DRAFT REPORT

The Social Context of Unmanaged Recreation on National Forest Lands

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Abstract

In a 2003 speech, the Chief of the United States Forest Service identified "unmanaged recreation" as one of the Four Threats that jeopardize the health of the National Forests, the quality of recreation experiences, and essential ecosystem functions. Unmanaged recreation presents a challenge to both researchers and managers of outdoor recreation 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; and incomplete knowledge about recreation visitor's values and relationships with each other and the land. We describe the unmanaged recreation issue as a "wicked problem", and we discuss the implications of this wickedness for addressing the unmanaged recreation issue. We base our conclusions about the nature of this issue on a problem analysis that included document analysis, literature review, and interviews with key informants, both inside and outside the Forest Service. Overcoming wickedness requires a local social process that includes intensified communication and collaboration among all stakeholders with an interest in hotspot areas of recreation conflict.

"The formulation of a wicked problem is the problem!"
Rittel and Webber 1973:161

I. Introduction

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 the National Forests, the quality of recreation experiences, and essential ecosystem functions (Bosworth 2003). The other three threats identified by the Chief of the Forest Service were wildland fire and fuels, habitat fragmentation, and exotic invasive species. Substantial energy and resources are being directed toward the Four Threats and will likely continue to be focused in that direction. In this article, we formally describe the nature and the context of one of the Four Threats, unmanaged recreation. Although we focus on a single threat, we acknowledge the inter-connectedness, multi-dimensionality, and the social nature of all Four Threats.

II. What is Unmanaged Recreation?

The phrase "unmanaged recreation" has multiple connotations and interpretations, which present opportunities for debate and disagreement. Writings on the topic and stakeholder interviews include descriptions of unmanaged recreation as "unmanageable recreation",

"difficult to manage recreation", "inappropriate dispersed recreation", and "unmonitored nontraditional activities that are growing in popularity". In this article, the phrase "unmanaged recreation" is used to describe a broad problem with multiple stakeholders covering many issues related to outdoor recreation activities and visitor management on National Forest lands.

The diversity of stakeholders contributes to the difficulty of formulating a succinct definition of unmanaged recreation. The stakeholders understand and define problems of recreation management on public lands according to their various perspectives and insights. Stakeholders' definitions of unmanaged recreation are important because how a group chooses to define a problem largely determines the approaches they take to resolve the problem (Allen and Gould 1986:22). Representatives from leadership in the Forest Service often define unmanaged recreation in terms of unchecked use of off-highway motorized vehicles (OHVs), unbridled OVH recreation, creation of unauthorized OHV routes, and related ecological impacts.

> The major concerns are … the Four Threats … Fourth is unmanaged recreation. In many places, recreational use is outstripping our management capacity and damaging resources, *particularly the unmanaged use of off-highway vehicles*. This is a legitimate use of public lands, but we do need to manage it better (Bosworth 2004a, emphasis added).

> Unmanaged off-highway vehicle (OHV) use is a *spotlight issue* representing this threat [unmanaged recreation] because of the unauthorized creation of roads and trails and the associated erosion, water quality degradation, and habitat destruction (USDA Forest Service undated a, emphasis added).

From the perspective of leadership in the agency, OHV recreation seems to serve as the poster child for the unmanaged recreation problem (Bosworth 2003; Bosworth 2004b; USDA Forest Service undated a; 2004a; 2004b). The problem from the perspective of the Forest Service is one of sustainability. The impacts of OHV recreation are considered to be more damaging than many other forms of recreation and such use is not viewed as sustainable. However, the Forest Service is required by Executive Orders 11644 and 11989, issued in the 1970s, to designate lands for motorized recreation, monitor motorized recreation to ensure that it is in compliance with these regulations, and mitigate adverse effects of motorized recreation (GAO 1995). To conform

to these legal provisions, the Forest Service is in the process of approving a rule that would establish a system of roads, trails, and designated areas for motorized recreation. Under the rule, most types of motorized recreation on the entire National Forest System would be strictly limited to the designated network of routes, which is a major shift from many previous travel plans where National Forest managers kept areas open to OHV recreation "unless posted closed" (USDA Forest Service 2004c; 2004d). Managing OHV recreation in compliance with established regulations is necessary; however, cases of problematic OHV recreation on Forest Service lands appear to be one symptom of a larger and more challenging problem—unmanaged recreation.

> A combination of a lot of people, diverse interests, more free time, flexible schedules, and technology all combine to put a lot of people on the [national] forest for us … That creates some problems. Unmanaged recreation is not strictly about ATVs or dirt bikes. They do play a large component. They fall under the umbrella of unmanaged recreation. They have potential to do a lot of damage in a short amount of time. We tend to focus on that a lot (Forest Service Employee C).

In this article, we describe the unmanaged recreation issue as a "wicked problem" (Churchman 1967; Rittel and Webber 1973), and we discuss the implications of this wickedness. We provide a synthesis of relevant information for understanding the complex social nature of unmanaged recreation, including key stakeholders and some of their perspectives. The contributions of the paper include (a) a description of the unmanaged recreation phenomenon in terms of its wickedness and social complexity, (b) an examination of the broad situational context of the problem, (c) a description of the relevant stakeholder perspectives, and (d) implications for how to address unmanaged recreation.

III. Research Approach

In the next section we describe wicked problems and put forth that the wicked nature of unmanaged recreation has implications for how the problem should be approached. We base our conclusions about the nature of this issue on a problem analysis that included document analysis,

literature review, and interviews with key informants, both inside and outside the Forest Service. The study participants were purposively selected for their personal and/or professional knowledge of and experiences with outdoor recreation and its management on National Forest lands. Initial interviewees provided us with the names of additional people to be interviewed. A detailed research diary was logged to provide a supplemental source of information. The research study diary documented the observations and experiences of the primary author regarding his interactions with interviewees and other research participants. All study participants work, recreate, or do both on two districts of an urban national forest in Colorado. The study period was September 2004 through August 2005.

We chose this approach to provide a qualitative understanding of the context surrounding the unmanaged recreation issue—a preliminary appraisal (Beebe 1995).[1] Such an understanding is valuable for a number of reasons; it identifies the questions that researchers and managers should be asking; it is flexible in nature; thereby, it allows for both creation and communication of knowledge that is iterative and well-suited for studying dynamic problems and multiple stakeholders. The approach also serves as a participatory exercise giving voice through interviews and observations to stakeholders directly involved with the problem.

