

Understanding the Wicked Nature of “Unmanaged Recreation” in Colorado’s Front Range

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Abstract Unmanaged recreation presents a challenge to both researchers and managers of outdoor recreation in the United States because it is shrouded in uncertainty resulting from disagreement over the definition of the problem, the strategies for resolving the problem, and the outcomes of management. Incomplete knowledge about recreation visitors’ values and relationships with one another, other stakeholders, and the land further complicate the problem. Uncertainty and social complexity make the unmanaged recreation issue a wicked problem. We describe the wickedness inherent in unmanaged recreation and some of the implications of wickedness for addressing the problem for the Front Range of the Rocky Mountains in Colorado. Conclusions about the nature of the problem are based on a problem appraisal that included a literature review and interviews of key informants. Addressing wickedness calls for institutional changes that allow for and reward the use of trust building, inclusive communication, and genuinely collaborative processes.

Keywords Collaboration · Natural resource conflict · Problem definition · United States Forest Service · Unmanaged recreation · Wicked problems

“The formulation of a wicked problem is the problem!” (Rittel and Webber 1973:161)

In a 2003 Earth Day speech, the Chief of the United States Forest Service (Forest Service) identified “unmanaged recreation” as one of the “four threats” that jeopardize the health of National Forests, the quality of recreation experiences, and essential ecosystem functions (Bosworth 2003). The Forest Service identified three additional threats: wildland fire and fuels, habitat fragmentation, and exotic invasive species. We document the nature and the context of one of these threats: unmanaged recreation. Although we focus on a single threat, we acknowledge the interconnectedness, multidimensionality, and complex human dimensions of all four threats.

The purpose of this article is to illustrate how unmanaged recreation in the Front Range of the Rocky Mountains in Colorado has attributes of a “wicked problem” (Allen and Gould 1986; Churchman 1967; Conklin 2005, 2006; Nie 2003; Rittel and Webber 1973). We discuss the implications of wickedness for addressing unmanaged recreation. The contributions of the article include (1) a description of the unmanaged recreation phenomenon framed as wicked and socially complex, (2) an examination of the broad situational context of unmanaged recreation, (3) a limited description of relevant stakeholder perspectives, and (4) implications and recommendations for how to address unmanaged recreation in the Front Range of Colorado.

What is Unmanaged Recreation?

The phrase “unmanaged recreation” has multiple connotations and interpretations, providing opportunities

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for debate and disagreement. Conversations with recreation researchers and Forest Service employees are often peppered with alternative labels such as “unmanageable recreation”; “difficult to manage recreation”; “inappropriate dispersed recreation”; or “unmonitored nontraditional activities, growing in popularity.” We define the unmanaged recreation phenomenon as *a broad environmental decision and management problem, involving multiple stakeholders and numerous outdoor recreation activities and conflicts, occurring simultaneously in and around urbanizing National Forests*. This definition has a caveat: the intermixing of National Forests with private, state, and other federal lands suggests that unmanaged recreation is not exclusively a Forest Service problem.

The social context of unmanaged recreation does not allow for a succinct, measurable definition because in each unmanaged recreation situation, there will be numerous and diverse individuals and groups who are interested and vested, referred to as stakeholders. Similar to other management problems that involve forest conditions, stakeholders understand and define recreation management conditions according to their personal perspectives, insights, and values (Hull and others 2001). Definitions of any one case of unmanaged recreation vary, but are nonetheless important because how a group chooses to define a problem largely determines strategies for resolution (Allen and Gould 1986).

The Forest Service has highlighted unchecked use of off-highway motorized vehicles (OHVs), creation of unauthorized OHV routes, and related ecological impacts as the quintessential unmanaged recreation issues (Bosworth 2004; USDA Forest Service 2004a, 2004b). The problem for the Forest Service is one of balancing multiple recreation activities through sustainable management (Bosworth 2004), but the current levels of impact from OHV recreation are not viewed by the Forest Service to be sustainable, requiring intervention. Given management constraints within the Forest Service, successful interventions require the cooperation of recreational visitors and vested others. Acknowledging the full nature of this problem, in addition to OHVs, is necessary to facilitate the desired cooperation.

The Forest Service is indeed required to manage OHVs according to regulations established in Executive Orders 11644 and 11989 and the new Travel Management; Designated Routes and Areas for Motor Vehicle Use Rule (United States General Accounting Office 1995; USDA Forest Service 2005). However, problematic cases of OHV recreation are just one symptom of the broader and more challenging problem

encompassed by the unmanaged recreation phenomenon. We investigated the nature of this broader problem on parts of the Arapaho–Roosevelt National Forest (ARNF) in Colorado. We observed evidence that unmanaged recreation involves more than diverse motorized and nonmotorized recreation activities. In addition to these, there are many activities occurring in places on and near the ARNF that involve some form of nonhuman mobility or some type of recreation technology, including car/RV camping with generators, horseback riding, equestrian sports, mountain biking, recreational target shooting, geo-caching, paintball gaming, technical rock climbing, and hunting using OHVs. Technological innovations and the popularity of extreme sports have encouraged novel forms of outdoor recreation (e.g., mountain boarding and off-road inline skating) that include a sense of extreme challenge and an attitude of conquering nature. New and evolving activities can bring controversies and challenges for both traditional forest visitors and Forest Service managers (Ewert 2001; Frawley 2005; Hollenhorst 1995; Morgan 2005).

