONCLUSIONS

The fundamental point of this paper is that for applied research to be helpful, an interactive and participatory framework between management and research is necessary. Within this framework, a mutually beneficial and educational process in terms of problem definition can occur and realistic appraisal6 of the contribution6 and limitation6 of research can be established.

A second major point is that research is generally not the source of answers to management problems. Rather, the primary value and

responsibility of research is to provide decision makers with accurate information about the probable consequences of alternative actions. A corollary to this is that one of the major contributions of research, especially social science research, is the provision of concepts, principles and frameworks.