We focus on the context of unmanaged recreation for National Forests in Colorado's northern Front Range of the Rocky Mountains. The problem-definition and goal-formulation for the unmanaged recreation issue is relevant for other urban national forests in the West. While we are largely concerned with the situation on National Forest lands, the intermixing of these lands with private, state, and other federally administered lands suggests unmanaged recreation is not exclusively a Forest Service issue.

IV. Wicked Problems

Analysis of documents and in-depth interviews provides support for the argument that the unmanaged recreation issue on National Forest lands more closely resembles a wicked problem than it does a well-defined analytical problem. In this section we explain the concept of wickedness by contrasting it with ideas inherent in rational scientific management.

Allen and Gould (1986:21) argue that public forestry in general has become dependent on models of "scientific rationality and the assumption that more information on a phenomenon automatically leads to better management." Allen and Gould concede that many public forestry problems, although ecologically complex, lend themselves to being solved with traditional analytical models and are characterized by the existence of right and wrong solutions. Optimal, and thus efficient, solutions are sought by planners and managers who apply linear thought processes. Goal-directed models of performance-based management and accountability for government agencies (GAO 1998, 2003) are examples of linear thought processes that may be inappropriate for addressing some types of decision problems:

> [A] large class of decision problems encountered today are not amenable to treatment by a formal analytical procedure incorporating a process of optimization. These problems are complex and often ill-defined. It may not be easy … to determine where the cause of the difficulty really lies … *formulating such a problem and resolving it are one and the same thing*, since selection of a particular explanation of the symptoms of the problem often determines the way it is resolved (Radford 1977:2, emphasis added).

Rittel and Webber (1973) characterize such problems as wicked because they have the following attributes: (1) there is no definitive formulation of a wicked problem; (2) wicked problems have no stopping rule to indicate that the problem has been resolved; (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" because there is no opportunity to learn by trial-and-error, every attempt counts significantly; (6) wicked problems do not have an exhaustively

describable set of potential solutions, nor is there a well-described set of acceptable procedures that may be incorporated into the planning process; (7) every wicked problem is essentially unique; (8) every wicked problem can be considered to be a symptom of another problem; (9) the existence of a discrepancy representing a wicked problem can be explained in numerous ways, and the choice of explanation determines the nature of resolution.

Pellizzoni (2003:203), expanding on these concepts, refers to wicked problems as "intractable controversies" typically characterized by "radical uncertainty":

> By radical uncertainty I mean a kind of uncertainty different from the one typically addressed by rational choice theory. It is a situation where not only the means, but also the goals and structure of a problem are ill-defined. Radical uncertainty brings into question the model of rational actor which is at the basis of traditional conceptions of science, … Intractable problems are different from the simple 'disagreements' of routine political debate. The latter can be resolved by appealing to 'facts'—that is, by using shareable kinds of rational argument referred to scientific research, witness, past experience, … The former cannot. In this case, the parties in dispute tend to 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.

Wicked problems involve substantial amounts of uncertainty about the goals, methods, and outcomes of decision-making, management, and subsequent evaluation. We put forth that the unmanaged recreation issue on National Forest lands is an environmental management problem in which facts and values overlap to create wickedness. In the following sections, we describe how the unmanaged recreation problem involves complexity, uncertainty, multiple objectives, and multiple participants.

V. The Situational Context of Unmanaged Recreation

One implication of the wickedness inherent in the unmanaged recreation problem is the need to recognize that social systems are just as dynamic and complicated as the ecosystems that contain National Forest lands. Scientists, planners, and land managers alike will most likely fail to fully understand and successfully address increased social complexity and conflict in outdoor

recreation at the ecosystem level without first understanding the social, historical, and typically place specific context, including multiple stakeholders (Williams and Patterson 1996).[2] This section provides background that is necessary for understanding, in part, why outdoor recreation management on National Forest lands has become increasingly problematic. We review trends that contribute to increased diversity in stakeholders, their values, and activities on national forests. An interviewee with the Forest Service explained what has occurred in recent decades:

> We have had issues with unmanaged recreation for probably as long as the Forest Service has existed. It's certainty [the case today] with more people discovering their national forests and more people … nationally… the population growing … and with [outdoor] recreation becoming such a popular activity …We are seeing growth, huge growth in outdoor recreation sports, and in addition to that, 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. There are people doing a wide variety of things on the national forests. Back in the late 50s, early 60s we had no clue (Forest Service Employee C).

Factors that increase social complexity on National Forest lands include (a) population growth, especially in counties that contain federal lands in the American West; (b) urbanization of some National Forest lands; (c) increased participation in most outdoor recreation activities in the United States since 1980; (d) innovations in recreation technologies; and (e) deceases in funding and personnel for recreation programs and monitoring.

A. Population and Migration

Broad macro-level trends in population demographics, economics, and environmental values and sensitivities in the United States have contributed to a movement in which a growing number of people are choosing to reside/retire in communities with service-based economies near natural resource settings such as national forests (Cordell and Tarrant 2002; Dwyer and Childs 2004; Egan and Luloff 2000; Frentz 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). Current rates of in-migration seem to be primarily fueled by increasing human desires to recreate outdoors and experience environmental amenities while improving both perceived and actual health and quality of life for themselves and their families. This trend adds social complexity by increasing the number and diversity of stakeholders and their views on recreation issues (Conklin 2001).

New migrants to the Rocky Mountain West from the eastern and northern United States, for example, bring knowledge about outdoor recreation that developed through experiences on private and public lands in the Northeast, which differ substantially from the ecology, geology, and climate of the West. In-migrants tend to arrive with diverse needs for leisure, differing recreation expectations, various worldviews, and resource ethics that often conflict with those of the residents and managers at the new places (Larson and others 1993; McBeth 1995). Acculturation into western recreation environments may occur after a time for some newcomers. Other migrants, who choose to stay, may never completely adapt to the novel place, thereby changing the socio-cultural atmosphere of the recreation setting overtime.[3] In-migration often diversifies race, class, and gender, which affect preferences for recreation experiences and settings (Dwyer and Barro 2001) and how people define contentious environmental problems (Taylor 2002).