This article proposes that increased participation in both novel and traditional recreation activities, combined with urbanization, private landowner conflicts, and other factors contribute to the social complexity and the wickedness inherent in unmanaged recreation. This article is not about motorized recreation per se; rather, it is about unmanaged recreation being a wicked problem that requires different approaches to visitor management and problem resolution on the ARNF and adjacent lands. Recreational activities and the ecological impacts from recreation can be complex, but these are not wicked in themselves. The social nature of unmanaged recreation is wicked. Acknowledging wickedness and understanding the social context of this problem are prerequisite to managing multiple stakeholders in ways that enable them to collectively address impacts to the land, natural resource protection, and sustainable outdoor recreation.

Wicked Problems

The concept of wickedness is illustrated by contrasting its attributes with those of tame problems (Table 1). We argue that the unmanaged recreation problem on and near urbanizing portions of the ARNF more closely resembles a wicked problem than it does a well-defined analytical problem. Allen and Gould (1986:21) argued that public forestry in general has become dependent on models of objective “scientific rationality and the assumption that more information on a

Table 1 A comparison of attributes for wicked and tame decision problems^a

Problem attribute	Wicked problems	Tame problems
Formulation of problem statement	Ill-defined, unstable	Well-defined, stable
Type of problem complexity	Social networks, cultural values	Technical, analytical, linear, ecological
Diversity of stakeholders	High	Low
Commonality with other problems	Unique, time and place dependent	Belong to a class of similar problems solved in similar ways
Preferred type of solution	Emotionally satisfying	Rationally best, optimal
Agreement on when solution is reached	Low	High
Set of alternative solutions	Numerous, unlimited	Limited
Cost of testing alternatives (i.e., trial and error)	High	Low
Evaluation of solution	Subjective, good or bad	Objective, right or wrong

^aAdapted from Allen and Gould (1986), Conklin (2005, 2006), Nie (2003), and Rittel and Webber (1973).

phenomenon automatically leads to better management.” Many public forestry problems, although ecologically complex, are not wicked but tame in nature, having right and wrong solutions that can be formulated using linear analytical models (Table 1). Linear problem solving follows the traditional wisdom of gathering and analyzing data about a problem to formulate the optimal solution, and then proceeding to implement that solution (Allen and Gould 1986; Conklin 2005, 2006). Linear reasoning based on a problem definition formulated by the experiments of forest ecologists, for example, is ill-suited for addressing wicked problems because in the case of wickedness, no one definitive and consensual definition can be formulated (Radford 1977; Rittel and Webber 1973).

Wicked problems were characterized as such because they have the following attributes: (1) the choice of definition for a wicked problem determines the nature of resolution; (2) wicked problems have no stopping rule to indicate resolution; (3) solutions to wicked problems are not objectively true-or-false, but tend to be value-driven, good-or-bad; (4) there are no immediate and no final tests of a solution to a wicked problem; (5) every solution to a wicked problem is a one-shot operation, every attempt counts substantially; (6) wicked problems do not have an exhaustively describable set of alternative solutions, nor is there a well-described set of acceptable procedures that may be used in decision-making; (7) every wicked problem is essentially unique; and (8) every wicked problem can be considered to be a symptom of another problem (Rittel and Webber 1973).

Wicked problems involve substantial amounts of uncertainty about what is at stake including the goals, methods, and outcomes of decision-making, management, and subsequent evaluation (Nie 2003; Pellizzoni 2003). Wickedness often results in intractable controversies typically characterized by a situation of “radical uncertainty” in which the stakeholders “emphasize different facts, or give them different interpretations,

so that each party seeks to confute the empirical evidence adduced by the others; there is no consensus either on the relevant knowledge or on the principals at stake; facts and values overlap” (Pellizzoni 2003:203). Our main premise is that unmanaged recreation on some National Forests is a wicked problem having many of these attributes. We communicate evidence that describes, in part, the uncertainty, dynamic nature, and diverse stakeholders inherent in the unmanaged recreation problem using the ARNF in the Front Range of Colorado as an example.

Research Approach

We conducted a qualitative appraisal of the unmanaged recreation problem between September 2004 and August 2005. Our appraisal included a literature review using Internet search engines and interviews with key informants. The study informants were chosen for their professional and personal knowledge of and experiences with outdoor recreation issues, visitors, and management. In addition, the interviewer maintained a research diary of field notes, containing verbatim interview transcripts and the details of observations, conversations, and interactions that he recorded during participant observation (Bernard 1994) with local recreation visitors. All interviewees work, volunteer, or recreate on the ARNF.

We chose this approach to provide a preliminary understanding of the context surrounding unmanaged recreation, an initial rapid appraisal, which is appropriate for exploratory studies where the recreation research community has a limited understanding of the attributes of the unmanaged recreation phenomenon (Beebe 1995). The goal was to understand the problem situation in a timely fashion to prevent making decisions that are precisely wrong in terms of local context (Beebe 1995). We integrated illustrative excerpts from

interviews and documents into the body of the article to synthesize large amounts of information into a coherent story about the wicked nature of unmanaged recreation and what it means for stakeholders in the ARNF.

The insights gleaned from this synthesis, together with the understanding gained from reading the story, are valuable for a number of reasons: (1) the questions that researchers and managers should be asking become more clear; (2) knowledge is allowed to emerge in a participatory exercise that gives voice to the people involved by communicating what they say and write about the problem; and (3) the insights can help guide decisions about what additional research is needed and how to initiate collaboration.

The insights and recommendations presented should be considered most useful for guiding future research and collaborative efforts to address unmanaged recreation in Colorado's Front Range, particularly for the ARNF. The general framework of wickedness and the implications of wickedness for addressing unmanaged recreation that we discuss may be relevant for other urban public lands in the western United States. We suggest that this study be used to complement and to inform longer term, follow-up case studies that use surveys, probability sampling, or additional interviewing with larger samples.

