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Section 10.

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Section 10. A Wilderness Planning-Application Example

APPLYING OUR KNOWLEDGE TO THE "BOB"

Robert C. Lucas

Proceedings Compiler

Steve McCool organized a special evening session at the National Wilderness Research Conference to present a case study involving the integrated application of a variety of advanced management concepts and techniques to the Bob Marshall Wilderness Complex, a large area including three contiguous wildernesses. The session involved eight presentations on different components of the total management program. A handout contained papers for each presentation, a reprinted paper, and an overview by McCool.

Because we think this was an unusually effective session that presented a practical program that could be borrowed from by other wilderness managers, we chose to print the handout material as the section that follows. The program described is also an encouraging example of cooperative teamwork among managers, scientists from the Forest Service, University, and an environmental research firm, and the concerned public.

PUTTING WILDERNESS RESEARCH AND TECHNOLOGY TO WORK IN THE BOB MARSHALL WILDERNESS COMPLEX

Stephen F. McCool

The Bob Marshall, Great Bear, and Scapegoat Wildernesses, comprising a combined area of 1.5 million acres, lie astride the Continental Divide in northern Montana. While each was classified as Wilderness under different legislation, they are managed today as one coordinated unit, the Bob Marshall Wilderness Complex (BMWC) by the Flathead, Helena, Lewis and Clark, and Lolo National Forests. Together, they represent one of the largest undeveloped and pristine landscapes in the lower 48 States. They are home to a wide variety of wildlife; every major wildlife species present in the area at the time of European man's first entry is still present, although the grizzly bear and wolf are on the threatened and endangered species list.

The "Bob," as many local individuals term the area, is often recognized as the "flagship" of America's National Wilderness Preservation System. What happens in the area is often of great interest not only to people in local communities but to others across the Nation and around the world. To many, the area represents the essence of wilderness values and purposes.

The BMWC has long provided outstanding opportunities for extended horse and backpacking trips; it is nationally famous for fall big game hunting, and provides excellent opportunities for river floating through 86 miles of the Flathead River now a part of the National Wild and Scenic Rivers System. While use densities in the BMWC are relatively low, visitor research has shown that visitors are concerned about encounters with others and about conflicts with other types of users.

A management plan for the area was developed in 1972. However, because of the lack of public support, most of the plan has never been implemented. In 1982, a process was begun to develop a new plan, with several different assumptions about the nature of the planning process. Effective wilderness planning was viewed as possible only with (1) use of contemporary wilderness management concepts and technology and (2) consensus of those affected by the plan.

In 1981, a decision was made to base the planning process on the Limits of Acceptable Change wilderness planning system. A draft section of the Forest Service Manual had been released in the fall which described the process, although the system itself wasn't completed until January 1985. In early 1982, another decision was made to incorporate public involvement from the beginning, and an initial meeting of the LAC Task Force was held in February. This summary describes both the LAC process and the important role of the Task Force in developing the new visitor use management plan.

It is important to understand that the success of the planning effort in the BMWC is highly dependent on the interaction of these two elements. LAC will not succeed in this area without continuing public participation. On the other hand, the public participation is successful partly because of the structure LAC provides to the planning process. Another element critical to the success of the planning was the commitment made by the managers, members of the public, and researchers to do what they could to make the system work in the face of decreasing budgets. Undoubtedly, the importance of the BMWC as a symbol of wilderness preservation helped with securing this level of commitment.

The purpose of this report is to summarize the various elements of application of LAC to the BMWC as well as describe the public participation process. The objective in doing this is to inform others how wilderness management planning was approached in this situation, not to describe how wilderness management planning should be conducted.

The report is organized in two sections. The first section describes the LAC process, and how various technical and research efforts were used within the context of that process. A reprint of a Western Wildlands article describing the LAC system opens this part of the discussion. In the second section, the public involvement process is depicted, as well as the role of the public in developing and implementing the plan.

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Scapegoat Mountain, Bob Marshall Wilderness Complex. *Photo/Dan Dodge*

Limits of Acceptable Change: A New Framework for Managing the Bob Marshall Wilderness Complex

George H. Stankey, Stephen F. McCool and Gerald L. Stokes

The Bob Marshall Wilderness has been aptly described as the "flagship" of the American wilderness preservation system. Along with the adjacent Great Bear and Scapegoat Wildernesses, the "Bob," as it is known locally, forms the core of a 1.6 million acre block of spectacular wild country. From the awesome Chinese Wall to the grizzly bear that roam throughout the area, the Bob Marshall Wilderness Complex (BMWC) possesses much of what we commonly ascribe to wilderness. And each year thousands of visitors come to the area to backpack, white water raft, or hunt big game. The BMWC is truly a national treasure.

But those values and features that give the BMWC its special place in America's wilderness system are threatened. Managers, users, citizens and scientists all have expressed concern that increasing demands on the Complex could damage the area's vegetation, soil, water and wildlife; moreover, the growing numbers of users make it increasingly difficult to provide the kinds of outstanding opportunities for solitude described in the 1964 Wilderness Act.

In addition to increasing use pressure on

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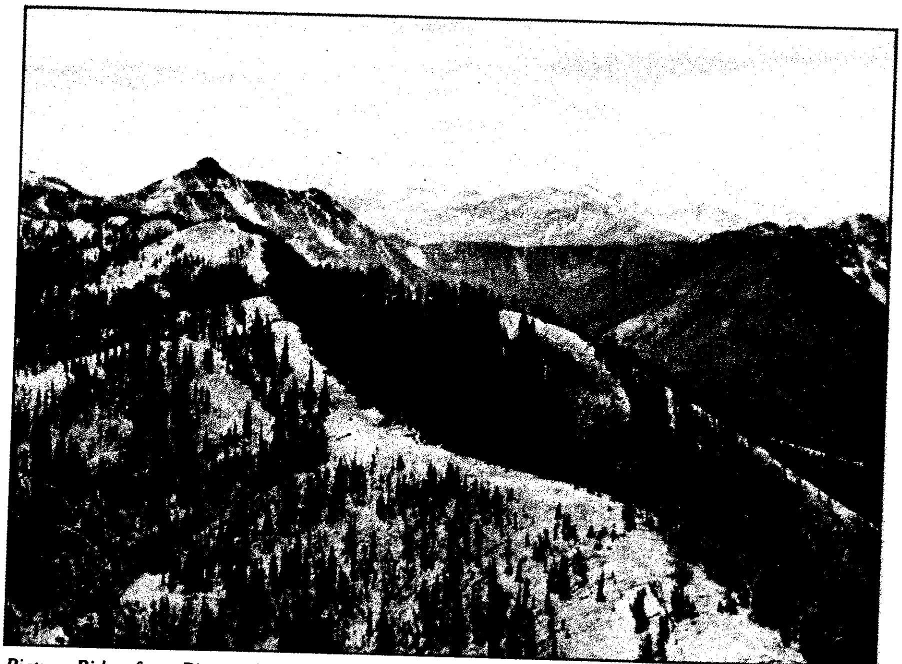


Picture Ridge from Picture Peak, Bob Marshall Wilderness. *Photo/Don Dodge*

the BMWC, changing legislative guidelines also demand that managers move to resolve the issue of "How much is too much?" For example, regulations implementing the National Forest Management Act require national forest plans 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."

But while the pressures confronting the BMWC are severe, they are by no means unique. Many wildernesses today throughout the country face similar problems, and managers, interested citizens and others are working on means to implement effective management to protect the environmental and experiential qualities that characterize wilderness.

The carrying capacity approach to wilderness management, drawn from range and wildlife management, holds an appealing simplicity. If some specific use level actually signals the onset of environmental deterioration and unsatisfactory recreational experiences, it could be said that an area is exceeding its carrying capacity when it exceeds that level. Wilderness managers would have a clear, unequivocal basis for restricting use.

Considerable research has been done on the carrying capacity model and its ability to help provide managers with the information necessary to make decisions about appropriate use levels. Both ecological and social studies focused on the level of use at which unacceptable impacts begin. However, this focus was hampered by the lack of a clear and predictable relationship between use and impact. In some environmental settings, even low use levels can produce substantial impacts on vegetation and soils; in other locations, such resources are very resilient. Some recreational experiences, such as the search for solitude, are adversely affected by increased use levels; others, such as physical exercise, are not.

Developing a straightforward understanding of the use-impact relationship was also confounded by what we might call the "it all depends" syndrome. A certain amount of use in a particular environmental setting would lead to a certain level of impact, depending on the weather or on the specific kind of recreational use taking place. A certain number of encounters per day would provoke a particular reaction from people, depending on where the encounters occurred or how the people behaved. The virtually infinite number of factors upon which the use-impact relationship depended makes it very difficult to arrive at answers that could be used by managers.

However, the basic difficulty grew out of the focus on "How much is too much?" Increasingly, researchers and managers came to realize that this was the wrong question. Rather than attempting to discover this elusive number, it became apparent that attention should be focused on what kinds of conditions were desired. Conditions included the state of the resource—the quality of vegetation at campsites or forage in meadows, water quality and other measures, as well as the nature of the experience—the encounters with others while traveling or at the campsite, for example. By focusing on the conditions desired, we could then begin to look at how much and what kinds of use would be consistent with their maintenance.

This shift in attention from an appropriate use level to the desired condition underlies our revised approach to the recreational carrying capacity issue.

This approach—the limits of acceptable change (LAC)—represents a framework within which decisions can be made about the kinds of conditions that will be permitted to occur in an area. We will also look at how the LAC framework has been used to address recreation impacts and issues in the BMWC and how it integrates with the political environment within which decisions about wilderness resources are made.

The basic premise of the LAC concept is that change is a natural, inevitable consequence of recreation use. Both environmental and social changes are involved. Acceptance of this premise immediately redefines the traditional question about carrying capacity from "How much use is too much?" to "How much change is acceptable?"

The LAC framework recognizes the inevitable impacts that occur as a result of human use. Wilderness managers might want to retain pristine conditions throughout an area, but the reality is that once use occurs, resource conditions begin to change—soils are compacted, vegetation is disturbed. Similarly, social conditions change—interparty contacts rise, conflicts increase. The nature and extent of these changes will vary throughout an area because of differences in types and amount of use, susceptibility of vegetation and soils to use pressure and other factors. This does not imply that a decision could not be made to prohibit change caused by recreation; such a decision would, however, necessitate a virtual prohibition of recreational use.