In addition, 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), contributes to more retirees recreating on urban national forests such as the Front Range of Colorado (Walters 2002). Older members of a community tend to seek and may require outdoor recreation facilities that are more accessible and proximate to urban areas.[4] Members of an aging population often seek day visits and less challenge in recreation and prefer or require roads, well-developed and

accessible facilities, and areas established for wheel-chairs, bicycles, and passenger vehicles that traditionally were rare on rural national forests.

B. Urbanization of the National Forests

Linked to population growth, some National Forest lands are becoming more urban. The Forest Service has classified about fifteen National Forests and approximately 60 distinct Ranger Districts as urban (Bricker and others 2005; USDA Forest Service 1996). Urban national forests and grasslands tend to be located within fifty miles of population centers of greater than one million residents. Urban National Forest 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). [5]

For residents of the major population centers of industrialized countries, the adjacent forested areas are increasingly perceived as an extension of city life (Pigram and Jenkins 1999:142). Urban residents are drawn to the interfaces of cities and forests for recreation, self-renewal, and respite from daily stresses. The wildness and the sense of freedom characteristic of National Forest lands are diminished as forests are increasingly transformed into structured parks and open spaces. Ironically, the mindset of freedom remains for some, and recreational activities that were traditionally dispersed on rural forests remain legally permitted on many urban forests such as dispersed camping, burning campfires, hunting, driving off paved roads, and target shooting using a variety of firearms. These activities become problematic and contentious when equestrians, hikers, dogs, mountain bikers, and private land owners are added to the mix.

Natural resource law enforcement on these forests has largely shifted from resource protection and monitoring of recreational permits to issues of public safety and law enforcement

similar to officers who patrol city streets. We identified depreciative behaviors and other nontraditional social problems such as vandalism, body dumping, residence on the forest by the homeless and itinerant laborers, unruly drug and alcohol consumption during large group events such as counterculture gatherings or high school camping parties, escaped campfires, dumping trash and household appliances, cultivation of marijuana, manufacture of methamphetamine, and the abandonment, subsequent stripping, and burning of motor vehicles. Crime and depreciative activities on national forests that impact the resource and the visitor experience have become priorities for managers on urban forests (Chavez and Tynon 2000).[6]

C. Participation in Outdoor Recreation

A survey of the United States public conducted for the American Recreation Coalition found that 55 percent of the respondents reported at least one visit to an area administered by a federal land management agency within the past year (RoperASW 2004). The Forest Service manages the largest amount of federal land in the United States at 147 million acres (Cordell and others 2004b). In 2002, 214 million people visited the lands managed by the Forest Service; this number is expected to increase substantially as the U.S. population doubles by the end of this century (Bosworth 2003; USDA Forest Service 2004a).[7] While the numbers of visitors on the National Forest lands and other federally managed lands continue to increase, actual acreage of public land on which to recreate remains essentially constant.

At the forest level, outdoor recreation has been documented as the primary reason for visiting urban National Forest lands. In calendar year 2000, the National Visitor Use Monitoring Project (NVUM) reported that 72 percent of those surveyed on the Arapaho-Roosevelt National Forest, an urban forest located in the Front Range of the Rocky Mountains in Colorado, said that

recreation was their primary purpose for visiting (USDA Forest Service 2001). In fiscal year 2001, the NVUM project interviewed visitors on Colorado's other urban National Forest lands (Pike-San Isabel National Forest and Comanche National Grasslands) and found that 91 percent of those visitors said their primary reason for being on the forest was recreation (Kocis and others 2002).

At the activity level, many specific types of outdoor recreation activities are increasing in popularity.[8] In Cordell's survey (2004b:38) on outdoor recreation participation in the United States, 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 services and facilities (+111%); and driving off-road using motorcycles (OHMs), all-terrain vehicles (ATVs), or other four-wheel drive vehicles (+109%). Readers will quickly note that two of the fastest growing outdoor recreation activities, snowmobiling and driving off-road, are motorized while the others are non-motorized. Motorized recreation is generally perceived to be distinct from non-motorized recreation and perhaps incompatible with the backcountry experiences and environmental philosophies of some people. Non-motorized activities have been equated with human-powered, contemplative activities, which allow a noticeably quieter recreation experience and which are generally believed to result in less lasting damage to both the physical and social settings than motorized activities.[9]

D. Advances in Recreation Technology

While participation rates in recreation activities rise and the population of the United States grows larger, older, and more ethnically diverse (Chavez 2001a; Cordell and others 2004a; Dwyer 1995), outdoor recreation is simultaneously becoming more technologically advanced

and diverse (Bengston and Xu 1993; Ewert 2001; Ewert and Shultis 1999; Warnick 1995). Technologies and the availability of consumer products based on these in the United States have contributed to increased levels of participation and diversity for recreation activities (Hollenhorst 1995; Pigram and Jenkins 1999).[10] The world wide internet, for example, has generally allowed for increased awareness of opportunities for outdoor recreation and nature-based travel. Access to information about unique places and settings for outdoor recreation has increased. In some cases, recreation places and opportunities that may have been well-kept local secrets before the advent of internet communication are now open to people around the globe.

Nearly all 37 activities tracked by Cordell and others (2004b) involve a degree of post-1980 technology for clothing, equipment, and vehicles. The original mountain bikes that were introduced for trail riding on the national forests had essentially no front or rear suspensions separate from the bike's frame. In addition to the shock absorbing front suspensions of many mountain bikes today, soft or broken tail mountain bikes have independent rear suspensions jointed to the bike's main frame and are commercially available and popular. The newer mountain bikes demonstrate an example of a recreation technology that can enhance performance for the rider and which generally allows easier biking on difficult backcountry trails. Motorized OHV activities have advanced in terms of technology. The original motorized ATVs were two-wheel drive tricycles that were unstable to a degree of danger that led to their prohibition in the 1980s. Many of the ATVs or quad runners used today are four-wheel drive, which substantially enhances the performance of the vehicle and the rider and allows maneuverability on most types of terrain in backcountry areas (Havlick 2002).