Findings on the Situational Context of Unmanaged Recreation

A local Forest Service interviewee summarized some key factors that have likely contributed to the unmanaged recreation problem in recent decades:

“... It's certainly [the case today] with more people discovering their National Forests and more people ... the population growing ... with recreation becoming such a popular activity ... We are seeing ... huge growth in outdoor recreation sports, and ... we have diversification of types of outdoor recreation. So, it is not just the camping, fishing, hunting type of thing like it used to be. Now, we have all kinds of technology and all kinds of interests ... people are doing a wide variety of things ... Back in the late 50s, early 60s, we had no clue.”

We identified similar trends that may increase social complexity on National Forests: (1) population growth and migration in counties that contain public lands, (2) urbanization, (3) increased participation in outdoor recreation, (4) changes in recreation technologies, and (5) dwindling resources for outdoor recreation programs and monitoring.

Population and Migration Trends

Broad macrolevel trends in the United States such as growth in population, economic prosperity, and an affinity for landscapes that are perceived to be natural have contributed to a demographic shift in which people are choosing to move to communities with service-based economies near environmental amenities (Cordell and others 2004a; Dwyer and Childs 2004; Egan and Luloff 2000; Frenz and others 2004; Shumway and Otterstrom 2001; Swanson 2001). This is particularly the case in the Rocky Mountain West in states such as Colorado, where in-migration has contributed to population growth rates that are two to three times greater than those for the United States as a whole (Baron and others 2000). Population trends appear to be fueled by changes in environmental attitudes and values, increased desires to recreate in and experience nature, and perceived improvements in quality of life (Cordell and Tarrant 2002).

These trends add social complexity by increasing the number and diversity of stakeholders and perceptions of recreation management (Conklin 2005, 2006). New migrants to the Rocky Mountain West from the eastern and northern United States, for example, bring knowledge of outdoor recreation that developed through experiences on private and public lands in the Northeast, which differ substantially from the West in culture, ecology, geology, and climate. People moving in tend to arrive with diverse needs for leisure, differing recreation expectations, various worldviews, and resource ethics that often conflict with those of long-time residents and managers (Larson and others 1993; McBeth 1995). Acculturation to recreation environments in the West may occur for some newcomers, but others may never completely adapt to the novel place, potentially changing the socio-cultural atmosphere over time.

In-migration can diversify age, race, and class, which affect preferences for recreation experiences and settings (Dwyer and Barro 2001) and how people define contentious environmental problems (Taylor 2002). Permanent and seasonal migration of retirees in the United States, where 10% to 14% percent of the population is age 65 and older (U.S. Bureau of Census 2002), tends to increase the number of older Americans recreating on public lands (Glasgow 1995). Older migrants are attracted to the scenic beauty and the accessible recreation opportunities (Walters 2002) that are available where cities interface with National Forests.

The Urbanization of National Forests

Linked to population growth, the Forest Service has classified about 15 National Forests and approximately 60 distinct Ranger Districts as urban; these tend to be located within 50 miles of population centers of greater than one million residents (Bricker and others 2005; USDA Forest Service 1996). Urban, forested public lands, similar to city parks in some respects, are typically characterized by intense recreational activity primarily in the form of day-use with severe competition for open space and recreation amenities (Larson and others 1993). The Front Range portion of the ARNF is proximate to a rapidly growing urban area that includes the cities of Boulder, Denver, and Fort Collins, Colorado.

Urban residents are drawn to the interfaces of cities and forests for recreation, self-renewal, and respite from daily stresses (Pigram and Jenkins 1999). The sense of freedom typically characteristic of National Forests may be diminished for some visitors if urbanization continues and these forests are increasingly transformed into structured parks, open spaces, and developed facilities. Many activities that were once dispersed on rural forests remain legal on some urban forests such as camping with campfires, hunting, mountain biking, driving off paved roads, and target shooting using firearms (Bricker and others 2005; Morgan 2005). These activities become problematic and contentious when groups such as birders, equestrians, hikers, dog walkers, mountain bikers, and private landowners are added to the mix.

Law enforcement on urban forests has largely shifted from resource protection and monitoring of recreational permits to issues of public safety and crime (Chavez and Tynon 2000). During interviews in the field, we identified behaviors such as vandalism; body dumping; residence on the forest by the homeless/itinerant laborers; unruly drug and alcohol consumption during large group events such as counterculture gatherings or high school parties; escaped campfires; dumping trash/household appliances; cultivation of marijuana; manufacture of methamphetamine; and the abandonment, subsequent stripping, and burning of motor vehicles.

Participation Trends in Outdoor Recreation

A survey of the United States public conducted for the American Recreation Coalition found that 55% of respondents reported at least one visit to an area managed by a federal agency within the past year (Roper 2004). In 2002, 214 million people visited National Forests; this number is expected to increase

substantially as the population doubles by the end of this century (Bosworth 2003; USDA Forest Service 2004a). The number of visitors on National Forests is increasing while the actual acreage of public land for recreation remains relatively constant.

The National Forest System defines recreation use in terms of visitor-day units in aggregates of 12 hours; since 1970, the number of visitor days recorded for National Forests has increased 100% (Laitos and Carr 1999). In 2000, the National Visitor Use Monitoring project (NVUM) reported 6.2 million visits to the ARNF (USDA Forest Service 2001). In 2001, the NVUM project reported 3.9 million visits to Colorado's urban Pike-San Isabel National Forest (Kocis and others 2002). The NVUM project reported confidence intervals for these estimates of $\pm 15\%$ to 18% , respectively.