The shift in focus from "how much use" to "how much change" carries with it two important implications. First, it directs attention from use level as the key management concern to the environmental and social conditions desired in wilderness. The link between use level and conditions is complex; moreover, the previous focus on use level only partially explained and helped manage human-induced change. The new orientation focuses directly on managing for desired conditions rather than on how recreation use *per se* should be managed.

The second implication of the LAC management framework is that it clearly places the issue of capacity in a prescriptive as opposed to a technical context. Traditionally, the task was to define the level of use beyond which excessive impact would occur. Such an approach contributed to the belief that establishing capacity was a technical procedure requiring an understanding of the relationship between use and change. However, the LAC framework, with its focus on desired conditions, immediately addresses the matter of *acceptable change*, and the answer to such a question is ultimately one of personal judgment, not science. Judgements of acceptability require not only the viewpoints of managers and researchers but of citizens as well.

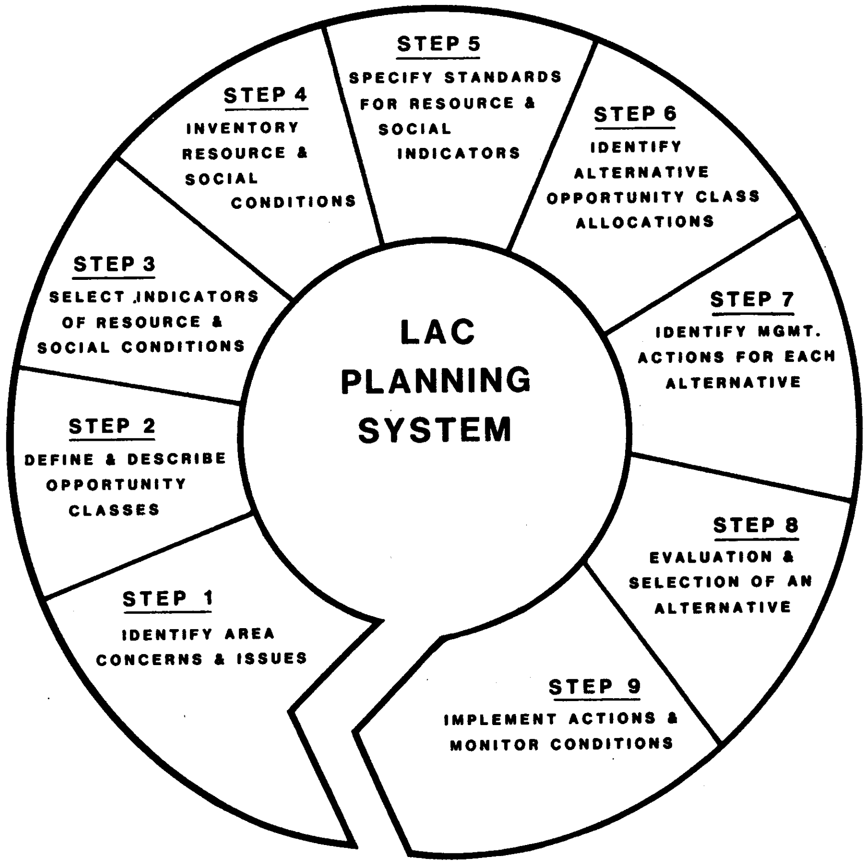
Of course, technical information and understanding remain an important part of the LAC process. It is critical that we understand the technical processes of energy flow in wilderness ecosystems and the complex relationships between recreational use and vegetative impact. However, the LAC process treats such information as an aid in answering what is acceptable, not as a determinant.

Explicit recognition of the importance of providing diverse wilderness conditions in the BMWC and the implementation of management actions to achieve or maintain conditions form the basis of the LAC framework. Given that any use produces at least some change, the process requires managers to identify where, and to what extent, varying degrees of change are appropriate and acceptable. The conditions that characterize a particular type of opportunity and that distinguish it from others are specified by measurable objectives that define the limits of acceptable change (Lime 1970, Frissell and Stankey 1972).

We talk about "acceptable" change. The word "acceptable" has been purposely selected because it emphasizes the idea that the amount of change that occurs reflects a judgement made about its appropriateness. Other words might have been chosen, such as "unavoidable." A word like "unavoidable" implies there is a discrete predictable amount of change associated with a given use level, beyond which no further change should occur. However, this is simply not an accurate portrayal of the way things work.

To implement the LAC framework, managers proceed through nine interrelated steps (Figure 1). Briefly, these steps involve the following:

Figure 1



1) Identify area issues and concerns. Citizens and managers meet to identify what special features or qualities within the area require attention, what management problems or concerns have to be dealt with, what issues the public considers important in the area's management, and what role the area plays in both a regional and national context. This step encourages a better understanding of the wilderness resource, a general concept of how the resource should be managed and a focus on principal management issues. Issues such as outfitter allocation, horse and trail management, threatened and endangered species and opportunities for solitude were identified as important in the BMWC.

2) Define and describe wilderness recreation opportunity classes. Any wilderness area contains a diversity of physical-biological features, use levels, evidence of recreation and other human uses, and type of wilderness experiences. The type of management needed will also vary throughout an area. Opportunity classes describe subdivisions or zones of wilderness where different resource, social and managerial conditions will be maintained. These classes represent a way of defining a range of diverse conditions within the wilderness. And while diversity is the objective here, it is important to point out that the conditions found in all cases must be consistent with the area's designation as wilderness. The definition of opportunity classes is not an excuse to maintain conditions inappropriate in a wilderness.

In step 2, we define the number of classes that will be managed and develop general descriptions of the kinds of resource, social, and managerial conditions appropriate to each. For example, Table 1 shows the resource and social settings identified as appropriate in each of four opportunity classes in the BMWC, ranging from pristine conditions to one typified by the relatively more visible impacts of human use. Again, such classes serve as management objectives for specific areas of the wilderness.

3) Select indicators of resource and social conditions. Indicators are specific elements of the resource and social setting selected to represent (or to be "indicative of") the conditions deemed appropriate and acceptable in each opportunity class. Because it is impossible to measure the condition of and change in every resource and social feature in a wilderness, we select a few indicators as measures of the overall condition or "health" of the area. Examples would include amount of bare ground at campsites or average number of other groups encountered per day. They should be easy to measure quantitatively, related to

Table 1
Brief Descriptions of Wilderness Recreation Opportunity Classes in LAC Planning for the Bob Marshall Complex

	MOST PRISTINE			LEAST PRISTINE
	Opportunity Class I	Opportunity Class II	Opportunity Class III	Opportunity Class IV
RESOURCE SETTING: (General description)	Unmodified natural environment	Unmodified natural environment	Unmodified natural environment	Predominantly unmodified natural environment
Ecological conditions	Not measurably affected by the action of users	Minimally affected by the action of users	Moderately affected by the action of users	Many locations substantially affected by the action of users
Prevalence and duration of impact	Temporary loss of vegetation where camping occurs and along some travel routes. Typically recovers on an annual basis.	Minor loss of vegetation where camping occurs and along most travel routes. Most impacts recover on an annual basis.	Moderate loss of vegetation where camping occurs and along most travel routes. Impacts in some areas persist from year to year.	Moderate loss of vegetation and soil on major travel routes campsites, and popular lakeshores. Impacts persist from year to year.
Visibility of impacts	Not apparent to most visitors	Apparent to only a low number of visitors	Apparent to a moderate number of visitors	Impacts are readily apparent to most visitors
SOCIAL SETTING: (General description)	Outstanding opportunity for isolation and solitude	High opportunity for isolation and solitude	Moderate opportunities for isolation and solitude	Moderate to low opportunities for isolation and solitude
General level of encounters	Very infrequent	Low	Moderate	Moderate-high
Interparty contacts while traveling	Very few	Low	Moderately frequent	Relatively high
Interparty contacts at the campsite	Nonexistent	Fairly low	Moderately frequent	Common

the conditions specified by the opportunity classes and reflect changes in recreation use.

Indicators are an important part of the LAC process because their condition reflects the overall conditions found throughout an opportunity class. It is important to understand that an individual indicator might not adequately depict the condition of a particular area. It is the "bundle" of indicators that is used to monitor an area.

4) Inventory existing resource and social conditions. Inventories can be a time-consuming and expensive part of planning. In the LAC framework, the inventory is guided by the indicators selected in step 3. Other factors, such as bridges, lookout towers, outfitter base camps and critical habitat, can also be inventoried. This information will be helpful later when the consequences of various alternatives are being evaluated. The inventory data are mapped so that both the condition and location of the indicators are known. The inventory provides a measure of the indicators' existing condition throughout the area, as well as a data base from which managers can formulate the standards for each indicator in each opportunity class.

5) Specify standards for resource and social conditions in each opportunity class. Here we identify the range of conditions for each indicator considered appropriate and acceptable for each opportunity class. By defining those conditions in measurable terms, we provide the basis for establishing a distinctive, diverse range of wilderness opportunities. Standards serve to define the "limits of acceptable change." They are the maximum permissible conditions that will be allowed in a specific opportunity class; they are not necessarily objectives. In the BMWC, for example, where four opportunity classes have been defined, standards for campsite solitude and other indicators have been proposed.

The inventory data collected in step 4 play an important role in setting standards. We want the standards defining the range of acceptable conditions in each opportunity class to be realistic and attainable; we also want them to do more than mimic existing conditions. Standards play a critical role of indicating when restoration or enhancement might be needed.

6) Identify alternative opportunity class allocations reflecting area-wide issues and concerns and existing resource and social conditions. Most wildernesses could be managed in several different ways and still retain their basic wilderness qualities. In step 6, we begin to identify some of these different alternatives. Using information from step 1 (area issues and concerns) and step 4 (inventory of existing conditions), managers and citizens can begin to explore how well different opportunity class allocations meet varying interests, concerns and values. For example, in the BMWC planning effort, one alternative allocated a large proportion of the area to those opportunity classes in which impact is least acceptable. However, another alternative gives greater emphasis to those opportunity classes where higher impact levels are acceptable. Yet another alternative featured maintenance of the *status quo*.