There are two relevant aspects of recreation technology: (a) technology purchased by consumers for use on National Forest lands and (b) technology available to recreation managers

for their daily efforts to manage visitors and settings (Bengston and Xu 1993). Some technologies shared by managers and recreation visitors have had a presence on public lands for decades. For example, four-wheel drive trucks and jeeps (4x4s) continue to be used for both public recreation and for monitoring/patrolling activities by forest managers and rangers. The primary difference between the 4x4s used by many off-road enthusiasts and the vehicles used by agency managers and protection officers is found in the number and types of performance enhancing modifications that have been made to the vehicles owned and operated by forest visitors. Modified 4x4s are capable of traveling on designated OHV roads that are impassable to most standard passenger 4x4s used by managers and rangers who are responsible for monitoring activities and enforcing regulations on these routes. In general, technological advances in recreation equipment, vehicles, and communication have increased participation and enhanced access for recreation visitors on National Forest lands. While at the same time, the numbers and the resources of recreation mangers and law enforcement rangers in urban fringe forests have declined. Without adequate personnel on-the-ground, advanced technology for managing visitors in the backcountry has limitations.

E. Inadequate Resources for Recreation Programs

Under funded and under staffed programs for outdoor recreation were identified in a comprehensive set of case studies done by the United States General Accounting Office (1995).[11] The primary findings from the case studies indicate a problematic situation for recreation managers at the study sites. The situation was clearly communicated in the executive summary:

> At the eight locations … OHV programs generally received limited federal funding, and relatively few staff devoted either all or part of their time to OHV activities. According to BLM and the Forest Service, the limited federal funding available for their recreation programs, including OHV programs, has generally been less than requested and does not reflect their management needs. … OHV activities were given lower funding and staffing priorities than other competing programs at the eight locations … State governments,

> local communities, and private organizations, however, were contributing funds and volunteering services to supplement the federal efforts. … At all eight locations, individual OHV users, OHV user groups, and local volunteers contributed services and materials (GAO 1995:4).

Information about federal support for recreation programs across the entire National Forest System remains incomplete. However, there is evidence that federal agencies do not have adequate resources to properly manage some areas and require outside assistance for recreation funding and impact monitoring. Today, fiscal constraints, proposed budget cuts (Farquhar 2005; Gerhardt 2005; Helms 2005), and incomplete information about the effects of increased recreation on federal lands (Estes 2001) seem to compound an already complicated situation for managers working on-the-ground by introducing new challenges and uncertainties while exacerbating traditional problems. [12]

VI. The Social Context of Unmanaged Recreation—Multiple Perspectives

In the previous section, we described broad trends that affect outdoor recreation planning and management. Some of these contextual factors reemerge in this section where we identify participants that have some level of involvement, responsibility, or interest in the unmanaged recreation problem. The stakeholders each have histories, value systems, objectives, and perspectives regarding recreation issues that require more attention as groundwork for understanding the unmanaged recreation issue on National Forest lands. We identify and describe, in part, various perspectives to provide a fundamental understanding of how different people view the problem.[13]

A. The United States Forest Service—Urban Problems, Rural Budgets

Interviews with employees working in law enforcement, forest protection, and/or recreation planning on one national forest in Colorado's Front Range allowed us to identify issues relevant

to unmanaged recreation from their perspective. In addition to better regulation of OHV recreation, which is the focus of Forest Service leadership, these interviewees recognize other dimensions of the problem including (a) inconsistent signing for recreation roads and trails, (b) too few employees working on-the ground, (c) a sense of inalienable freedom inherent in dispersed recreation, (d) and a checkerboard or noncontiguous pattern of land ownership with private lands intermixed with National Forest lands.

Consistency in travel management plans and route signage are seen as necessary, however there is a need to build flexibility into plans to address the complexity and uncertainty of the unmanaged recreation issue because local place geographies and stakeholders dictate the specifics of outdoor recreation management at any particular time.

> Interviewer: … if there were ideal and consistent travel management regulations across forests do you think that would be the answer to the unmanaged recreation problem?
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> Interviewee: … It's part of it. It makes it easier for the public to comply with our regulations when they are consistent. At the same time, areas are different, and we need to maintain the flexibility that we have implementing some of our … sub part B regulations or our supervisors' orders because you will definitely have unique circumstances in different areas, so we need to maintain that flexibility… Standardized regulations, yeah, as much as they can be sure that would be good … Many forests do a great job at having things like that posted at their main entrance points. It is just not every forest or district geographically permits that kind of thing (Forest Service Employee B).

The messages communicated to visitors by the signs may be more amenable to standardization across forests, however.

> … What I think would be very helpful to getting our message and our regulations across is consistency in how we sign things. We need to be very definitive in what is prohibited. Some of our signing in the past has attempted to address what can occur out there instead of what is prohibited, and it doesn't fly well in our courts. The judge or the presiding magistrate wants to know definitively if this person was behind a closed gate that said no motorized vehicles. They don't care if hikers are permitted, snowshoers are permitted, bicycles are permitted … They want to focus on what *isn't* permitted or what's prohibited. It's also a much simpler cleaner sign when you just say the following is prohibited versus a laundry list of what is permitted … when you are telling folks what they cannot do. They retain it more. It addresses what they are looking to do much more succinctly as well, so I think that some standardized signing—and we have that to a degree—but some consistent standardized signing is important (Forest Service Employee B).

A shortage of rangers and recreation field staff is seen as a factor that contributes to unmanaged recreation, and the realities of budget constraints are recognized as part of the under staffing issue.

> …Really my bottom line—what I think 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 … Yeah, of course, I'm a little biased because I am in law enforcement, so I'd want [additional personnel] to be, at a minimum, forest protection officers and ideally lots more forest service law enforcement officers. Realistically, we don't have the budget … we need the will to make that happen, but in an ideal world, yeah, I think that would take care of a lot of our challenges and problems (Forest Service Employee B).

Urban National Forest lands 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. In very limited places, they allow horses … All the people are normally on highly developed paved roads and trails and scenic overlooks and visitor centers, and so one or two points of access into a national park—very structured, so people go to the national forest and it is entirely different. There is a lot of freedom ... and it is a good thing. Freedom is a good thing. People like that … (Forest Service Employee C).

However, this freedom has costs, especially with today's increasing levels of dispersed recreation on the national forests. Recreation seems to be overloading budgetary and personnel capacities of the Forest Service in some urban fringe areas.