In a survey of outdoor recreation participation in the United States (Cordell and others 2004b), the fastest growing activities since 1982 included viewing and photographing birds (+231%); day hiking (+194%); backpacking (+182%); snowmobiling (+125%); primitive camping with tents in areas with no facilities (+111%); and driving off-road using motorcycles, all-terrain vehicles (ATVs), or other four-wheel-drive vehicles (+109%). In 2004, approximately 62 million people (i.e., combined total for snowmobiling and driving off-road) had participated in the fastest growing motorized activities, and 225 million people (i.e., combined total for viewing/photographing birds, day hiking, backpacking, and primitive camping) had participated in the fastest growing nonmotorized recreation activities (USDA Forest Service 2004e).

Changes in Recreation Technology

While participation rates for outdoor recreation rise and the population of the United States grows larger, older, and more ethnically diverse (Chavez 2001; Cordell and others 2004a; Dwyer 1995), outdoor recreation activities are simultaneously incorporating new technologies (Bengston and Xu 1993; Ewert and Shultis 1999; Warnick 1995). Advancements in communication and the availability of consumer products based on new technologies have contributed to increased levels of participation in diverse recreation activities in the United States (Hollenhorst 1995; Pigram and Jenkins 1999). The Internet, for example, has generally allowed for increased awareness of opportunities for outdoor recreation and nature-based travel. As access to information about unique places and settings for outdoor recreation increases, some places and opportunities, which might have been

well-kept local secrets before the advent of the Internet, may become available to people around the globe.

Most activities tracked by Cordell and others (2004b) involve a degree of post-1980 technology for recreation clothing, equipment, or vehicles. For example, many of today's mountain bikes have shock-absorbing front and rear suspensions, which enhance performance for riders and generally allow easier biking on difficult backcountry trails. Likewise, the original ATVs were two-wheel-drive tricycles that were unstable to a degree of danger that led to their prohibition in the 1980s. Today, many ATVs, or quad runners, are four-wheel drive, which substantially enhances the performance of these vehicles and riders' abilities to maneuver on most types of terrain in the backcountry (Havlick 2002). Changes in recreation technologies increase the number of people participating in most activities, and potentially expand recreation participation across a broader landscape.

Shrinking Resources for Recreation Programs

The number of and resources available to recreation managers and enforcement rangers in urban fringe forests seem to be declining. Underfunded and understaffed programs for outdoor recreation were identified as a problematic situation for managers in a comprehensive set of case studies of federal lands done by the United States General Accounting Office (1995). The primary findings of this study showed that federal funding and staffing available for recreation programs, including OHV programs, was generally limited and did not reflect the needs of managers at the time.

We did not examine complete information about federal support for recreation programs across the entire National Forest System, but the total budget of the Forest Service was 4.7 billion dollars in 2004 and is slated to decrease by an estimated 660 million dollars in 2006 (United States Office of Management and Budget 2005). The budget for Forest Service roads and trails is estimated to decline from 234 million dollars in 2004 to 189 million dollars in 2006 (Farquhar 2005). Fiscal constraints, proposed budget cuts (Gerhardt 2005; Helms 2005), and incomplete information about the effects of increased recreation on federal lands (Estes 2001) exacerbate an already complicated situation for managers working on-the-ground by introducing new challenges and uncertainties. Specifically, tight budgets impact the number of

law enforcement rangers and recreation field staff on a National Forest. An interviewee from Forest Service Law Enforcement explained from her perspective:

“I think what would behoove everybody best in the long run is having more Forest Service officers out here on-the-ground, in the field to talk with people, and if it means writing somebody a ticket, fine. If it means taking the time to educate somebody and correcting their behavior, fine ... I definitely think that a huge part of the answer is more Forest Service presence ... I'm a little biased because I'm in law enforcement ... Realistically, we don't have the budget ... but in an ideal world, yeah, I think that would take care of a lot of our challenges and problems.”

Findings on the Social Context of Unmanaged Recreation—Multiple Perspectives

Increasing population, demand for recreation, and urbanization near public lands, when combined with decreasing capacities to manage these lands, confounds recreation planning and management, leading to situations of unmanaged recreation. These issues are echoed by managers and forest visitors alike. In addition, each of the stakeholder groups we interviewed has a history, value system, and objectives regarding recreation issues that require more attention as groundwork for understanding unmanaged recreation on the Front Range of Colorado.

The Views of Forest Service Personnel

Urban National Forests often have thousands of acres and hundreds of miles of roads that allow visitors access to dispersed recreation opportunities that have traditionally carried a sense of freedom and relaxed regulations:

“You know most recreation on the National Forests is unmanaged; that's one of the beauties of it. That's why people like the National Forests versus the National Parks because when you go into a National Park, it's *very* structured, and you have to stay on trails and they don't allow a lot of things that we do. They don't allow dogs. They don't allow motorcycles. They don't allow ATVs ... people go to the National Forest and it is entirely different. There is a lot of freedom ... Freedom is a good thing. People like that ...” (Forest Service Employee).

Freedom is valued, but it has costs, especially with today's increasing levels of recreation on the urbanized Front Range of Colorado:

“... We have so many roads, so many trails, and so many acres of land to manage. ... Even if our budget doubled, we wouldn't be able to keep up with the recreation demand, so our whole mode is to focus on areas where we can have some control—a lot of our developed areas, trail heads, picnic areas, and campgrounds—we do a good job of managing [those areas] and the higher use trails and put more maintenance dollars into ... the areas that ... frankly come up as *hotspots*. There are issues. People are complaining about certain things in certain places ... most of these tend to be in ... urban front country ... and it has certain characteristics ... proximity to developed private land ... anything that's within an hour drive of Denver Metro ... It is heavily impacted ... That is where we are seeing a lot of unmanaged recreation and the effects” (Forest Service Employee).

