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Integrating Subsistence Use and Users into Park and Wilderness Management

Since its passage in 1980, the Alaska National Interest Lands Conservation Act (ANILCA) has mandated numerous National Park Service (NPS) units to manage for the continuation of customary and traditional subsistence opportunities in designated wilderness areas throughout Alaska. From its legislative history, it can be argued that ANILCA assumes that subsistence activities are natural components of ecosystems. As such, they are inherent in such concepts as "wilderness" and "wilderness preserve." Many subsistence activities, however, rely on use of motorized equipment and involve harvesting of natural resources, activities generally prohibited in the "Lower 48" by the Wilderness Act of 1964. As a result, subsistence activities may affect the quality of recreational visitor experiences in designated wilderness areas in some Alaskan national parks. Along with potential effects of subsistence on visitors, interactions between subsistence users and park visitors may affect the quality of subsistence opportunities, which are mandated under ANILCA. Because the Organic Act of 1916 requires the NPS to manage for "natural" elements and public "enjoyment" of national parks and related areas, it is necessary to begin to analyze the relationship between subsistence use and recreation use in order to fulfill this dual and potentially conflicting management obligation.

ANILCA offers little legal guidance regarding the quality of subsistence opportunities to be provided. As a result, many national parks in Alaska have been reluctant to formally incorporate subsistence use and users into wilderness planning and management. Consequently, little theoretical or empirical work has been done to develop a conceptual framework allowing park managers to identify, monitor, and manage for conflict reduction between recreation users and subsistence users. Although it is widely perceived that negative interactions between recreation users and subsistence users exist (Figure 1), no systematic management framework has been developed and implemented that identifies and monitors the quantity and effects of these kinds of interactions. The lack of such a framework suggests that indicator-based management

Figure 1. Conflicts may arise between recreational and subsistence users of wilderness in Alaska. The sign reads: 'To all sport fishermen. No sport fishermen on native allotments. We natives depend on wildlife that's around us. Only natives have a right!! By Land Owner.'

approaches may be a useful conceptual starting point for addressing this issue.

Indicator-based Frameworks for Park and Wilderness Management

During the last 20 years, several indicator-based park and wilderness management frameworks have evolved, including limits of acceptable change (Stankey et al. 1985; McCool and Cole 1997) and visitor experience and resource protection (Manning et al 1996; Hof and Lime 1997; National Park Service 1997). Developed from the concept of recreation carrying capacity, these planning and management approaches seek to define the level of resource protection and the type of visitor experience to be provided. In doing so, indicator-based planning approaches traditionally organize park and wilderness management into two components: resource and experiential. Once desired future conditions have been defined, indicators and standards of quality are developed to monitor recreation impacts and

guide management actions in an effort to realize desired future conditions.

"Desired future conditions" are broad, narrative statements defining the level of resource protection or the type of visitor experience to be provided. "Indicators of quality" are more specific, measurable variables reflecting the meaning of desired future conditions. They are quantifiable measures of management objectives. Indicators may include elements of the biophysical and social environments that are important in determining either the quality of the visitor experience or the quality of the biophysical environment. "Standards of quality" define the minimum acceptable condition of each indicator variable.

Indicator-based planning frameworks provide management utility for at least two reasons. First, they require managers to identify and define desired future conditions. As a result, adopting an indicator-based planning framework can serve as a catalyst for the development of specific management objectives. For example, since ANILCA is vague on the point of establishing a management priority regarding the quality of subsistence activities to be provided, adopting an indicator-based planning framework may be desirable because it focuses attention on identifying this as a management objective. Second, from an experiential or social perspective, indicators of quality provide an analysis of variables associated with the visitor experience. This analysis can help increase the quality of the visitor experience by providing managers with data to make informed decisions regarding carrying-capacity and visitor-use management issues in various recreation settings. In Alaska's national parks, for instance, recreation and subsistence activities occur in many of the same places. Therefore, quantitative understanding of the experiential impacts between both kinds of users may assist in the management of these areas.

Integrating Subsistence Issues with Indicator-based Park and Wilderness Management

Current models of indicator-based planning frameworks may not be fully adequate for addressing subsistence issues, for several reasons. As previously discussed, these frameworks conventionally divide park and wilderness management into experiential and resource components. Subsistence activities, however, are neither strictly resource nor experiential components of park and wilderness management. Unlike discrete recreation activities, subsistence activities are multidimensional in nature and reflect entire lifeway systems that may not be understood as individual activities. As a result, it may not be conceptually valid or appropriate to reduce subsistence activities into discrete components.

Moreover, indicator-based management frameworks require quantifiable data to develop indicators and standards of quality. Attempts to obtain quantitative experiential data from traditional subsistence may prove challenging. Prior development of experiential indicators within the context of recreation management has relied on visitor reactions to scenarios that use text or photographs to describe various ranges of visitor-use levels and associated impacts. It is not clear these methods will work as well with subsistence users, some of whom are not accustomed to Western quantitative thought patterns. As a result of these factors, subsistence activities introduce considerable challenges into the application of current indicator-based management models.