> … [People] should be able to go out and enjoy their national forest, but the cost for us is … We have so many roads, so many trails, and so many acres of land to manage. We can't manage it all. We can't, especially with the current budget situation. 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 trails. We try to pick some of the higher use trails and put more maintenance dollars into them … and then focus on some of the areas that … frankly are—come up as *hotspots*. There are issues. People are complaining about certain things in certain places, so we focus on those and most of these tend to be in … urban front country is what we are calling it, and it has certain characteristics … proximity to developed private land, adjacent also … to the urban Front Range … anything that's within an hour drive of the Denver Metro—hour, hour and a half—Front Range urban population is fair game. It is heavily impacted, and it kind of meets the definition of what we call urban front country. That is where we are seeing a lot of *unmanaged* recreation and the effects (Forest Service Employee C).

In the case of Colorado's Front Range, unmanaged recreation emerges as regional in scope, but the agency is constrained to concentrate management efforts in "hotspots" of conflict. Hotspots often involve privately owned residential lands. Interviewees identified troublesome conflicts between vocal private land owners and various recreation visitors:

> Interviewer: … How about the residents who own land adjacent or adjoining the forest land … regarding interactions with recreationists or conflicts …
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> Interviewee: … I'm speaking in broad generalizations—see disclaimer below. Obviously 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 and 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 ... and it's just human nature—they become protective, they become territorial, they think of it as kind of an extended backyard … that leads to a lot of frustration on everyone's part … because [private owners] would like us to be doing things differently, and we may have different plans for that area, or what we may be planning according to the forest plan and other protocols … [we] may be planning to do things that they would enjoy or like to see happen … but it just may not happen in the time frame that they would like to see (Forest Service Employee B).

Hotspots on urban national forests tend to be characterized by noncontiguous forest boundaries interwoven with private residential developments, mining claims, and/or lands owned by municipalities and state natural resource agencies. Hotspots are characterized by recreation activities that conflict and which tend to 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 rarely agree on how to manage hotspots. An interviewee summarized how multiple conflicts can arise and how inadequate staffing, monitoring, and law enforcement further complicate the situation.

> On this forest we've got so many checkerboard land patterns with private landowners and people are going across private land, and that is where we get a lot of our complaints, and then they are going in mud bogs and off-road and that is where we get a lot of resource damage … from the OHVers' perspective, they want challenging places to ride and recreation [management] does really deal with that and respond to that and say, 'Okay, let's look at our roads and talk to the 4-wheel drive clubs and make some challenging roads.' But, at the same time, when you make a road that is really rough, then [the Forest Service] may not be able to get in there with whatever we are driving to patrol it and to make sure that people are where they should be, and then of course the other patrol issue is even if we had a bigger patrol staff, just how would you ever cover all the acres on this forest? It is just all the places that OHVs can end up. If we had more patrols, it

> would certainly help. We have very limited patrols especially law enforcement patrols—gun carrying officers. We have one full-time officer on [this district] and we have one and a half on [the other district] and how many acres … (Forest Service Employee A).

One of the characteristics of a wicked problem is that conceptions of the problem are conceptions of the solution. For example, if insufficient signage and law enforcement are considered to be part of the unmanaged recreation problem, then better signage and increased law enforcement are part of the solution. If hotspots on urban national forests and other interface areas are thought to provide the primary setting for unmanaged recreation, hotspot areas should be targeted when addressing the problem. Since different stakeholders, conceive the problem differently, they also conceive the solutions differently. The next section compares perspectives for other stakeholders who hold a position regarding unmanaged recreation.

B. The Recreation Visitors and their Views

Today, recreation visitors to National Forest lands are as varied and diverse as the Nation's forests. There are three broad groups of recreation visitors and respective activities involved in the unmanaged recreation problem including (a) motorized, (b) non-motorized, and (c) activities that fall somewhere in between such as mountain biking.[14] Representatives of these groups tend to define the unmanaged recreation issue differently. Their views tend to be emotionally charged, value-driven, and often in conflict with each other and with the Forest Service. Stakeholders from the recreation community, similar to the agency, often do focus on motorized recreation when discussing unmanaged recreation on National Forest lands (e.g., Cook 2005).

Motorized recreation activities, participants, and their vehicles are diverse. [15] The motorized recreation community, in general, is 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, the Utah Shared Access Alliance petitioned lawmakers and governmental agencies:

> 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. Thus, we stand united in petitioning that lawmakers and governmental agencies hear our concerns, genuinely listen to our complaints, and carefully consider our recommendations (a) in setting policies that promote equal and shared access to the outdoor attractions of our State, and (b) in establishing land use plans for the shared motorized use of scenic lands that belong to all of us—not just an elitist few (Swenson 2005).

In this view, motorized recreation is often restricted rather than unchecked. Recreation management that creates a loss of opportunities through OHV road closures is seen as the cause of other problems, such as crowding and disrespectful behavior on the part of recreation visitors.

> … but the bad thing is with the Front Range growing the way it is, and the roads having seasonal closures on them, and roads that go through private property that are being closed—the more destruction that you have. For instance right now, everybody wants to go out in the northern ranger … District—there is [one road] open, and I'm not sure it's open now, they may have closed it because of moisture and [a second road] … those are the only two roads. [The second one]—you can't go anywhere on it, so that throws everybody down to [the other one] … then it throws them down into this area … there is one road open … 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. … That throws everybody down to the [southern] District, and … the roads are getting abused. I honestly believe that if they would open—I'm all for seasonal closures when justified, but just because the road needs a seasonal closure on it they close it the first of February; they don't open it until the first of June when it should be actually closed maybe April and May; I can't justify … this, and it is the same way with the campgrounds. If we want to go camping right now, there isn't a campground except for [one] up the [canyon] that's opened. Everything else has got a gate across it (Recreation Visitor A).

Unmanaged recreation is seen by some to be linked to a lack of commitment, prioritization, resources, and personnel on the part of the Forest Service to properly manage OHV recreation. This inability is thought to contribute to natural resource damage. A representative of the Blue Ribbon Coalition, a group that advocates for public access to public lands, wrote:

> According to the Forest Service, OHV recreation is enjoyed by more than 36 million people on a national basis. Rather than recreationists being the "problem," I submit that the lack of prioritization or commitment to recreation management by federal agencies, the administration, and Congress has resulted in some degradation of resources 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 non-motorized recreation community also has its views. The primary non-motorized, or human-powered, recreation pursuits on the national forests include hiking, studying nature (e.g., birding, wild flowering) backpacking, paddling, non-technical climbing, cross-country skiing, and snow shoeing. Recreation visitors who participate in such activities tend to see themselves as contemplative, appreciative, and quiet forest visitors. In response to the Forest Service's request for comment on its 2004 proposed rule to designate routes for OHV recreation, representatives of 63 human-powered recreation organizations responded in a letter:

> 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 presenting 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 (American Hiking Society 2004).