7) Identify management actions for each alternative. The alternative allocations proposed in step 6 are only the first step in the process of developing a preferred alternative. In addition to the kinds of conditions that would be achieved, both managers and citizens need to know what management actions will be needed to achieve the desired conditions. In a sense, step 7 requires an analysis of the costs, broadly defined, that will be imposed by each alternative. For example, many people might find attractive an alternative that calls for restoration of much of the area to a pristine character. However, such an alternative might necessitate introduction of strict use rationing, prohibition of horses and closure of some areas. In light of such costs, the alternative might not seem as attractive.

Step 7 provides a measure of what it will take to move the area from its existing condition to that desired. Management actions for the BMWC include information, education, campsite closure and rehabilitation, increased enforcement of regulations and some restrictions on party size. The action proposed for a specific area varies according to the opportunity class and intensity of the problem.

8) Evaluation and selection of a preferred alternative. With the various costs and benefits before them, citizens and managers can proceed to evaluate the various alternatives, and the managing authority will then select a preferred alternative. Evaluation must take many factors into consideration, but examples would include the responsiveness of each alternative to the issues and concerns indentified in step 1 and the management requirements identified in step 7. It is important that the factors figuring into the evaluation process and their relative importance be made explicit and available for public review.

9) Implement actions and monitor conditions. With an alternative finally selected, the necessary management actions (if any) are put into effect and a monitoring program instituted. The monitoring program focuses on the indicators selected in step 3 and compares their condition with those identified in the standards. This information reflects the success of the actions. If conditions are not improving, the intensity of the management effort might need to be increased or new actions implemented.

These nine steps comprise the LAC framework. By identifying desired conditions in a precise, measurable way, the LAC system would avoid the lack of specificity and "motherhood" nature of many previous management plans. But the LAC is, in many ways, still theory or at least an untested and unproven approach. Will it really work?

The verdict is not in and might not be for some time. The application of the LAC framework in the three wildernesses comprising the BMWC represents the first complete test of the system. The effort involves the four national forests that manage the area (Flathead, Helena, Lewis and Clark and Lolo), the Wilderness Management Research Unit of the Intermountain Forest and Range Experiment Station and a wide range of wilderness interest groups.

Because of the area's size and complexity, as well as the intense public interest in its management, it has been necessary to develop some special approaches to help guide application of the LAC. Many of the ongoing duties involved with working through the process have been placed in the hands of a contracted consultant who acts as a facilitator, thus freeing national forest staff from many of the logistical details involved in developing proposed management actions for such a large area. The facilitator also acts as a neutral party in the process in an attempt to bring public interest groups into the early steps of the LAC process. Because many of these groups ultimately will be affected by the results of the process, they have been encouraged to provide their experience and knowledge in the effort to develop a preferred alternative.

Managers still play a key role as members of a core team that meets periodically to discuss details of the process, information needs and the commitment of organizational resources. The facilitator identifies responsibilities for these individuals as well as decisions for which they are ultimately responsible.

In addition to the core team, a larger task force also has been established. The task force is composed of researchers, Forest Service personnel and individuals representing organized and unorganized interests in the Bob Marshall Complex. The task force was organized in this way to encourage dialogue and mutual learning (Friedman 1973) among individuals with different types of expertise.

The task force provides continuing public participation in the LAC process. It is a means of informing citizens about the process and gaining their understanding and support. A basic precept underlying formation of the task force is that a substantial, important body of expertise exists within the citizenry. Another precept is that without public understanding and support, the process is unlikely to succeed. This is a particularly important notion, for it is consistent with the growing realization that resource planning is ultimately a political rather than a technical process. Although managers' technical skills are clearly needed, they must be coupled with a level of political competence that insures understanding of the various interest groups and their beliefs, values and motives (Cortner and Richards 1983). Such understanding helps managers negotiate planning direction so that the various interests are dealt with in a reasonable and responsible fashion. By being responsive to the expertise and concerns of various interest groups, planning has a better chance of success (Culhane and Friesema 1979). Finally, the task force represents a microcosm of the political marketplace. The diversity of interest groups represented insures that all values and viewpoints will be addressed in the planning process. The "ownership" felt by individuals working cooperatively should also ensure that the plan is implemented.

There has been much frustration with wilderness planning in the past, and the shelves are filled with documents that never saw the light of day. Will the LAC framework change this or is a similar fate in store? Obviously, we will have to wait and see. However, the integral role of public participation in developing the LAC process, coupled with the specificity of the conditions that managers and citizens identify as desirable, should help provide a level of accountability often lacking in past plans.

For those interested in the details of the LAC process, an expanded version of this article will soon be available as a General Technical Report entitled The Limits of Acceptable Change System for Wilderness Planning. *Copies can be obtained from the Intermountain Forest and Range Experiment Station, 507 25th St., Odgen, Utah, 84401.*

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CAMPSITE INVENTORY

David N. Cole

As discussed previously, the crux of the Limits of Acceptable Change (LAC) system is the periodic monitoring of key indicators to determine whether or not standards are being met. One of the most difficult steps in implementing LAC is the selection of indicators that are meaningful and that can be monitored in a cost-effective manner. There is little value in selecting indicators that cannot be adequately monitored, whether this inability is due to constraints on manpower, funding, equipment, or training. There is also little value in collecting data on trivial indicators that bear little relation to the area's most significant objectives and problems.

For the Bob Marshall Wilderness Complex, an early meeting of the Task Force identified campsite impacts as one of the foremost concerns. Consequently, development of a procedure for inventorying and monitoring campsites was a high priority. Such a procedure would be the basis for evaluating indicators developed to measure the number and condition of campsites. Because the area to be inventoried was 1.5 million acres in size and there were only a handful of people available to work part-time on the inventory, a procedure involving rapid estimates of a number of site characteristics and impact parameters was developed. Such systems are becoming increasingly common, particularly in areas where large numbers of campsites must be inventoried. Although not as precise as systems based on measurements, rapid estimate systems provide gross estimates of site condition and are often the only feasible option. For example, in Sequoia and Kings Canyon National Parks, where one of the earliest of such systems was developed, over 7,400 campsites have been inventoried (Parsons and MacLeod 1980). It would be virtually impossible to take detailed measurements of so many sites.

The procedure developed for the Bob Marshall Wilderness Complex was a modification of the Sequoia-Kings Canyon system and is explained in more detail in Cole (1983a). The form that was used is shown at the end of this article. The general procedure was to locate all sites in the area--not just those that were most heavily used or damaged. All likely campsite locations were visited and a form was filled out for each site showing evidence of previous recreational use. The usual criterion for deciding whether or not a site is a campsite is evidence of a campfire. Inventorying all sites is important if management is concerned about proliferation of new sites or shifts in the distribution of sites.

A considerable amount of information not directly related to the LAC process was collected on each site. For example, the front side of the form consists of a series of parameters that describe the site's location, size, and facilities. This information was collected because it is potentially useful and only requires a few minutes to fill out. Most of the time required to inventory campsites is spent travelling between sites. Therefore, the cost of collecting a little more information is low.

The data collected on indicators are on the back side of the form. For each site, information was collected on the following parameters: vegetation loss, increase in bare mineral soil, tree damage, tree root exposure, development, cleaniness, camp area, barren core camp area, and number of social trails. Weighted ratings for each parameter were then summed to derive an overall index of impact for each site.

Indicators were selected following field trips to identify problem situations, evaluation of public concerns, and analysis of detailed measurements taken on a sample of 35 campsites (Cole 1983b). Frequent problems in need of management were places with excessive numbers of sites, places with large numbers of highly impacted sites, and individual sites with either excessive amounts of tree damage or excessive amounts of barren soil. The indicators selected to address these problems were (1) number of campsites per 640-acre section, (2) number of moderately and highly impacted campsites per 640-acre section (moderately and highly impacted campsites are those with weighted impact indexes of 30-50 and over 50, respectively), (3) number of damaged trees on any campsite, and (4) area of barren core on any campsite.

From the inventory data collected it was possible to display the range and distribution of conditions for each indicator. For indicators 3 and 4, this was available directly from the inventory form. To evaluate indicators 1 and 2, all campsites were located on maps along with their impact index. It was then possible to count the number of campsites and the number of moderately and highly impacted campsites in each section. For example, the number of highly impacted

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campsites per section ranged from 0 to 5, with the vast majority of sections having either 0 or 1 highly impacted site. Knowledge of these distributions, along with considerations of objectives, facilitated the selection of standards for each indicator. Because there were four opportunity types, most indicators had four different standards, one for each opportunity type. For example, the maximum number of campsites allowed per section is 1 in opportunity class I, 2 in class II, 3 in class III, and 6 in class IV; the maximum amount of barren core on any campsite ranged from 100 square feet in class I to 2000 square feet in class IV.

Once a preferred allocation of opportunity classes was agreed upon, it was possible to identify places where these standards were exceeded. By counting the number of places where standards were exceeded it was possible to evaluate how realistic the standards were. For example, 82 campsites exceeded the barren core area standard. This was judged to be a reasonable number of situations to try to correct and these standards were accepted. Once the final set of standards and the opportunity class allocation is accepted, the places where standards are exceeded are identified as "problem areas" in need of management. Actions are taken to correct these problems and then, at a future date, sites are reexamined--the monitoring phase--to see where old problems have been solved and new problems have developed.