Although significant, the challenges discussed above present several possibilities for adapting current indicator-based management frameworks to incorporate subsistence issues. First, researchers and management personnel need to develop appropriate methods for collecting baseline experiential subsistence-use data. Undoubtedly, a combination of qualitative and quantitative methodologies should be utilized in attempting to develop appropriate indicators of quality for subsistence activities. This includes developing qualitative methodologies that complement the conventional approach, which may be less meaningful to subsistence users. Although developing integrative methodologies is challenging, studies from sociology demonstrate the use of quantitative analysis in a variety of cultural settings. For example, Krymkowski and Hall (1990) studied differences in values between ethnic groups in Kenya using a multivariate analysis. Although this was a quantitative study, the researchers thoughtfully selected a methodology and variables that were meaningful to both ethnic groups. Moreover, the paper by Borrie et al. (this issue) demonstrates how qualitative and quantitative research methods can be complementary.

Once appropriate methodologies have been developed, managers should begin to collect baseline experiential subsistence-use data in addition to visitor experience data. Valid experiential subsistence- and recreation-use data are essential for developing meaningful indicators and standards of quality. Moreover, these data will assist in determining whether subsistence activities have components that are affected differently by recreation use, along with potential impacts of subsistence activities on the recreation experience. If such impacts do exist, then indicator-based management approaches provide a useful conceptual framework for monitoring and managing them over time.

Second, managers must be willing to define desired future conditions or management objectives in

terms of the quality of subsistence opportunities to be provided. Although not mandated in ANILCA, development of these management objectives is essential because they are a necessary element of any indicator-based management framework. Furthermore, a commitment to adopt an indicator-based management approach will serve as a management catalyst because it focuses attention on the development of management objectives.

Finally, integrating subsistence issues with indicator-based management frameworks should incorporate an adaptive management component. Adaptive management has been broadly defined as a process that enables "learning and experimentation" to occur (Lee 1990).

In managing subsistence issues, it is important to remember that numerous planning and management applications will be required because current indicator-based management frameworks may not be fully adequate for analyzing the relationships between subsistence and recreation users. Managers must be willing to apply current models with the intention of not necessarily making long-term management decisions, but rather learning from these applications. This learning can then be used to adapt the model to each site as needed. Over time, this process may lead to a better understanding of the interactions between recreation and subsistence users, as well as provide insights into developing new methodologies that capture the strengths of both qualitative and quantitative research approaches. In turn, a better understanding of the relationship between recreation and subsistence activities will result in more effective management tools for providing the highest-quality experience for both user groups.

Application of Indicator-based Management at Gates of the Arctic National Park & Preserve

NPS has recently been challenged to undergo a new round of wilderness planning in Alaska. In response, a study was conducted at Gates of the Arctic National Park and Preserve that considers the feasibility of integrating subsistence issues into indicator-based management frameworks (Vande Kamp et al. 2001). Among its findings, the report discusses several recommendations that Gates of the Arctic managers should consider to effectively integrate subsistence use and users into indicator-based management approaches. These recommendations include accurately describing current wilderness use, articulating goals and desired conditions based on park purposes, and shifting towards a less expert-driven, more transactive planning process.

Descriptive research. One of the primary ways descriptive wilderness use data can be useful is by identifying problem areas in which human

use is having negative impacts on resources and experiences. Such problem areas are not only important issues that should be a focus of management attention, they may also serve as "bottlenecks" where human use has its greatest impacts. Because it is generally acknowledged that both the likelihood of encounters with other visitors and their impact on experiences varies across sites (Whittaker 1992; Graefe et al. 1984), social conditions at some sites may prove to be effective indicators of experience quality for much larger areas. For example, Tarrant et al. (1997) found that on the Nantahala River, North Carolina, use levels were more of a concern at rapids than at other locations. Identifying such bottlenecks in visitor-use patterns, using them as indicators, and setting standards for appropriate social conditions in those areas may provide managers with a more appropriate plan than the use of generic indicators, such as number of encounters per day.

When wilderness is to be managed as several zones, descriptive data can be critical in helping planners decide the appropriate zones for particular wilderness areas. Although all zones need not match existing use patterns, including any wilderness area in a zone that requires different social conditions than those currently in existence should occur only when the change in conditions is preferable and justified. Without data describing existing conditions, unjustified changes are likely to be included in the plan, resulting in unnecessary impacts on users.

Furthermore, descriptive data are necessary to assess the potential impacts of planning and management decisions. For example, to assess whether a standard of five encounters per day will require management action, it is necessary to know the current number of parties that visitors encounter. By knowing the different characteristics of users commonly found at a variety of wilderness sites, Gates of the Arctic managers can assess whether planned policies will more heavily affect particular user groups.