From the perspective of these non-motorized recreation visitors, unregulated motorized recreation defines the unmanaged recreation problem. The non-motorized community may largely support the proposed federal rule to designate routes for OHV recreation in a manner that controls and limits motorized recreation, which they currently view as an unchecked threat to the resource and their preferred activities. 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 in this section.

Although there seems to be some consensus that the agency is constrained in its abilities to properly address unmanaged recreation, motorized and non-motorized recreation visitors are generally polarized—both sides see the other as the problem. While discussing the image of

motorized recreation, one recreation visitor expressed sentiments that non-motorized activities are causing resource impacts as well.

> [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 is horses and backpackers and see the environmental damage that they are doing (Recreation Visitor A).

Polarized views are well-organized. Motorized and non-motorized recreation visitors as well as conservation organizations (e.g., Wilderness Society 2005) often are formally organized into local clubs and state and national associations with influential leadership, officially published bylaws, and position statements for recreation issues. Organized 4x4 clubs, for example, tend to socialize their children and educate their members regarding the norms and various characteristics of their outdoor recreation activity and the relevant management issues. Organized clubs and associations advocate for and volunteer substantial amounts of time to manage their preferred types of recreation activities on National Forest lands. Representatives from the Forest Service often partner with representatives from the recreation organizations to share ideas and to coordinate volunteer-based activities, which plays an important role in outdoor recreation management. However, more communication among motorized visitors, non-motorized visitors, other recreation visitors, private land owners, conservationists, and the Forest Service is certainly needed to defuse the unmanaged recreation problem, particularly at the level of local hotspots of conflict on National Forest lands.[16]

C. Conflicting Resource Values and Wickedness

A key informant interview was conducted with a local representative from the conservation community working on the motorized recreation issue in Colorado. From a broad environmental

protection view, unmanaged recreation is an emerging large-scale issue with potential to substantially affect the National Forest System similar to the mining and timber industries.

> Interviewer: … what does the term unmanaged recreation mean to you?
>
> Interviewee: 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, and nobody imagined—of course we had the road proliferation in the twenties I guess, but only in the last decade has recreation become [an unregulated boon] … it seems to me that recreation is sort of the new unanticipated use of the national forest that does not yet have it's own Organic Act. It is kind of an exciting period to be in because we desperately need one … all of us wish that we had written 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, so unmanaged recreation is a brand new use that had not ever been defined or regulated or managed.
>
> Interviewer: … do you think that it is unmanageable right now?
>
> Interviewee: No, not at all. It is just there is no funding. … especially I mean—I don't know the other regions, but this region and for example … the supervisor of this forest, and certainly [district rangers], I think have developed some pretty sophisticated concepts for how to manage motorized and mountain bike recreation and all kinds of recreation, which I think are on the right track. It is just that there is no funding to implement their concepts that I think are going to be very effective.

This exchange highlights the observation that stakeholder groups have different desires regarding recreation management, and they are not yet working together to address the unmanaged recreation problem on National Forest lands. The problem is again connected to motorized recreation and is not necessarily seen as unmanageable for the Forest Service given the provisions laid out in Executive Orders 11644 and 11989 but rather federally under funded and under staffed making implementation of existing management strategies unrealistic (e.g., The Mountaineers 2004).

The unmanaged recreation problem is inextricably linked to conflicting environmental values and worldviews held by different stakeholders. The problem becomes wicked and fraught with uncertainty when environmental values are central to the debate over unmanaged recreation and how it should be addressed (Pellizzoni 2003).

> Interviewer: … How does the conservation community in and around [this forest district] see the problem or define the problem … what ways are they thinking about it?

> Interviewee: We really come to this and all issues 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 sort of … a conservation biology background, certainly talking to [other people—they'll] tell you 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, so from that point of view, the principle impact to ecosystems that we think recreation has is habitat fragmentation because trails are continuing the fragmenting effect of roads … conservation biology says that one of the biggest threats to species today is fragmentation … so we are really, really concerned ultimately that what used to be remote, pristine, quiet, inaccessible backcountry and secure habitat for species that are sensitive to human disturbance that those areas are being discovered and entered by people, which was never possible before the new recreation technologies were invented.
>
> Interviewer: … you spoke a little bit about the intrinsic value of nature, that it has a right to exist … Do you think that there are off-road vehicle users that … recognize that intrinsic value?
>
> Interviewee: I think so. I've never really pulled that out of any of my … off road vehicle compadres. It gets very murky because … right now in our kind of social dialog in the country, enviros are being marginalized as sort of anti-human, anti-access and the view that I express is being a little bit marginalized, and I guess a dialog that really kind of is an example of what you are talking about is this … open space debate that's been going on, and it is mountain bikes and horses and people with dogs versus the pure nature advocates like me, and so we have been debating if people can go off trail and if their dogs can go off leash and stuff like that, and certainly the mountain bike community here … considers itself to be conservationists, and they think that we are using fake science and over zealous 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 protect nature. That's how I would characterize their conservation ethic.
>
> Interviewer: … it seems to come down to the debate of whether people are a part of [nature] or not …
>
> Interviewee: Yeah … I don't know if that will ever be resolved. If you keep us out of nature and you have a pristine wilderness, and I mean—certainly humans have always been part of nature, but at the current population levels and numbers and levels of technology. It is difficult to continue the same integration that we used to have with nature.

Facts and values overlap in the unmanaged recreation problem. One apparent fact is that there is increased recreation participation on a limited amount of national forest land leading many to believe that the land and the recreation experience are seriously jeopardized. Nonetheless, it is unclear and undecided for the people involved how their values and desires fit into the situation. For one particular hotspot in Colorado, Left Hand Canyon, there appears to be some shared awareness about the unmanaged recreation situation with no clear consensus over a single prescription for what to do about it or what the outcomes of management will be. Solutions based on the facts alone cannot adequately address the inherent values that are muddying the unmanaged recreation problem.