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BOB MARSHALL - GREAT BEAR - SCAPEGOAT WILDERNESS COMPLEX - CAMPSITE INVENTORY

GENERAL SITE DESCRIPTION

(1) SITE NUMBER: ____________

(2) UTM COORDINATES: 12 _ _ _ _ E _ _ _ _ _ _ N

(3) USGS QUADRANGLE: ____________

(4) DATE CODED: _ _ (Month) _ _ (Day) _ _ _ _ (Year)

(5) CODED BY: (Name) ____________

(6) ELEVATION: (To nearest 100 ft) ____________

(7) VEGETATION: (Circle one)

1 - Closed forest   3 - Nonforested, densely vegetated

2 - Open forest   4 - Nonforested, sparsely vegetated

Dominant species ____________
Habitat type, if known ____________

(8) LANDFORM: (Circle one)

1 - Floodplain   2 - Other valley bottom   3 - Cirque basin

4 - Sideslope   5 - Ridgetop   6 - Other ____________

(Do in office)
(9) DISTANCE TO CLOSEST TRAILHEAD: ____________ (miles)

(10) DISTANCE TO CONSTRUCTED TRAIL: ____________ (feet)

Screening: 1 - Complete   Maintained: 1 - Yes
(circle one) 2 - Partial   (circle one) 2 - No
3 - None

(11) DISTANCE TO WATER: ____________ (feet)

Type: 1 - River/creek   3 - Spring
2 - Lake   4 - Other ____________

(12) DISTANCE TO CLOSEST CAMPSITE: ____________ (feet)

Screening: 1 - Complete
(circle one) 2 - Partial
3 - None

(Do in office)
(13) NUMBER OF OTHER CAMPSITES WITHIN 1/4 MILE: ____________

(14) MAXIMUM PARTY SIZE ACCOMMODATED: (Circle one)

1 - 1-2   3 - 7-10   5 - more than 15

2 - 3-6   4 - 11-15

(15) TYPE OF USE: (Circle as many as apply)

1 - Foot   3 - River

2 - Stock   4 - Outfitter

(16) CLOSEST FIREWOOD SOURCE: (Circle one)

1 - One-site   3 - 100-300 feet   5 - >1/4 mile

2 - <100 feet   4 - 300 ft-1/4 mile

(17) CLOSEST FORAGE SUPPLY: (Circle one)

1 - On-site   3 - 100-300 feet   5 - >1/4 mile

2 - <100 feet   4 - 300 ft-1/4 mile

(18) FACILITIES: Present ____ Absent ____
(If present, write number of each type in blank.)
1 - Fire ring____   6 - Hitchrail____
2 - Primitive seat____   7 - Corral____
3 - Constructed seat____   8 - Toilet____
4 - Table/shelf/counter____   9 - Other____
5 - Meat rack____

IMPACT EVALUATION

	ON CAMPSITE	ON UNUSED COMPARATIVE AREA
(19) VEGETATION COVER: (Be sure to compare similar areas, same species, slope, rockiness, and canopy cover)	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%
(20) MINERAL SOIL EXPOSURE: (Percent of area that is bare mineral soil)	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%

Rating (Circle one category)

	1	2	3
(21) VEGETATION LOSS:	(no difference in coverage)	(Difference one coverage class	(Difference two or more coverage classes)
(22) MINERAL SOIL INCREASE:	(No difference in coverage)	(Difference one coverage class)	(Difference two or more coverage classes)
(23) TREE DAMAGE: No. of trees scarred or felled_____ % of trees scarred or felled______ (est.)	(No more than broken lower branches)	(1-8 scarred trees, or 1-3 badly scarred or felled)	(> 8 scarred trees, or >3 badly scarred or felled)
(24) ROOT EXPOSURE: No. of trees with roots exposed____ % of trees with roots exposed____(est.)	(None)	(1-6 trees with roots exposed)	(> 6 trees with roots exposed)
(25) DEVELOPMENT:	(None)	(1 fire ring with or without primitive log seat)	(> 1 fire ring or other major development)
(26) CLEANLINESS: No. of fire scars______	(No more than scattered charcoal from 1 fire ring)	(Remnants of >1 fire ring, some litter or manure)	(Human waste, much litter or manure)
(27) SOCIAL TRAILS: No. of trails_____	(No more than 1 discernible trail)	(2-3 discernible, max. 1 well-worn	(> 3 discernible or more than 1 well-worn)
(28) CAMP AREA Estimated area______ (ft^2)	(< 500 ft^2)	(500-2000ft^2)	(> 2000 ft^2)
(29) BARREN CORE CAMP AREA: Estimated area______(ft^2)	(< 50 ft^2)	(50-500 ft^2)	(> 500 ft^2)

Calculation of impact index (do in office)

(30) PHOTO RECORD________________________

(31) COMMENTS: (Details about location of site, impacts, management suggestions, etc.)

____

____

____

(32) IMPACT INDEX ____________

VISITOR TREND SURVEY DATA IN RELATION TO THE LAC PROCESS

Robert C. Lucas

Comparable visitor surveys covering a wide range of activity, experience, attitude, and visitor characteristics were carried out in the three-area Bob Marshall Wilderness complex in 1970 (Lucas 1980) and 1982 (Lucas 1985). Although the studies were not designed or conducted with Limits of Acceptable Change (LAC) in mind, information from them has proved useful in the LAC process, particularly in choosing indicators and setting standards, as well as describing general issues.

The availability of data from two periods has increased the usefulness of the survey data. Various conditions are not only described for a recent year (1982), but, because of data for the earlier year (1970), it is apparent whether potential problems associated with the condition are improving, stable, or deteriorating. The trend information suggests priority of managerial attention, the need to represent the condition with an indicator, the needed level for standards, and the magnitude of the needed management effort beyond what 1-year data could.

Some general background information was relevant to the overall LAC process, helping identify issues. Overall visitor satisfaction stayed high, and satisfying factors changed little from 1970 to 1982. However, dissatisfying factors changed substantially. Complaints about trail conditions increased six-fold, and complaints about crowding and conflict (particularly hikers' dislike of horse use and its impacts) tripled.

Hiker use increased much more than horse use in the 12-year period, stays became a little shorter and parties smaller. Visitors were less dependent on wood campfires and used stoves more. Use was less concentrated. These trends generally suggest lower potential impacts per party.

Compared to 1970, most experienced visitors in 1982 felt overall area quality had stabilized; in 1970 many more of the experienced visitors felt the area's condition was deteriorating. The management challenge faced in the LAC process seems to be more preventing further deterioration than restoration.

Other results related more specifically to indicators and standards. These are presented in outline form, relating study data to the importance of potential indicators and the current situation in the Bob Marshall Wilderness complex relative to the indicators.

Robert C. Lucas is Project Leader, Wilderness Management Research Unit, Intermountain Research Station, Missoula, MT. Dr. Lucas provided general assistance on application of LAC and applied results of recent visitor research to the development of social indicators.

1. Campsite Density/Isolation

   a. Importance

   --Most campers want isolation (table 1).

Table 1.--Camper preferences for camps nearby, Bob Marshall Wilderness complex, 1970 and 1982

	Number of other nearby camps desired			
Year	0	1	2	3 or more
1970	86	7	4	3
1982	81	7	6	6

--Standards for campsite solitude need to be fairly strict, although 1982 campers accept other campers a little more than in 1970.

--Also, solitude ranked number five on a list of appeals in 1982, number 4 in 1970, and the higher ranked appeals are things largely beyond managers' control; for example, scenery.

--The Wilderness Act requires "outstanding opportunities for solitude," and "impact of man's work substantially unnoticeable."

   b. Situation:

--Campers report more trouble finding desired level of campsite solitude (table 2).

Table 2.--Camper reports of success in finding desired campsite solitude, Bob Marshall Wilderness complex, 1970 and 1982

	Success in finding desired campsite solitude		
Year	Every night	Some nights	Never
	- - Percentage of total visits - -		
1970	76	18	6
1982	63	33	4

--Lenient standards for campsite solitude will probably lead to increased problems finding desired solitude. (Very few campers may have wanted some neighbors but didn't have them.)

--92 percent of campers reported "no trouble" finding an unoccupied campsite in 1982 (not asked in 1970). Only 2 percent reported trouble at more than one place. Supply of campsites appears adequate.

2. Campsite Impacts

a. Importance:

--80 percent considered but rejected campsites.

--26 percent rejected sites because of condition--reasons, in order, firewood scarce (4 percent); grazing scarce (3 percent); bare ground (3 percent); litter (2 percent); horse manure (2 percent). (Only two people mentioned "old firerings.")

--The Wilderness Act requires "preservation of wilderness character". . . "unimpared," "preservation of natural conditions," "with imprint of man's work substantially unnoticeable."

b. Situation:

--In 1970, 22 percent rated vegetation and soil impact conditions only "fair to poor."

--In 1982, 31 percent said "fair to poor." ("Very good" ratings dropped from 47 percent to 33 percent.)

--Situation worsening in view of campers; standards probably should be set to stop decline, perhaps reverse trend.

3. Number of Encounters

a. Importance:

--Only 11 or 12 percent (both years) said "number (of other visitors) met didn't matter." Important to almost 90 percent.

--49 percent in 1982 said solitude a "very important" reason for visiting wilderness. (Scenery, relaxation, escape civilization, and avoid mechanized recreation were higher, but managers have little control of these.) (Not asked in same way in 1970.)

--Satisfaction was higher when encounters lower, and fewer said they met "too many" at lower encounter levels--especially the 49 percent of 1982 visitors who said solitude was "very important" to them (not asked in 1970). Gamma = 0.57 (57 percent of variation in feelings of crowding by visitors who valued solitude accounted for by average number of other parties met per day.)

--"Solitude" number two "high point" 1982 (after "scenery"), cited by 17 percent (not asked in 1970).

--"Crowding" number two "low point" 1982 (after "poor trails"), cited by 9 percent.

--The Wilderness Act requires "outstanding opportunities for solitude."

b. Situation:

--Encounters low, but higher in 1982 than 1970 (table 3).

Table 3.--Encounters with others reported by campers, Bob Marshall Wilderness complex, 1970 and 1982

Campers only	1970	1982
Overall average number of other parties met per day	1.0	1.2
	Percent of total visitors	
Average numbers met per day:		
0	42	26
1-2	48	63
3-5	9	9
6-10	1	2
11-20	0	0
over 20	0	0

--High levels of solitude are a distinguishing characteristic of the BMWC, and standards need to reflect this.

--Only 18 percent said "crowding was a problem."

--But the main change from previous visits was "more use."

--However, most visitors said they met "about right number," and opinions were slightly more favorable in 1982 (table 4).

Table 4.--Campers' opinions of number of visitors they met, Bob Marshall Wilderness complex, 1970 and 1982

Opinion of number met	1970 (Campers)	1982 (Campers)
Too few	2	1
About right	52	60
Too many	32	27
Didn't matter	12	11

--Solitude attitudes are mixed and not always consistent, but there is little basis for setting encounter standards lower than visitors currently are experiencing.

4. Range Utilization

a. Importance:

--Horse use common. (39 percent of visitors on horseback or hiking with stock in 1982. Horse users account for majority of visitor days.)

--Possible competition with wildlife forage.

--Wildlife observation down from 1970 to 1982 and reported elk and deer hunter success down.

--Wilderness Act language--"left unimpaired," "preserve natural conditions," etc.

b. Situation:

--In 1982, average number of horses per party was nine, only 7 percent with over 20 head. Down from 1970 (average 12).