Unmanaged recreation emerges as a regional problem along the Front Range of Colorado's Rocky Mountains, but the Forest Service may often be constrained to concentrate efforts in local “hotspots” of conflict. From the perspective of these interviewees, hotspots often involve privately owned residential lands and conflicts between private land owners and forest visitors:

“... there are going to be exceptions, but a lot of folks who purchase land adjacent to the National Forest don't fully understand the implications of it being National Forest land not National Park land. They don't understand that there are going to be all types of uses out here that they may or may not agree with ... target shooting, people camping immediately adjacent to their property. A lot of the folks who move into an area want the area to change. They want us to implement closures restricting uses that they don't feel are compatible with their version of what National Forest land should be ... they become protective, ... territorial, they think of it as ... an extended backyard ... that leads to a lot of frustration on everyone's part ... [private owners] would like us to be doing things differently, and we may have different plans for that area ...” (Forest Service Employee).

Hotspots of unmanaged recreation on Colorado's urban Front Range tend to be characterized by noncon-

tiguous National Forest boundaries interwoven with private residential developments, mining claims, and lands owned by municipalities and state natural resource agencies. The situation on the ARNF has been described as “checkerboard land patterns” where forest visitors enter private property either legally, illegally, or accidentally, which leads to numerous complaints and conflicts. In addition to multiple ownerships, hotspots have multiple conflicting recreation activities that simultaneously occur in close proximity. For example, during field work, we observed people target shooting in crowded campgrounds. Recreation monitoring and law enforcement are difficult in these areas, and managers, private owners, and recreation visitors may rarely agree on how to address problems and work toward resolutions.

One of the characteristics of a wicked problem is that conceptions of the problem are conceptions of the solution. For example, if insufficient monitoring and law enforcement are considered to be part of the unmanaged recreation problem, then more monitoring and increased law enforcement are part of the solution. If hotspots on urban forests in the Front Range that involve conflicts with private land owners are viewed as the primary setting for unmanaged recreation, should not such hotspot areas be targeted when addressing the problem?

Because different stakeholders conceive the problem differently, they also conceive the solutions differently. The next section compares perspectives for other stakeholders in the unmanaged recreation problem.

The Views of Recreation Visitors

There are three broad groups of recreation visitors and respective activities involved in the unmanaged recreation problem including (1) motorized, (2) nonmotorized, and (3) activities that fall somewhere in between such as mountain biking and target shooting. Representatives of these groups tend to define the unmanaged recreation problem differently, and their views are often polarized and sometimes diverge from the views and intentions of the Forest Service (Cook 2004; Swenson 2005; USDA Forest Service 2005).

The motorized recreation community is often concerned with trail closures and equal access to public lands (Chavez and Schuett 2005). When OHV recreation trails and roads are closed, motorized recreation visitors feel that they are losing access to opportunities to experience public lands. For example, a petition from the Utah Shared Access Alliance stated:

“We are greatly concerned and see, all too frequently, little regard for the “human element” in closing off areas to motorized vehicle use. We see other aspects of resource management being given clear and often exaggerated priority. The focus seems to be solely on land and resource protection, founded on extremist views and manufactured facts. Motorized use, even when permitted, is based on unreasonably strict conditions. We and our families, as motorized recreationists, end up being the ones unnecessarily hurt by these drastic decisions” (Swenson 2005).

In this view, the problem is that motorized recreation is often restricted rather than unmanaged. Decreased opportunities by road closures are seen as the cause of other problems such as crowding and disrespectful behavior because the roads that do remain open are receiving unsustainable levels of use. A motorized enthusiast and recreation club leader explained using a local example:

“The bad thing is with the Front Range growing the way it is, and the roads having seasonal closures ... and roads that go through private property are being closed—the more destruction that you have. For instance right now, everybody wants to go out in the northern [area, but]—there is [one road] open, and I’m not sure it’s open now, they may have closed it because of moisture ... [The second road]—you can’t go anywhere on it, so that throws everybody down to [the other open road] ... which the Forest Service has no access through, but people are going up vandalizing it and not respecting private property. There is a gate up, and I look for it to be closed real shortly ... the roads are getting abused ...”

Unmanaged recreation is viewed by some to be linked to a lack of commitment, prioritization, resources, and personnel on the part of the Forest Service to properly manage recreation (USDA Forest Service 2005). The situation seems to be fraught with frustration and concern over lands that have been impacted. A representative of a group that advocates for public access wrote:

“... Rather than recreationists being the ‘problem,’ I submit that the lack of prioritization [for] ... recreation management by federal agencies, the administration, and Congress has resulted in some degradation ... in the urban interface or other high use areas [hotspots] ... In recent years, what little funds are appropriated for OHV and other recreation management activities have been

redirected to pay for wildfire suppression or other non-recreation projects ... Unmanaged recreation is not the problem, it is the lack of commitment by agency leadership to enact existing and proven OHV management prescriptions that protect resources while allowing for a quality motorized recreational experience on public lands” (Amador 2004).