> Interviewer: … Do you think that other stakeholder groups or other people … agree on what unmanaged recreation is or is not?
>
> Interviewee: I think so. … I think that 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, … there are other places in [this] ranger district that are becoming Left Hand Canyons. 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 …
>
> Interviewer: So, the problem is being recognized?
>
> Interviewee: … Yes, but it is terribly fraught with anxiety because the parameters are being narrowed down and the amount of land is narrowed down and the population is growing, so 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 because the motorized—the motorcycle people here, for example, used to be able to ride in the wilderness areas and then … the fires we've had and then the right-of-way private land closures and then all the developments and subdivisions and all the in-holdings … but their original riding opportunities and trails are being very drastically restricted, so they are just 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. It is unlimited demand colliding with a limited land base.

Unmanaged recreation can be characterized as having no one right solution on which people may agree. While conservationists may view closing a hotspot area or limiting recreational use as the proper solution, motorized recreation visitors that use the area may view an additional closure as part of the unmanaged recreation problem. People are interpreting aspects of the problem differently based on their values. Both environmental protection advocacy groups and motorized access advocacy groups feel that their views and values are marginalized and largely unconsidered in the controversy over how to properly managed outdoor recreation. They each believe that they are losing what they hold most dear, so they each conceive the solution in terms of preserving what they hold most dear making the problem intractable. Pellizzoni (2003:206) describes the dilemma:

> What is lacking is a single description and connection of the facts, a shared vision of the meanings of concepts and principles. Facts become soft, and values hard. It is increasingly difficult to distinguish between them.

When the values and perspectives of other stakeholders that were not addressed in this article such as private land owners and the commercial recreation industry are considered, the unmanaged recreation problem becomes increasingly fragmented:

> The fragmented pieces are, in essence, the perspectives, understandings, and intentions of the collaborators … The more parties involved in a collaboration, the more socially complex. The more different those parties are, the more diverse, the more socially complex (Conklin 2001).

Desperately hoping that the Forest Service directs more money and law enforcement toward the problem seems to be an insufficient resolution, albeit one having some consensus.

VII. Implications of Wickedness for Unmanaged Recreation

In the previous section we described stakeholders' perspectives relevant to the problem and how these create wickedness. Next, we discuss implications of the wicked nature of the problem for formulating approaches to address unmanaged recreation on National Forest lands.

An intractable controversy such as unmanaged recreation moves decision-making and planning beyond linear problem solving and rational science. The Chief of the Forest Service acknowledges that unmanaged recreation is a wicked problem:

> Dealing with the Four Threats is not primarily a matter of finding technical solutions. Each threat has social, economic, and ecological components that are complex and extremely difficult to reconcile, whether its fire and fuels, invasive species, loss of open space, or unmanaged outdoor recreation. We can't simply apply technical or regulatory solutions and hope to succeed—the OHV issue, for example, is not just a matter of law enforcement (Bosworth 2005).

The Forest Service appears to recognize the wicked nature of the unmanaged recreation problem, but it is not clear that the implications of this wickedness for addressing unmanaged recreation have been acknowledged. The Forest Service is similar to other stakeholders in that it *values* protection of natural resources on its lands and quality outdoor experiences for recreation visitors. The Chief of the Forest Service described the agency's mission:

> Federal agencies like the Forest Service are generally guided by a mission with a basis in law. You sometimes hear people complain that the Forest Service doesn't have a clear purpose anymore—that our mission isn't clearly enough defined by Congress, … Here is our mission statement: 'To sustain the health,

> diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.' … that seems clear enough. *But somebody else might see 'health, diversity, and productivity' a little differently … And different people are going to have different needs that will sometimes come into conflict* (Bosworth 2004a, emphasis added).

The needs and values of various publics served by the Forest Service will continue to change over time and across forest districts making it difficult for recreation managers to rationally predict future scenarios. Linear thinking and optimization models used to create performance standards and management tools for generalized application across recreation problems and settings are ill-suited for addressing unmanaged recreation. More data and more computer models will not solve the unmanaged recreation dilemma. Taming the problem by reducing it to smaller more manageable problems that are straightforward and analytical in nature tends to fail in the long-term and may exacerbate the situation in the short-term (Conklin 2001). Leadership in the Forest Service recognizes the need for a different approach.

> The Forest Service is not all one thing for all time. We have changed over time, and will continue to change. Unless we do, we will not be able to meet the challenges ahead or the changing needs of the people we serve. That doesn't mean blowing in the wind; we remain committed to a land ethic. But it does mean that *sustainable forestry isn't a single narrow prescription*—so many trees of such-and-such a size in such-and-such an area. Ecosystems are more dynamic and resilient than that, so our focus has to be on long-term outcomes, not short-term prescriptions (Bosworth 2004a, emphasis added).

The Forest Service faces a dilemma. One of The Four Threats, and likely the other three are wicked problems. With respect to unmanaged recreation, the wickedness has been acknowledged by the Chief of the Forest Service. However, current operating conditions are calling for performance standards that allow for quantification of outcomes to demonstrate efficiency in government budgets and spending (GAO 1998, 2003). Approaches for addressing wicked problems in general do not allow for quantifiable or objective measures of success. Wicked problems require non-traditional solutions (Allen and Gould 1986:23):

> Analytic models will continue to contribute to tactical management—they handle short-term, quantified situations nicely. However, long-range forest plans involve power struggles, imprecise goals, fuzzy equity questions, and nebulous information and thus become wicked. Innovative solutions will be required.

Addressing unmanaged recreation calls for internal change for the Forest Service and the development of alternative processes and strategies. The initial objective should be to mutually understand social context and stakeholder values at the local scale including the views of local experts in the agency. When refining and implementing the proposed federal rule to designate a trail system for OHV recreation, for example, the Forest Service should design work plans for local hotspots rather than develop strategies for the region or forest level. Even some forest districts may be too large and diverse for standardized recreation planning and management. Large-scale centralized and unified planning simply does not work for addressing wicked problems (Allen and Gould 1986; Pellizzoni 2003).

When addressing the wickedness inherent in the unmanaged recreation problem, an atmosphere of inclusiveness and a philosophy of pluralism are necessary. Inclusive participation at the local level provides unique insights and understandings of recreation management problems, fosters social relationships, and builds local networks all of which enable collective action. As the Forest Service plans how to approach the unmanaged recreation problem, it should seek out other participants and interest groups, other contexts, other concerns, and other problem definitions relevant to the local situation (Pellizzoni 2003).