--More supplemental feeding of horses, 75 percent in 1982; 65 percent in 1970. (Others depend entirely on grazing in wilderness.)

--Twenty percent of horse users rejected a campsite because of scarce grazing (1982--not asked in 1970).

--Most common way of holding horses reported in 1982 was "tiea to trees," with high potential for impacts.

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APPLICATION OF A GEOGRAPHIC INFORMATION SYSTEM IN THE BOB MARSHALL WILDERNESS COMPLEX

John Mercer

The Limits of Acceptable Change (LAC) process apportioned the Bob Marshall Wilderness Complex (BMWC) into four opportunity classes with different standards for each class. Nine indicators were developed that must be inventoried and monitored regularly to determine the state of the resource in each opportunity class. For the LAC process to work, the data have to be analyzed and the information displayed at least on a yearly basis.

Several problems surfaced in meeting these information needs:

--New inventory data, because of the numbers involved, were cumbersome. For example, there were nearly 1,800 campsite inventory forms completed for the BMWC, each with 32 pieces of information.

--The analysis by LAC opportunity classes required considerable manipulation of the data. The opportunity classes have different limits for some indicators. This often requires that the data be sorted by opportunity class as well as by the different standards.

--Many of the data are tied to specific locations in the wilderness. In addition, many indicators are related to unit area and must be displayed on maps. The large size of the BMWC makes this a difficult and time-consuming task.

--The data have to be readily available, easily updated, and stored in a consistent format. Much of the existing information was in dissimilar formats scattered among five different Ranger Districts in the four National Forests that manage the BMWC. These problems have been addressed through the use of the Geographic Information System (GIS).

WHAT IS A GEOGRAPHIC INFORMATION SYSTEM?

There are many different Geographic Information Systems. They evolved in the 1960's and have been in use since that time. In general, a GIS is a computerized data base designed to handle large amounts of spatial as well as nonspatial information. Data can be incorporated from many different sources, including maps, field reports, inventories, and remote sensors such as LANDSAT satellites.

A GIS is very efficient in storing, retrieving, manipulating, analyzing, and displaying data. The user of a GIS can access information based on relationships between different kinds of data. It is helpful to visualize data in the GIS as organized in layers. Topographical data would form one layer, campsite location and inventory data another, and so on. In manipulating data, information layers are overlayed one over the other to determine relationships. For example, in the BMWC one task of the GIS will be to find all campsites that are severely or moderately impacted within Opportunity Class One (most pristine) areas. The resulting data set will be displayed on a map and indicate sites in Class One areas that are violating impact standards. When one considers the nearly 1,800 campsites in the BMWC, this represents a considerable reduction of time required for a tedious and repetitive chore, time that can be better spent on wilderness management problems.

A brief literature review reveals that there is extensive material describing the different kinds of GIS (Marble and Peuquet 1983). They have been used in wildland inventories, in forest management, and in classification of forest communities (Calkins and Tomlinson 1977). Mooneyhan (1982) describes the use of a GIS in Olympic National Park to develop a wildfire prediction model. One interesting feature of a GIS is that the different layers of information tend to reinforce accuracy of the biological and physical data. This has important implications in large wilderness areas like the BMWC, where field inventory data on vegetation and landforms are limited and difficult to obtain.

COMPONENTS OF THE GIS

The GIS used in the BMWC was originally developed by Bain (1984) for the nonwilderness portions of the Flathead National Forest. It was modified during 1984-85 and designed for use in the LAC process and general wilderness management of the BMWC. The software is the raster-based Video Image Communication and Retrieval System (VICARS) used in combination with the Image Based Information System (IBIS). Both were developed by the Jet Propulsion Laboratory in California. The GIS

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system software and mainframe AMDAL computer time are leased from Washington State University at Pullman, and accessed by the Data General 8000 series computer at the Flathead Forest Supervisor's Office in Kalispell, MT. (For more information on GIS and VICAR/IBIS see Colwell 1983).

The GIS has full mapping capabilities integrated with Landsat 3 multispectral imagery. The Landsat imagery provides large scale vegetative mapping of the wilderness at a relatively low cost. In addition to the Landsat vegetative data, the GIS has 57 other data layers including: watershed boundaries, lakes and streams, landtypes II and III, administrative and legislative boundaries, soil types, campsite locations and attributes, LAC opportunity classes, trail locations and attributes, range inventory, range allotments, digital terrain model (topography), slope, aspect, and elevation, administrative sites and structures, grizzly bear habitat, and special use inventories (Tomlinson Associates 1985).

The data layers can be overlayed in almost any fashion to produce new data layers, which can be modified to produce new data layers, and so on. The system has the capacity to conduct searches, make arithmetic and algebraic calculations, do weighted modeling, and measure area, distance, and numbers. The end products can be displayed in tabular form, or on maps at almost any scale.

The bulk of the spatial data was available from conventional sources, such as maps and reports. These data were manually entered in a vector format using the Universal Transverse Mercator grid system and an Numonics digitizing table and later converted to raster form for use with VICARS.

Information specific to the LAC process was collected through campsite, trail, range, and vegetation inventories. The campsite data were manually entered into a Base--II data base management system designed to screen the data for internal errors. After the data were checked and graded for reliability they were stored in standard ASCII files and later converted to the VICAR format. A historical trail map was developed from early records showing all trail segments that were ever maintained in the BMWC since 1917. This information along with trail inventory data was manually digitized.

Ground truth for the Landsat vegetative data was obtained from grizzly bear habitat maps, other wildlife habitat maps, and intensive vegetative inventory of seven inventory blocks totaling approximately 6,000 acres in the BMWC. Landsat data were classified and incorporated in the data base using IBIS and a process developed by Bain. Range survey information was manually entered.

APPLICATION OF THE GIS

The GIS will be used to store and display information on all nine indicators used in the LAC program in the BMWC. It will calculate the four indicators associated with campsites directly from campsite inventory data. In addition, as the GIS is relatively easily updated, it will be used to monitor and display changes in the indicators over time. It will flag areas in opportunity classes that have indicators that exceed the standards. It will also list indicators that are scheduled for reinventory.

The GIS will be used in trail management. Trail inventory data provide information on trail conditions, use levels, maintenance history, and needs. Projected or required maintenance levels can be totaled for miles of trail in each category and displayed graphically. This information can be correlated with per mile costs for each maintenance level and used to develop "what if" scenarios for planning and budgeting of trail dollars. Trail attributes--slope, soils, vegetation, aspect, etc.--can be analyzed to determine which attributes are common to problem areas. A hazard rating system could be developed for new trail location or rerouting. This will help focus reconnaissance efforts in the field and reduce planning time and costs.

The potential exists for campsite analysis using the GIS. It may be possible to identify attributes such as vegetation and soils common to severely impacted campsites and develop predictive capability based on site characteristics. Impacts can be analyzed to determine patterns of use, pinpoint chronic problems, and help the manager focus efforts in the field.

The GIS has important implications for wildlife habitat management in the BMWC. The ability of the GIS to generate overlays of soils, vegetation, aspect, slope, etc. will facilitate habitat identification and maintenance of ecosystem stability and diversity through wildfire management.

LIMITATIONS OF THE GIS

The GIS has the capacity to precisely locate objects such as campsites within a meter square on the ground and display the vegetation and soils for that site. However the accuracy of any overlay is entirely dependent on the quality of the input data. The old cliche, "garbage in--garbage out" is particularly true for GIS systems. An error of four mm on a 1:24,000 scale USGS quad represents an error of 96 meters on the ground. Small errors will have little effect on LAC applications. But they may significantly influence the utility of the GIS analysis of trail and campsite attributes.

It is important that field personnel are properly trained and take the time to collect inventory data and locate campsites and trails as accurately as possible. Field inventory maps greater than 1:24,000 scale increase the possibility of error during the inventory and digitization stages. USGS quads were used exclusively in the BMWC. Ortho-photo quads may enable more precise location of field data in areas with complex topography, or dense forest.

Some individuals resist the use of computers in wilderness management. This may be particularly true of traditional long-time wilderness users, outfitters, and field managers. Some of that reluctance stems from the fear that the computer will usurp the decision making process. It is important to remember that the GIS is merely a tool. In the right circumstances, it has the potential to help the manager identify problems by analyzing large amounts of data rapidly and accurately. It can provide the manager with more time to examine problems and lead to more efficient use of personnel in the field.

AN ONGOING PROCESS

The GIS in the BMWC is scheduled to come on line this fall. After the system is in full operation, much work needs to be done to test the resolution and accuracy of the data. Along with the LAC program, the application of the GIS in the BMWC is an ongoing process that will be continually revised and improved over time.

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WILDERNESS EDUCATION

Ken Wall

In October 1984 the Wilderness Institute at the University of Montana competed against 30 other universities and private consulting firms across the country for a contract from the Washington Office of the Forest Service, U.S. Department of Agriculture, to develop a demonstration project to teach a natural resource issue to agency employees and the public. The Natural Resource and Environmental Education Program (NREE) is a new approach to public education by the Forest Service, with a special emphasis on natural resource issues on individual National Forests.

The project consists of the following components:

1. Background literature, educational materials, and supporting information on wilderness management of the Bob Marshall Wilderness Complex (BMWC).
2. Classroom and field trip education exercises and learning activities on main concepts of managing wilderness ecosystems, written for fifth grade students.
3. Visually oriented material, including a slide-tape program, notebook, brochure, and fact sheets, directed at adult audiences. Reference and source list for background literature, educational materials, and supporting information gathered and indexed throughout the project, supplemented by an annotated bibliography.

The goal of the project is to collect and organize information, and develop educational activities and audio-visual aids to demonstrate a method of teaching the public about a natural resource issue. A second goal is to provide the Flathead, Lewis and Clark, Lolo, and Helena National Forests with educational materials to increase the general public knowledge and awareness of wilderness management problems in the BMWC, and to provide information for wilderness managers to change harmful wilderness behavior and reduce site-specific impacts and user conflicts.

The major management topics for the project are:

1. Background history, and development of philosophies and values that led to the creation of the Wilderness Act.
2. Legislative history, policy, and regulations governing wilderness and the methods used by agencies to manage wilderness.
3. The natural characteristics of wilderness ecosystems.
4. Wilderness skills, etiquette, minimum impact techniques, proper equipment, health hazards, and safety needs.