The nonmotorized recreation community also has views. The primary nonmotorized, or human-powered, recreation pursuits on the National Forests include hiking, birding, wildflowering, backpacking, paddling, nontechnical climbing, cross-country skiing, and snow shoeing. Nonmotorized groups tend to see themselves as contemplative, appreciative, and quiet forest visitors. In response to the Forest Service’s request for comment on the 2004 proposed rule to designate routes for OHV recreation, representatives from 63 human-powered recreation organizations submitted a signed letter stating:

“Unchecked motorized recreation causes severe and lasting damage to the natural environment on which human-powered recreation depends. In addition to placing soil, vegetation, air and water quality, and wildlife at risk through pollution, erosion, sedimentation of streams, habitat fragmentation ... unmanaged motorized use alters the remote and wild character of the backcountry, denying other users the quiet, pristine, backcountry experience they seek and presents safety and health threats to other recreationists ... [we] support efforts to address the serious and growing problem of renegade off-road vehicle use, [but we] worry that crafting new rules without devoting considerable resources for many years to implementing the rules ... funding, education, maintenance, monitoring, planning, and enforcement will result in continuing decline of our National Forests and human-powered recreational opportunities” (Colorado Mountain Club 2004).

From the perspective of these nonmotorized recreation visitors, unregulated motorized recreation defines the unmanaged recreation problem. The nonmotorized community may largely support the federal rule to designate routes for OHV recreation in a manner that controls and limits OHV recreation, which they currently view as an unchecked threat to the resource and their preferred activities (USDA Forest Service 2005). However, they are concerned that federal resources are not adequate to

implement and monitor the proposed rule echoing the concerns of the Forest Service employees and the motorized visitors described earlier.

Although there seems to be some consensus that the agency is constrained in its abilities to properly address unmanaged recreation, motorized and nonmotorized recreation visitors are generally polarized—both sides see the other as the problem. For example, one recreation visitor expressed sentiments that nonmotorized activities are causing resource impacts:

“[T]he motorized recreational [community] is 25 years behind the non-motorized in trying to get the image set that not every motorized vehicle is out to destroy stuff. What I wish is that more people that knock us as motorized would go up into a wilderness area where all there has been are horses and backpackers and see the environmental damage that they are doing.”

Stakeholders with polarized views are well organized. Motorized and nonmotorized forest visitors as well as conservation organizations (Wilderness Society 2005) are often formally organized into local clubs and state and national associations with influential leadership, published bylaws, and position statements for recreation issues. Organized 4 × 4 clubs, for example, tend to socialize and educate their members regarding the norms and attributes of their recreation activity and the relevant management issues. Some of these associations advocate for and volunteer substantial amounts of time to manage their preferred types of recreation activities and settings on public lands. Representatives from the Forest Service often partner with representatives from recreation organizations to share ideas and to coordinate volunteer-based activities, playing an increasingly important role in recreation management on public lands (Bristow 2004). Nonetheless, more mutually accepted partnering, with common vision and goals, is needed among motorized visitors; nonmotorized visitors; unorganized, less vocal recreation visitors; private land owners; conservationists; and the Forest Service to defuse the unmanaged recreation problem, particularly at the level of local hotspots of conflict.

Conflicting Resource Values and Wickedness

We interviewed a local representative from the conservation/human-powered community who has substantial experience with recreation issues in Colorado.

This informant views unmanaged recreation as an emerging large-scale problem with potential to substantially affect National Forests in the Front Range similar to the mining and timber industries of the past:

Interviewer: ... What does the term unmanaged recreation mean to you? “I really liken it to ... back in the thirties we had unmanaged grazing before the Taylor Grazing Act, and then we had unmanaged timber [harvesting] before all those other laws, and earlier on, we had unmanaged mining. ... Of course we had the road proliferation in the twenties ...but only in the last decade has recreation become [a booming enterprise] ... recreation is sort of the new unanticipated use of the National Forests that does not yet have its own Organic Act. ... We desperately need[ed] one ... 20 years ago, and now we are at a point were the motorized groups and the American Recreation Coalition are writing their own legislation, and it isn't what we want, so the *recreation community* is not going together to get such legislation. ... Unmanaged recreation is a brand new use that had not been defined, regulated, or managed.” *Interviewer: ... Do you think that it is unmanageable right now?* “No, not at all ... there is just no funding ... especially [in] this region. ... The supervisor of this forest, and certainly [district rangers] have developed some pretty sophisticated concepts for how to manage motorized, mountain bike, ... and all kinds of recreation, which I think are on the right track. It is just that there is no funding to implement [these effective] concepts.”

This exchange illustrates and highlights our observation that stakeholders have different goals regarding recreation management, and the “recreation community” is not yet working together to address unmanaged recreation on the ARNF. The problem again is linked to motorized recreation, and is not necessarily viewed as unmanageable by the informant but rather federally underfunded and understaffed, making implementation of existing management strategies unrealistic (The Mountaineers 2004).

The conflict inherent in unmanaged recreation appears to be inextricably linked to intrinsic values of the environment and the worldviews of different stakeholders (Nie 2003). Decision problems become wicked and fraught with uncertainty when these values become central to the debate over how to address unmanaged recreation (Pellizzoni 2003) as illustrated by the informant:

“We really come to this ... issue from an ecological standpoint, and we’re in the mindset that nature has an intrinsic right to exist in and of itself independent of its utility to humans, and some of us come from ... a conservation biology background ... [some people say that], ... ‘My desire to protect ecosystems and ecosystem functions is just a social value that I have compared to my friend who’s highest value is to ride his motorcycle in nature’, but nevertheless, that is the perspective that we come from ... the principal impact to ecosystems that we think recreation has is habitat fragmentation; ... conservation biology says that. ... So we are really, really concerned ultimately that what used to be remote, pristine, quiet, inaccessible backcountry and secure habitat for [sensitive] species ... are being discovered and entered by people, which was never possible before the new recreation technologies ...” *Do you think that there are off-road vehicle users who recognize [this]*? “It gets very murky because ... right now in our social dialog in the country, environments are being marginalized as sort of anti-human, anti-access. ... The view that I express is being a little bit marginalized ... an example of what you are talking about is [our] open space debate. ... It is mountain bikes, horses, and people with dogs versus the pure nature advocates like me. ... We have been debating if people can go off trail and if their dogs can go off leash ... certainly the mountain bike community here ... considers itself to be conservationists, and they think that we are using fake science and overzealous arguments to exclude people. There is a feeling that they want to protect nature, but they don’t think that people have to be excluded to [do that] ...” *Do you think that other stakeholders agree on what unmanaged recreation is?* “I think so. ... the Blue Ribbon Coalition knows what it is, and the motorized clubs that sit in [on our meetings]—some of them are screaming even louder than we are about the lack of funding that’s allowing places like Left Hand Canyon (local hotspot) ... The motorized people are horrified that their use is being jeopardized and being given a bad name because no one knows how to manage it. I think that it is pretty clear to everybody what it is. The trouble is that the motorized folks are very weary of management ...” *So, the problem is being recognized?* “Yes, but it is terribly fraught with anxiety because the parameters and the amount of land are being narrowed down and the population is growing ... there is a lot of

anxiety about how to fix the problem ... [the motorized people] don’t want to be limited, and yet they know that there are going to have to be limits. It is very hard for them ... [with] the fires we’ve had, the right-of-way private land closures, the developments, subdivisions, and the in-holdings ... their original riding opportunities ... are being very drastically restricted ... they are worried about what management is going to mean. The way I see it is we have an unlimited demand on a limited land base and the two are in collision.”

For the Front Range in Colorado, facts and deeply held values seem to overlap in the unmanaged recreation problem. One version of reality reads: increased recreation participation on a limited amount of Forest Service land is jeopardizing the land and the recreation experience. Nonetheless, it is unclear and undecided for stakeholders how their values and desires fit into a solution. For one hotspot on the ARNF, Left Hand Canyon, there appears to be some shared awareness about the unmanaged recreation problem with no clear consensus on a single prescription for how to act or what the outcomes of management will be.

Solutions based on minimizing ecological and social impacts alone cannot adequately address the inherent subjectivities and divergent goals that are muddying the unmanaged recreation problem. No one right solution has emerged on which to agree. Although conservationists may view closing a hotspot and limiting recreational use as the proper solution, motorized recreation visitors may view an additional closure as part of the problem. People are interpreting aspects of the problem differently based on their values. Environmental protection advocacy groups, quiet recreation groups, and motorized access advocacy groups feel that their views and values are marginalized and largely unconsidered in this public lands controversy. Each believe they are losing what they hold most dear, so they conceive the solution in terms of preserving what they value, making the dilemma intractable. There is no single agreed-upon description and connection of the facts for the unmanaged recreation problem, and a shared vision of the management principles and outcomes is lacking (Pellizzoni 2003).

When the values and perspectives of other stakeholders that we did not directly address such as private land owners and the commercial recreation industry are considered, the unmanaged recreation problem becomes increasingly fragmented and so-

cially complex where the fragmented pieces are, in essence, the perspectives, understandings, and objectives of the collaborators (Conklin 2005, 2006). Directing more money, personnel, and law enforcement toward the problem, without a common vision and mutual trust among stakeholders, seems to be an insufficient resolution, albeit one having some consensus.

Implications of Wickedness for Unmanaged Recreation

An intractable controversy such as unmanaged recreation moves decision-making and planning beyond objective reasoning and linear problem-solving aimed at engineering consensus (Conklin 2005, 2006). The unmanaged recreation problem exists in the realm of the subjective, where emotionally satisfying solutions may be preferred (Table 1). Managers and decision makers cannot simply apply technical or regulatory solutions and hope to succeed—the motorized recreation issue, for example, is not just a matter of law enforcement (Bosworth 2005).

It is not clear that the Forest Service and the other stakeholders have completely acknowledged the implications of wickedness for unmanaged recreation. The different public views on this problem will continue to conflict and change over time and across the ARNF, making it difficult for recreation managers to reliably predict future scenarios. Designing efficient, standardized management tools for application across recreation problems and settings is ill suited for this problem. More data and more computer models will not solve the unmanaged recreation dilemma. Taming the problem by reducing it to smaller problems such as motorized trail designations that seem more straightforward and amenable to linear problem-solving could fail in the long term and may exacerbate the situation in the short term (Conklin 2005, 2006).

The Forest Service, along the Front Range of Colorado, is facing a dilemma: unmanaged recreation fits a wicked problem description, but the current operating conditions are calling for performance standards and quantifiable outcomes that demonstrate efficiency in management and spending (United States General Accounting Office 1998, 2003) as if they were facing a tame problem. Approaches for addressing wicked problems generally do not allow for quantifiable, objective measures of success (Table 1). Power struggles, imprecise goals, equity issues, and nebulous information create wickedness and a need for innova-

tive resolutions for urban hotspots of unmanaged recreation (Allen and Gould 1986).