In summary, descriptive research is necessary to document the use patterns by all groups, including recreational and subsistence users, and to investigate the extent of their interaction and its positive and negative effects on the quality of their experiences. Moreover, this research should focus on description of the system rather than on the collection of demographic information in order to study the relationships between various users and their social and physical environment over time. Such research will necessarily employ both quantitative and qualitative methods, and must investigate the activities and opinions of both groups if it is to be of maximum use.

Articulation of management goals. Along with conducting de-

scriptive research, integrating subsistence issues into indicator-based planning requires the articulation of management goals. Four general goals of management at Gates of the Arctic have been identified:

1. Preserve park resources.
2. Provide high-quality subsistence opportunities.
3. Provide high-quality recreation opportunities.
4. Maximize recreational enjoyment of park resources.

Indicator-based management frameworks conventionally address the inherent tradeoffs between unrestricted park access and pristine park conditions. As previously discussed, these frameworks conventionally organize pristine conditions into biological and social components. In the management goals outlined above, unrestricted access is represented by the "maximize recreational enjoyment" goal, while the biological and social components of pristine conditions are represented by the "preserve park resources" goal and the "provide high-quality recreation opportunities" goal. Although subsuming indicators and standards of subsistence quality under biological or social components would retain the original structure of the planning framework, close examination shows that this is not feasible. Subsistence use is legally and managerially distinct from biological protection as well as from provision of quality recreational opportunities. Subsistence users cannot be equated to grizzly bears or sport hunters. As a result, subsistence-use issues are conceptually different.

Integrating subsistence into indicator-based management frameworks will require more specific descriptions of management goals than the four generic versions presented above. In particular, the "provide high-quality subsistence opportunities" goal must be clarified. High-quality subsistence opportunities obviously require adequate chances to harvest desired species of plants and animals. However, the degree to which the experience associated with subsistence activity is legally protected is not clear. This uncertainty creates difficult choices for Gates of the Arctic managers attempting to determine whether the "maximize recreational enjoyment" goal conflicts with the goal of providing "high-quality subsistence opportunities."

Transactive planning. Finally, shifting towards a transactive planning approach may assist in the application of an indicator-based management framework at Gates of the Arctic. Transactive planning consists of a collaborative effort in which representatives of the public work closely with the planning team, sometimes serving as active team members. This planning approach is characterized by interpersonal dialogue and marked by a process of

"mutual learning" (Hudson 1979). The importance of involving the public on a collaborative basis is stressed repeatedly in the literature as one of the primary factors determining the success of indicator-based management frameworks. McCoy et al. (1995) interviewed 50 indicator-based planning leaders and divided them into two groups based on whether or not their planning application utilized public work groups. They concluded that those indicator-based planning efforts "which utilize public work groups reported a higher compliance with the technical process as well as a higher level of satisfaction."

Public participation is associated with successful planning because it forces justification of decisions, explanations of priorities, disclosure of biases, and clarification of proposed actions (McCool and Cole 1997). In addition, public participation has served as a source of institutional memory for agencies with frequent turnover of personnel. In their evaluation of indicator-based planning experience, McCool and Cole (1997) conclude that these planning approaches have benefited by moving from their original conception as an expert-driven process to a transactive process.

As previously noted, subsistence users who are not accustomed to Western quantitative thought patterns may be difficult to survey in the same way as conventional recreational visitors. By increasing public participation in the planning process to a level where subsistence users are well represented, Gates of the Arctic managers may avoid problems associated with not adequately representing the views of this group based on surveys or other quantitative measurement techniques.

Implementing a transactive planning process at Gates of the Arctic would require a substantial commitment of time and resources, relying on the collection of important social and natural science information for success. However, a transactive process might help park managers deal with a contentious legal environment and could encompass subsistence users who might be difficult to represent through other methods.

Conclusion

Integrating subsistence uses and users into indicator-based planning and management frameworks requires development of new research methodologies, identification of management objectives, and adoption of inclusive and flexible planning and management strategies, such as adaptive management and transactive planning, that incorporate learning. Despite these challenges, indicator-based planning and management frameworks provide a useful conceptual starting point in the development of a systematic management tool capable of monitoring and managing the impacts of subsistence

on recreation users and vice versa. At Gates of the Arctic, development of new research methodologies to describe current wilderness-use conditions, articulation of management objectives, and the shift towards planning and management strategies that encourage learning are likely to increase the chances of successfully integrating subsistence use and users into indicator-based management frameworks.

Beyond Alaska, the development of these management tools has international implications. As global populations continue to rise, along with sensitivity to native peoples, many new conservation areas will not be uninhabited. As a result, it will be important to develop and implement management frameworks that systematically measure and understand the relationships between visitors to and residents of such conservation areas.

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