The project will be completed in December 1985. For more information, contact Ken Wall at the Wilderness Institute, School of Forestry, University of Montana.

SUMMARY OF PROGRESS

Background Material

Now in progress (table 1) are several products to be used as graphic aids for wilderness education efforts. Prototypes for these products will be prepared for Forest Service-sponsored environmental education workshops in August.

The graphic aids include:

1. A 3- by 4-ft map of the National Wilderness Preservation System, showing the location of all areas in the system as of December 31, 1984. The back of the map includes a tabular listing of information on all areas in the system.
2. A portable table and wall display including graphics, photographs, and illustrations with accompanying text, describing the major issues of wilderness management.
3. A collection of 400 slides illustrating the BMWC and major human impacts and management concerns in area. We also have slides representative of recreational use in the area.
4. A 20-minute slide-tape program summarizing the major issues of wilderness management.

Other written support materials will be prepared for these workshops, including a series of 25 fact sheets on management issues, accompanied by supplemental reading lists. Also, a BMWC guide designed to introduce the wilderness complex to inexperienced users and communicate basic no-trace camping techniques will be prepared.

Summary Document

We are preparing a background document, summarizing the major aspects of the issue for the general public. This document will include a condensed two-page summary of the issue, and

Ken Wall is Assistant Director of the Wilderness Institute, University of Montana, Missoula. Mr. Wall is not only leading a major wilderness educational project, but he was also responsible for producing the automated slide-tape presentation used in the many information efforts involved in the planning process.

Table 1.--Summary of education products being developed to increase knowledge and awareness of management problems in the Bob Marshall Wilderness Complex

Project components	Products	Target audience
Background materials	Annotated bibliography	All groups
	Resource information	Agency, multiplier, organized group
	Education exercises and activities	5th grade
	Graphic support material --Photo display --Map of the NWPS --Poster	All groups (Agency and general public)
	Reading lists	All groups
Education exercises and activities	Teacher workbook/source book	Teachers
	4-hr classroom unit	5th grade
	2-hr lab unit	5th grade
	1/2- to 1-day field trip	5th grade
	Reference and source materials	5th grade
Visually oriented briefing materials	Slide-tape program	All groups
	Wilderness primer	First-time Wilderness users
	Fact sheets	All groups
	Notebook	Agency and multipliers
Reference and source lists		All groups

relevant material such as reference to laws, management guidelines and policy, and supporting graphics illustrations.

Educational Guide to the Bob Marshall

We are also preparing an extended brochure, approaching small booklet size. It is designed for the inexperienced wilderness visitor, the first time user of the BMWC. It will complement the slide show, or could be used as an independent mailer for general inquiries about the wilderness complex.

The main focus of the primer is to educate the public about wilderness travel and camping techniques and etiquette, and to give them some background on the human and natural history of the wilderness complex. It is directly targeted at reducing impacts from recreational use, the most important management issue according to most agency personnel I have talked to.

Many recreational impacts result from improper use by independent horsemen and pack stock. This audience is also one of the most difficult to reach and educate, and they are the least receptive to education. As a result, I approached Arnold (Smoke) Elser, a well-known and respected outfitter, to write this section of the primer, and he has agreed to do so. Smoke has authored two books on horse use and outfitting in the wilderness, and has been president of the Montana Outfitters and Guides Association. I believe he will have great credibility with horse users, and they might be more receptive to what he writes.

Although the focus of the guide is on no-trace camping techniques and visitor safety, we also want it to be interesting to readers, so it includes some history of the Bob Marshall and early wilderness pioneers, and a section on the flora, fauna, and geology of the wilderness complex.

Table and Wall Display

A portable table and wall display will be prepared to complement the slide show, or to be used alone at conferences, county fairs, and other public events. I have been gathering materials and photos, but have not yet put this together. It will include historic photos of the Bob Marshall, and contemporary photos and drawings of wilderness management issues and concerns. Photos will be captioned. The display will also include maps of the area, and a limited amount of typeset text.

National Wilderness Preservation System Map

I had hoped to have the map of the National Wilderness Preservation System ready for review in early June, but we have been delayed in locating some of the new areas in Washington and California included in the system during the 98th session of Congress.

5th Grade Module

We intend to stay with the original intent of our proposal to develop a three-part module of educational materials and activities for fifth grade use.

1. Background materials and activities, using a similar format to Project Wild and Project Learning Tree, but directing the content to the issue of wilderness management in the BMWC.
2. A lab exercise in the form of a wilderness management simulation game, incorporating all of the issues and concerns addressed in the background material, and allowing the students to apply what they have learned.
3. Activities and materials for an optional one-half day field trip to a "wild" setting, preferably with a wilderness manager, seasonal wilderness ranger, or trained volunteer to serve as a resource person.

Printed materials will be bound with an index of references and subjects, and a glossary.

Fact Sheet

Fact sheets are written for a lay audience and are designed to be used with the slide show, brochure, and table display. Each fact sheet will stand on its own, or they could be used as a set. They also might be useful at Ranger District offices and other areas where public contact occurs.

Slide Show

The slide show will be 20 minutes long, covering the major aspects of the issue of wilderness management in the BMWC. It will include several graphic slides to show the relationship of the BMWC to other wilderness areas in Montana and the Country, and the types and characteristics of wilderness use. It will also cover other aspects of wilderness management besides recreational use, such as management of natural wildfires and threatened and endangered species.

BIBLIOGRAPHY AND SOURCE LIST

We have collected and indexed much information on the issues of wilderness management and specifically on the BMWC. This collection includes the following:

1. A computer data base bibliographic file on wilderness management and the BMWC with 1,500 citations. Half of these citations are annotated. These citations include research and popular articles, books, dissertations, films, and brochures.
2. A collection of written material, including roughly 500 articles, research reports, management plans, federal laws, policy statements, brochures, maps, and other supporting documents that relate to management of the BMWC.
3. A collection of information on environmental and wilderness education centers across the United States, and samples of curriculum and interpretive materials distributed through these centers.

Based on comments on the last progress report that the 1,500-citation bibliography and source list includes too many technical references, and will overwhelm the lay audience, I have split the bibliography into two separate reference and source lists. The technical list is directed at land managers and researchers, and the non-technical list is directed at the lay audience. The list primarily contains articles and books; we have recently been adding slide shows, films, brochures, and other audio-visual aids available to the public. The best references and general overview articles will also be in the fact sheets for each topic.

AN ALTERNATIVE TO RATIONAL-COMPREHENSIVE PLANNING: TRANSACTIVE PLANNING

Stephen F. McCool, Joseph L. Ashor, and Gerald L. Stokes

Rational-comprehensive or synoptic planning is the most prevalent form of planning used today. Braybrooke and Lindblom (1963) define this form of planning as "the ideal way to make policy by choosing among alternatives after careful and complete study of all possible courses of action and their possible consequences in light of one's values." Synoptic planning involves a systematic process in which objectives are formulated, alternatives are identified, choice criteria are applied to the alternatives, and a recommended course of action is identified. The planner's tools are analysis, quantitative models, and explicitly established and formalized procedures for the conduct of the planning process. Information requirements are normally considerable, with an emphasis on information that can be quantified.

A problem with the rational-comprehensive approach is that the encompassing information requirements for a truly comprehensive model are unrealistic. As McLaughlin (1977) suggests, "the complete information requirement has been replaced by the best available or most affordable information, both of which seem to have become an acceptable end."

Others have criticized the synoptic planning approach from the perspective of the limitation of available knowledge and man's intellectual and problem solving abilities (Braybrooke and Lindblom 1963). The data gathering necessary for comprehensive analysis is often extremely costly. Freeman (1974) finds synoptic planning inadequate because goals are frequently multiple and inconsistent. Bolan (1967) also criticizes synoptic planning in terms of the planner's inability to determine goals or values, which are often in a state of flux. Grabow and Heskin (1973) argue that the centralizing and change-resistant technology of synoptic planning is largely the reason its goal of a systematic, rational approach to problem solving is unattainable. Sterile, technocratic, and centralized planning, with its relatively large information and budget requirements, seems out of place in a dynamic, politicized planning situation where funds are limited.

Transactive planning has been developed by Friedmann (1973) as a response to the deficiencies and problems posed by traditional synoptic planning. Friedmann feels that alternatives to solving social problems by centralized decision making must be developed, and that such an alternative process should include those impacted. Friedmann then suggests that small working groups of citizens form the basis of his transactive planning process. Such working groups, because of their relatively small size, encourage face-to-face communication and dialogue, and provide a setting where participants can acquire and use technical knowledge.

In these working groups, participants share their intimate knowledge and experiences with the planner, who shares the technical planning models and systematic ways of data manipulation with the citizens. The dialogue that develops leads to mutual learning, a learning which accumulates to both the citizen and the planner. Through the dialogue and learning processes, decision situations are eventually confronted. The working group, using its accumulated knowledge, makes an informed decision about a course of action. Because the working group is a microcosm of the political marketplace, decisions made by it are enforceable by various political actors.

There are fundamental structural differences between citizen involvement in transactive planning and how it is used in synoptic planning. In transactive planning, the citizen participant is viewed not only as having expertise about the subject matter, but also as an individual who has the capacity to act rationally, within the context of a working group. In a sense, the planner and citizen work as partners in developing actions to solve problems. In many ways, citizen involvement in synoptic planning situations has been superficial and adversarial. Citizens are asked only to respond to plans created by planners working in relatively insulated environments. Complete understanding of the problem is less likely because of the minimal role citizens play in plan development. Because agencies ask citizens to review plans, an adversarial role is intrinsic in the planning process. This leads to agency-citizen tension and dissatisfaction with the plan.

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LAC TASK FORCE ROLE

Gerald L. Stokes

The LAC Task Force was assembled in February of 1982 and has been gradually expanded since that time. The task force has functioned as an ad hoc umbrella group that is composed of managerial, research, and citizens components. All full task force meetings have included all three components. Thus the LAC Task Force can be seen as a three-legged stool with a managerial leg, a research leg, and a citizens leg. This composition of representatives allows the opportunity for sharing technical/scientific knowledge and personal knowledge (that gained through on-the-ground experience) among participants. Most citizens' representatives have personal knowledge of the Bob Marshall Wilderness Complex (BMWC) based on their experience as users. Many of them also have technical knowledge to share with others.