Recommendations

Large-scale, centralized, and unified planning that communicates from the top down simply does not work for socially regulating wicked problems (Allen and Gould 1986; Pellizzoni 2003; Williams and Matheny 1995). One size does not fit all. Forest Service managers in the Front Range of Colorado are reminded that cases of unmanaged recreation involve a number of factors such as diverse recreation activities and technologies; diverse conflicts, including private lands; numerous stakeholders; and growing populations adjacent to public lands. Motorized recreation is only one piece of the puzzle. Wickedness arises when these factors combine in one place at the same time. Addressing wickedness calls for institutional changes within the Forest Service that allow for and reward the use of trust building and inclusive communication processes (Lachapelle and others 2003; McCool and Guthrie 2001; Shindler and Toman 2003; Winter and others 2004). The first objective should be to understand social context by identifying all local stakeholders, including Forest Service experts who manage the hotspot in question. Different definitions of the problem need to be identified and discussed in ways that give equal weight to each perspective in order to establish common objectives, a common language, and a common vision for action.

The Forest Service has approved legal provisions in the form of a national rule to establish a system of roads, trails, and designated areas for OHV recreation (USDA Forest Service 2005). Under the rule, most types of motorized recreation on the National Forest System would be strictly limited to designated networks of roads and trails with cross-country travel prohibited, which is a major shift from many previous policies where areas remained “open to OHV recreation unless posted closed” (USDA Forest Service 2004c, 2004d). When implementing this OHV rule, the Forest Service should work with citizens to co-design plans for local hotspots rather than developing strategies for the region or the entire forest. Regional planning and decision-making may overlook, and hence marginalize, place-based interests, thereby foregoing opportunities to co-design and co-implement local plans. Informed by a local understanding, a partnership of stakeholders can articulate an appealing and shared vision for the future. Common goals can

temper and even reduce the polarization that makes unmanaged recreation intractable (Pellizzoni 2003; Propst 2005).

Following Williams and Matheny (1995:7), we suggest that decision making for implementing the OHV rule be framed as a local “ongoing, continuously changing public dialog among citizens, organized interests, and policy-makers.” Collaboration that overcomes wickedness can only happen in an atmosphere of inclusiveness where local recreation resource managers make the time to seek out and listen to local viewpoints and insights. Such collaboration can (1) provide unique insights for addressing issues that otherwise may have been overlooked, (2) foster social relationships and trust between people who previously refused to come to the table, and (3) build local social networks that allow shared visions and collective action. As the Forest Service implements the new OHV rule across the National Forest System, it should consider a new type of public involvement that genuinely seeks other participants and interest groups, other contexts, other concerns, and other problem definitions in addition to the most vocal, resourceful, or influential interests (Pellizzoni 2003).

Strategies for addressing unmanaged recreation that focus on measuring public consensus, opinions, or votes in the form of the aggregate attitude of the majority are insufficient because interest group polarization at national and regional scales has created an intractable “us against them” controversy over outdoor recreation. Collaboration that overcomes wickedness requires that decision-makers allow themselves to be directly informed by local positions and knowledge rather than the positions evident in national debates. Some local positions may be difficult to identify at first if not well organized and vocal. Nonetheless, in the context of increasing social complexity and wickedness, inclusive approaches that actively seek diverse input and involvement tend to succeed (Pellizzoni 2003; Propst 2005).

Conclusion

There are substantially large numbers of citizens in the United States participating in technologically diverse and potentially incompatible forms of recreation on limited amounts of Forest Service land managed for *both* recreation and natural resource protection. Expansion of urban population centers adjacent to National Forests is a factor that contributes to increased participation in outdoor recreation and *hot-spots* of conflict. The situation is exacerbated by

dwindling funding and staffing for recreation programs administered by the Forest Service such as law enforcement and inventorying and monitoring recreation trails and roads.

The diverse and numerous groups of people that may have stakes in an unmanaged recreation debate rarely agree on alternative resolutions, thereby ruling out solutions based on a single perspective (van Bueren and others 2003). Unmanaged recreation presents a challenge to recreation researchers and managers because it is shrouded in radical uncertainty, which results from disagreement over the definition of the problem, the strategies for resolution, and the outcomes of management. Also, more complete knowledge is needed about recreation visitors’ values and relationships with one another and the land.

Overcoming wickedness requires a local social process that involves inclusive communication and collective action among all stakeholders with an interest in local recreation management. Solutions should be considered temporary and place specific. To achieve successes, researchers and managers are first encouraged to accept the wicked nature of unmanaged recreation. Working together by building relationships between local stakeholders is the key to resolving cases of unmanaged recreation. Allen and Gould (1986:23) concluded that “people are what make problems wicked ... emphasis on people within the organization and on external customers is the central element when wicked problems are successfully handled.” Forest Service managers should be rewarded for using and developing people skills and their abilities to organize and facilitate social groups and collective action. Training, education, and requiring these skills and abilities for employment will continue to be important as the Forest Service addresses wicked problems.

Unmanaged recreation typifies numerous, dynamic, and technologically sophisticated interactions between people and National Forests. Conservation ecologists often use a cliché to describe the current environmental situation: *tinkering with nature leads to more tinkering*. Tinkering refers to interacting with social and ecological systems by trying to rationally control aspects of the systems without a complete understanding of the systems or the consequences of interventions. Despite our best intentions at rational control and efficiency in recreation management, there continues to be radical uncertainty and contradiction in the decisions that we make about how to coexist with one another and ecosystems over the long term (Pellizzoni 2003; Dovers and Handmer 1993).

We attempted to describe the social context of unmanaged recreation on the ARNF in Colorado's Front Range at a time when more tinkering is eminent and necessary. We provided a fundamental and contextually rich understanding of unmanaged recreation that appropriately acknowledges it as a wicked decision problem. Exploring the competing values and divergent goals that underlie this problem has highlighted the inadequacy of relying on the traditional wisdom of linear problem solving (Conklin 2005, 2006). This study provides an appropriate foundation on which to design research and collaborative partnerships to address unmanaged recreation in the Front Range of Colorado.

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