The managers have both personal knowledge of the area and scientific/technical background and knowledge and the researchers provide concepts such as Limits of Acceptable Change (LAC) and the best scientific data and analysis that is available. Through discussions and dialogue at general task force meetings and smaller subgroup meetings, the personal knowledge of all representatives becomes integrated with the collective scientific/technical knowledge of the group. This should provide:

1. Validation or tempering of scientific/theoretical/technical information with the personal knowledge of users and managers.
2. Validation or tempering of the collective personal knowledge of the group with scientific/technical data, analysis, and methodology.

The result should be the most accurate description of the real world management situation in the BMWC. This should also result in the most accurate assessment possible of what should and can be achieved to maintain or enhance that management situation, what the future real world state of affairs of the BMWC should be, and how to achieve that future state; that is, what management actions should be taken.

This process may be summarized (fig.1) as follows:

Dialogue and discussion within and among the three components of the task force results in mutual learning about the BMWC through sharing of personal and scientific/technical knowledge of the area. This mutual learning provides an opportunity to develop a consensus on what the state of affairs in the BMWC is and what, if anything, should be done to improve it. The final result would then be a course of action (direction for managing recreation use) that is scientifically, politically, and administratively justified, supportable, and defensible.

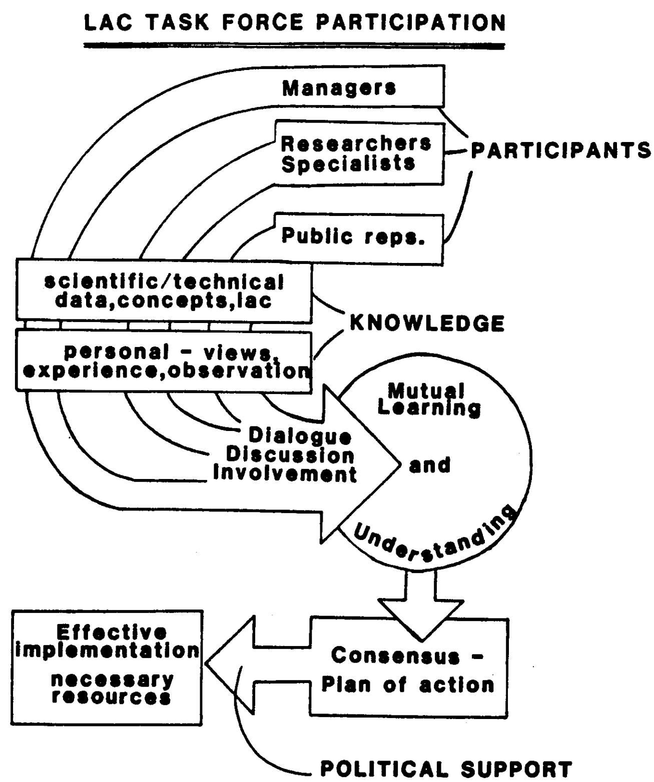

Figure 1.--Diagram showing participants in the LAC Task Force and how they interact to produce a consensus plan of action.

This process is based on several assumptions:

1. The scientific/technical data we have, although not all-inclusive, are adequate for this first-generation LAC planning effort and can be refined over time to fine tune conclusions and management direction based on the data.
2. The collective personal knowledge of users, managers, and researchers is sufficient to complement, validate, or refine conclusions based on the data.

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3. Managers, citizens' representatives, and researchers are willing to participate openly within the task force framework to develop a sense of shared ownership in the BMWC management challenges and development of solutions to those challenges.

4. The citizens component includes a sufficiently broad spectrum of BMWC interest groups to constitute a microcosm of local, regional, and national interest in the BMWC. The task force is not, however, necessarily representative of all wilderness interest groups. The formal public review process provides the opportunity for any groups or individuals not included in the task force to make their views known.

5. The citizens component provides an adequate "political market place" wherein the bargaining and tradeoffs necessary to develop a consensus can be conducted.

6. Managers responsible for legislative mandates and administrative policies emanating from the Wilderness Act will ensure that all solutions/directions are consistent with existing mandates and policies. All direction for managing recreation use in the BMWC must provide "for the American people of present and future generations the benefits of an enduring resource of wilderness."

7. The composition of the citizens component constitutes a potential viable political coalition that can ensure the LAC management direction and the managerial actions necessary to implement that direction are carried out. This coalition should continue to function after LAC direction is developed. This coalition could ensure adequate extra-agency political support and internal agency managerial support would be provided for implementation and ongoing monitoring. Some formal supporting organization might be formed by the citizens' representatives at their own initiative.

8. Solutions developed under the umbrella of the LAC Task Force will fall within the sideboards established by the Wilderness Act and subsequent policies and regulations. The composition of the citizens component should ensure wilderness resource values are adequately addressed within the context of Wilderness Act intent. If this does not occur, managerial prerogatives based on agency policies and regulations will be exercised.

9. What is acceptable and supportable by the citizens component will be acceptable and supportable by the population at large.

10. The formal public review of LAC draft direction developed by the task force will either validate or invalidate items 8 and 9.

An interForest core team was formalized under the auspices of the LAC Action Plan, which was signed by all four Forest Supervisors in August 1983, to develop a draft plan. Both managerial and research components have been intensively involved in this effort. The core team along with its research support operates as the technical arm of the LAC Task Force as a whole.

The task force has operated as a whole and in subgroups that have been formed to develop recommendations for particularly difficult problems or provide for a local forum to discuss the plan. The LAC Coordinator has been meeting with these subgroups to discuss the core team's efforts and progress and to get their further input regarding those efforts. As sufficient progress is made to warrant a general meeting, the full LAC Task Force is convened.

As managers deemed appropriate, they have involved other area-specific constituents not already included.

Following is a list of the representation that has been or is now included in the LAC Task Force.

The Wilderness Society
Sierra Club (State Chapter)
Back Country Horsemen of America and three area-specific chapters
Professional Wilderness Outfitters
Montana Outfitters and Guides Association
Montana Wilderness Association with two area-specific chapters
National Forest Recreation Association
Unaffiliated Users
Lincoln, MT, citizens subgroup
Swan Valley citizens subgroup
Flathead National Forest
Helena National Forest
Lewis and Clark National Forest
Lolo National Forest
University of Idaho
Montana State University
University of Montana
Montana Department of Fish, Wildlife, and Parks
Wilderness Management Research Unit, Intermountain Research Station
Wilderness Institute, University of Montana

ONGOING MANAGEMENT CONSULTATION PROCESS

Gerald L. Stokes

The underlying fact related to implementation of Limits of Acceptable Change (LAC) direction in general and associated management actions specifically is that management decisions will be made by the wilderness manager (District Ranger). This paper describes the wilderness manager's consultation options regarding the citizens' component of the LAC Task Force. This assumes ongoing involvement of the Task Force in LAC implementation through periodic meetings to discuss progress and problems.

Through the LAC Task Force development of the draft plan, wilderness managers are consulting with a diverse group of wilderness interest group representatives that comprise a political marketplace and a potential political coalition from whom the managers need support in order to implement LAC. This consultation will result in a set of management actions identified in the plan that will be available for the manager to use in achieving or maintaining conditions within standards. This set of managerial actions may be viewed as a bundle of sticks of varying sizes. Little sticks are nonregulatory and adversely affect few, if any, of the public in terms of convenience or freedom. As the sticks increase in size, they result in greater inconvenience or loss of freedom. Therefore, the sticks (management actions) can be arranged from nonregulatory to regulatory in their effects on users. This array of management actions can be displayed as the bundle of sticks available to the manager across the entire wilderness complex, by opportunity class bundle, or in area- or site-specific bundles. The configuration and the composition of bundles has been determined through the Task Force deliberations and the subsequent formal public review process. The final outcome is a legitimized bundle or bundles of management actions available to the manager falling in a nonregulatory to regulatory continuum.

Once the management actions are legitimized (supported or consented to through the Task Force and the formal public review and subsequent decision by the responsible line officer), the wilderness manager is technically free to choose and apply the management actions as necessary. In most situations, this exercise of managerial prerogative with no further consultation would be appropriate and acceptable to the public. This assumes that most actions will not entail use of big sticks. Where the use of big sticks becomes necessary, the manager has three choices:

1. Assume the adoption of the plan provides sufficient legitimation of all management actions and that use of a big stick requires no further consultation.
2. Acknowledge the big stick action is legitimate but elect to consult further with the Task Force on planned actions regarding a specific situation, area, or problem that requires a regulatory response.
3. Present the problem and ask the Task Force for a recommended solution.

Option 1 would not provide the manager with a current sense of the political support existing in the public or segments of the public, as indicated by the Task Force representation.

Option 2 would give the manager a sense of the political ramifications of intended actions in that the Task Force response to the proposed action would serve as a bellweather of general public response or responses of segments of the public. In essence, the manager could sound out the level of general Task Force support or support of some groups as interveners on the behalf of management if there is an appeal, or in communicating the need for the action to the general public and achieving public acceptance without major public opposition. The breadth and depth of opposition as well as support could be sensed through this approach.

Option 3 is essentially the same as 2 except it places the citizen Task Force members more in a position of responsibility for the problem and the solution and therefore potentially creating more ownership in and support of the manager's subsequent action.

The politically prudent manager would consult on an annual basis with the Task Force on problems that warrant consideration of big stick solutions. Option 2 or 3 would be used and the resulting sense heeded by the prudent manager. In both options, the manager would be free to use managerial prerogative in taking action that is contrary to the sense of the Task Force. A manager would probably do so with an understanding of the risks, cost, and probability of success of the proposed action.

If a problem comes up that warrants immediate action to deal with protecting the resource, the manager has the mandate to act without further consultation with anyone. If the situation

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warrants, the manager should act immediately. If immediate action is not warranted, then further legitimization of management actions with the Task Force should be considered. Subsequent consultation with the Task Force regarding emergency actions would be appropriate.

If a situation arises for which no appropriate legitimized management action exists and no emergency exists, the politically prudent manager would consult with the Task Force at the next periodic meeting. Option 2 or 3 would be used to legitimize a new management action needed to deal with an unforeseen situation/ problem.

CRITERIA AND GUIDELINES FOR USING THE TRANSACTIVE PLANNING APPROACH

IN WILDERNESS MANAGEMENT PLANNING

Joseph L. Ashor

Current research (Ashor 1985), and past research into transactive planning (Stokes 1982), has uncovered a set of criteria crucial to successful wilderness planning using the Limits of Acceptable Change (LAC) system and a transactive style of planning. A potential planning atmosphere should be evaluated by planners according to the reality of conforming in a rough way to these physical and social criteria before planning begins.

PLANNING CRITERIA

1. The plan will address important and serious problems that exist within the wilderness. People are unlikely to get involved unless they perceive there are problems worth addressing.

2. The planning environment should be manageable from both a physical and social standpoint. The actual size of the wilderness should be not so large as to overwhelm the technical capability of planners and their ability to organize meetings in convenient, central locations. If more than one National Forest or Ranger District is involved, as is often the case, all must be willing to commit the necessary resources to accomplish the task. The number of issues to be addressed should also be manageable and not overly comprehensive and complex. Also important is that the number of interest groups is not so large so as to make general task force meetings unresponsive and ineffective.

3. There must exist a potential for planners to organize citizen participants into a viable political coalition. Enough groups or individuals must be interested in participating to comprise a political marketplace. Those citizens with veto power must be willing to participate, or at least acquiesce to using an LAC planning framework (Stokes 1982).

4. The planners must have a wide range of personal characteristics and have at their disposal the appropriate tools to adequately and effectively progress through the nine-step LAC process. This means the planner using a transactive style of planning. . .

a. must have thorough knowledge of the LAC system, the rationale behind it, and how it is to be applied in their area,

b. must have the personnel and experienced field people to conduct an inventory of the indicators selected,

c. must have a willingness to serve people beyond what would be minimally acceptable and have the ability to bring the necessary people and tools together to foster dialogue and mutual learning (Stokes 1982),

d. must be skilled in managing interpersonal relations, have a heightened capacity for empathy, be willing to live with conflict, and have an understanding of the dynamics of power and the art of using that power to accomplish planning goals (Friedmann 1973),

e. must be a good leader, someone who is credible in the eyes of citizen participants both in terms of technical proficiency and trustworthiness; must have the confidence and trust of the people, and

f. should be committed to a transactive style of planning in which the scientific/technical knowledge is joined with the personal knowledge of the citizen through the life of dialogue which leads to mutual learning (Stokes 1982).

PLANNING GUIDELINES

The following guidelines are provided for managers and planners who might wish to use the LAC system and the transactive planning approach (based on Aleshire 1970; Ashor 1985; Glass 1979).

1. The design of the planning process should receive close attention and scrutiny. The most important factor here is the provision of many avenues for participation and involvement. Techniques are merely potential tools or means for achieving planning objectives. Certain techniques are more appropriate than others in achieving a particular objective. Therefore, along with using many techniques, attention should be paid to matching those techniques with certain citizen participation objectives (table 1). By utilizing a wide variety of participatory techniques, the weaknesses of one can be overcome by the strengths of another.

2. Ensure that interest group representation is comprehensive, or at least diverse enough to include all major groups who might be affected by the proposed management plan. Orchestrating the formation of the task force and making sure it has all the key players is one of the most important tasks of the planner.

Planners need not include all possible interest groups at the first meeting. Attempts to be overly comprehensive in the beginning increase the chances of not being able to get the process launched. However, the flexibility and openness of the process should eventually allow for diverse

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Table 1.-- Citizen participation techniques used in the Bob Marshall Wilderness Complex planning effort with associated objectives

Planning technique	Exchange information	Education of citizens	Building support	Supplemental decision making	Representational input
	Citizen Participation Objectives				
Task Force meetings[1]	x	x	x		x
Agency information meetings	x	x	x		x
Small subgroups[1]	x	x	x		x
Citizen/ agency workshop	x	x	x		x
Nominal group process				x	x
Surveys					x
Public mass meetings	x				
Problem analysis committees[1]	x			x	
Citizen interviews	x				x
Field trips[1]	x	x	x		

[1]Planning techniques most likely to promote dialogue and mutual learning.

and equitable representation. But, those with first-level veto power should be included as soon as possible; that is, those groups who have the most political clout to nullify planning efforts. Outfitter and guide organizations and national conservation and environmental clubs are some of the groups that usually hold first-level veto power. A rescanning of the task force make up should also take place periodically to ensure that those with veto power are eventually included. If individuals are brought into the process fairly late, they need to be educated about LAC and the purpose of the task force before they can effectively contribute to it.

3. The size of the planning team should be small enough to facilitate an easy exchange of personal and technical/scientific knowledge. Main task force meetings should contain no more than 25 to 30 participants. Smaller, task-oriented working groups or subgroup meetings operate most effectively with several to nine people. These meetings should be frequent enough to keep the process fresh in peoples' minds. Face-to-face dialogue should occur throughout the entire planning process.

4. Inform all participants of their role in the planning process. Citizen members of the planning team should be encouraged to develop their own solutions and management actions to solve problems, in short, to play the role of planning for themselves. If managers plan to use citizen-generated alternatives as part of the actual plan, citizens should be informed beforehand so as to increase the chances of them generating realistic alternatives. It should also be made clear to citizens that although their input and knowledge will be heavily relied upon, the final decisions rest with the managers. Planners must not make the mistake of using the citizens as decision makers. The role of the agency is still that of final decision maker. Informing citizen participants of their role is especially important in avoiding unrealistic expectations of the outcomes of the process.

5. Respond to problem situations immediately. Problem situations usually arise due to inadequate or faulty communication and misunderstandings. Citizens or other government agency officials who do not understand the LAC process or the nature of the public involvement can often do substantial harm. Keeping the

process on track means responding to these individuals as quickly as possible so as to avoid a situation that could possibly balloon out of proportion and beyond the control of planners and supportive planning team members.

6. Continue citizen participation after the formal planning process has been completed. Continued involvement of citizen task force members is vital to successful implementation of a management plan that utilizes LAC or any other management system. At a minimum, the task force should meet annually to evaluate the past season's management activities. This will help ensure that agreed-upon management actions and monitoring schedules are being adhered to by managers. It will also give managers and citizens a chance to reevaluate the effectiveness of key parts of the plan such as resource or social indicators. The flexibility of the LAC system is such that if an indicator or other aspects of the system are obviously not serving a useful purpose, they can be dropped and new indicators added and tried. This flexibility warrants continued input from users and citizens to ensure they accept any proposed changes or controversial management actions. It will also help maintain the high level of support and cooperative spirit needed for effective implementation.

Although these guidelines will help to provide a basic strategic framework for managers and planners who might wish to use the LAC/transactive planning approach, they will by no means guarantee its success. Fundamental to understanding the total process is realizing that there exist many bits and pieces that cannot be easily conveyed as simple rules or guidelines. Much of this is an art, a subtle process rather than something that can be taught and learned. The lead planner must rely heavily on intuitive path finding. A sense of what to do next to orchestrate a myriad of underlying agendas and when to initiate subtle actions can be just as much responsible for a successful process as other, more easily defined procedures. Again, the traditional planning activities are important, but only if effectively combined with less tangible, more humanistic characteristics of the process.

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BASIS FOR SUCCESS OF BMWC LAC PROCESS SUPPORTED IN

CURRENT BEST-SELLING POPULAR LITERATURE

Gerald L. Stokes

Following are quotes from In Search of Excellence and Megatrends that I feel are relevant to the wilderness planning endeavor in the Bob Marshall Wilderness Complex.

IN SEARCH OF EXCELLENCE

1. Product champions--those individuals who believe so strongly in their ideas that they take it on themselves to damn the bureaucracy and maneuver their projects through the system and out to the customer. P. xvi.

2. Those who implement the plans must make the plans. P. 31.

3. Creative thought (the precursor to invention) requires an act of faith. P. 47.

4. The scientific paper presents an immaculate appearance which reproduces little or nothing of the intuitive leaps, false starts, mistakes, loose ends, and happy accidents that actually cluttered up the inquiry. P. 48.

5. Pathfinding is essentially an esthetic, intuitive process, a design process. P. 53.

6. Both Warren Bennis in The Temporary Society and Alvin Toffler in Future Shock identified the need for the adhocracy as a way of corporate life. In rapidly changing times, they argued, the bureaucracy is not enough. By "the bureaucracy," they mean the formal organization structure that has been established to deal with the routine, day-in, day-out items of business--sales, manufacturing, and so on. By "the adhocracy," they mean organizational mechanisms that deal with all the new issues that either fall between bureaucratic cracks or span so many levels in the bureaucracy that it's not clear who should do what; consequently, nobody does anything. P. 121.

7. The task force is an exciting, fluid, ad hoc device in the excellent companies. It is virtually the way of solving and managing thorny problems, and an unparalleled spur to practical action. P. 132.

8. . . . one term for experimenting is 'bootlegging.' (The parallel term is "scrounging.") There the tradition of squirreling away a little bit of money, a little bit of manpower and working outside the mainstream of the organization is time honored. P. 144.

9. The new idea either finds a champion or dies . . . No ordinary involvement with a new idea provides the energy required to cope with the indifference and resistance that major technological change provokes . . . Champions of new inventions display persistence and courage of heroic quality. P. 200.

10. A special attribute of the success-oriented, positive, and innovating environment is a substantial tolerance for failure. You need the ability to fail. You cannot innovate unless you are willing to accept mistakes.

MEGATRENDS

1. High tech/high touch is a formula I use to describe the way we have responded to technology. What happens is that whenever a new technology is introduced into society, there must be a counterbalancing human response--that is, high touch--or the technology is rejected. The more high tech, the more high touch. P. 35.

(High tech--LAC process, data, and Geographic Information System (GIS); high touch--Task Force and intimate human involvement and interaction in the process).

2. People whose lives are affected by a decision must be part of the process of arriving at that decision. . . . participatory democracy has seeped into the core of our value system. Its greatest impact will be in government and corporations. P. 175

3. . . . we (the citizens) have grown more confident of our own ability to make decisions about how institutions, including government and corporations, should operate. P. 177.

4. Technical decisions are moving out of the hands of the so-called experts and into the political arena. P. 184.

5. It isn't technology, it's politics. It isn't facts, it's perceptions. P. 185.

6. People must feel that they have ownership in a decision if they are to support it with any enthusiasm. P. 209.

7. The new leader is a facilitator, not an order giver. P. 209.

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