Research methods for addressing the unmanaged recreation problem should not focus on measuring public consensus or opinion in the form of a shared principled view of the majority. It appears that the organized interest groups at the national level are basing their positions on values to create an intractable "us against them" controversy over the management of outdoor recreation on public lands. When designing and implementing plans, recreation researchers and managers should seek local answers based on all the involved participants' positions and insights regarding specific hotspots of conflict rather than

appealing to the polarized views of stakeholders evident in national level debates. Since these positions are not well-organized, they are often difficult to identify, but in the context of increasing social complexity that characterizes the unmanaged recreation problem, inclusive approaches that seek local context over generalization will succeed (Pellizzoni 2003).

The people involved in a local collaborative effort to address a problem of unmanaged recreation on their portion of a national forest are the key to its resolution. Allen and Gould (1986:23) concluded their analysis of wicked planning problems with this point.

> People are what make problems wicked, and people are the ones who can solve them. Emphasis on people within the organization and on external customers is the central element when wicked problems are successfully handled.

VIII. Conclusion

There are substantially large numbers of citizens in the United States participating in technologically diverse and potentially incompatible forms of outdoor recreation on limited amounts of national forest land managed for *both* recreation and natural resource protection. Growth and expansion of urban population centers adjacent to National Forest lands is a major factor contributing to increased levels of participation in outdoor recreation and diverse conflicts. The situation is exacerbated by inadequate funding and staffing for most recreation and monitoring programs administered by the Forest Service such as efforts to consistently sign and monitor recreation trails and roads.

The diverse and numerous groups of people that may have stakes in the unmanaged recreation debate may 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 both researchers and managers of outdoor recreation because it is shrouded in radical uncertainty, which results from disagreement over the definition of the problem, the

strategies for resolving the problem, and the outcomes of management and incomplete knowledge about recreation visitor's values and relationships relevant to each other and the land. Overcoming wickedness requires a local social process that involves intensified communication and collaboration among all stakeholders with an interest in hotspot areas of recreation conflict. Solutions will be temporary and place specific.

Similar to the other threats to National Forest lands, unmanaged recreation typifies numerous, dynamic, and technologically sophisticated interactions between society and natural resources. Conservation ecologists often use a cliché to describe our current environmental situation: *tinkering with nature leads to more tinkering*. In this context, 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 management interventions. Despite our best intentions at rational control and efficiency in natural resource recreation management, there continues to be 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).

This paper was an attempt to describe the social context of the unmanaged recreation problem on National Forest lands. We provide a fundamental and contextually rich understanding of unmanaged recreation that appropriately acknowledges it as a wicked decision problem. Acknowledging the human values that underlie the problem has more clearly demonstrated the inadequacy of objective rational approaches for resolving unmanaged recreation. This analysis provides a foundation on which to design future research agendas and management activities that address the myriad contentious issues facing the Forest Service as it reforms outdoor recreation management in the 21st century.

Notes

1 We applied a participatory rapid assessment technique because of the exploratory nature of the study and our (i.e., the recreation research community) rather limited understanding of the wickedness inherent in the unmanaged recreation phenomenon. Rapid appraisal provides relatively quick qualitative results that tend to be imprecisely correct and rich in local context; a rapid appraisal can prevent decisions that are precisely wrong in terms of local context (Beebe 1995:49). The findings and insights of an appraisal of this nature can be used to guide decisions about what additional research is needed or to guide initial design and implementation of basic research and management activities. We used established methods from the social sciences in this appraisal, but we do not suggest that this study substitute for more long-term, in-depth studies.

2 Researchers have previously identified and described frameworks for environmental management and policy problems that fit a wicked definition. See Allen and Gould (1986) for a discussion of wickedness in public forest management; LaChapelle and others (2003) for a discussion of fundamental and institutional barriers to participatory planning; McCool and Guthrie (2001) in the context of ecosystem-based planning; Nie (2003) for a discussion of the driving forces in natural resource-based political conflicts; and van Bueren and others (2003) for a policy network analysis of the debate over levels of zinc buildup in the environment.

3 Some newcomers who fail to assimilate to their new environments leave within relatively short periods after arrival (Beyers and Nelson 2000).

4 In counties of the Middle-Atlantic region of the Unite States, Glasgow (1995) found that migration by people age sixty and older was associated with increased use, on the part of the in-migrants, of public services related to outdoor recreation.

5 In the West, the urban national forests are located in southern California, central Arizona, along Colorado's Front Range, north-central Utah, and in the Pacific Northwest. The most popular recreation activities on urban national forest ranger districts are typically numerous and diverse including, hiking, camping, picnicking, walking trails, hunting, target shooting, wildlife viewing, fishing, sightseeing, driving corridors, mountain biking, and photography (Bricker and others 2005).

6 In addition, Chavez and Tynon (2000) reported murders, suicides, gang activity, domestic terrorism, satanic cult rituals, arson, and dumping of chemicals on urban national forests.

7 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 Forest lands has increased 100 percent (Laitos and Carr 1999).

8 See Roper ASW (2004) for an exception that documented actual decline in participation for some activities between 2001 and 2003 particularly for Americans aged 18-29; Dwyer (1995) predicted decreases in recreation visitors but increased diversity among future visitors into the next century.

9 Cordell reported on 37 nature-based recreational activities, including 32 non-motorized and five motorized activities, in which millions of Americans aged 16 or older had participated. A 2004 report estimated that approximately 62 million people (i.e., combined total for snowmobiling and driving off-road) had participated in the fastest growing motorized activities within the past 12 months of the survey; about 225 million people (i.e., combined total for viewing/photographing birds, day hiking, backpacking, and primitive camping) were estimated to have participated in the fastest growing non-motorized recreation activities during that period (USDA Forest Service 2004e). The research literature on the

effects of motorized recreation has documented a variety of physical and social impacts of concern (Stokowski and LaPointe 2000). Knight (1998) warned, however, that outdoor recreation of any type, regardless of activity style or mode of transport, is not benign when it occurs in excess, and if not properly managed, outdoor recreation can be as devastating as over logging or over grazing.

10 Technological advancements affect recreation on the National Forest lands in multiple ways. Ewert and Shultis (1999) developed a typology of technological effects and implications for outdoor recreation that described five broad topic areas for research and management including (a) access/transportation, (b) physical comfort for visitors, (c) visitor safety, (d) communication, and (e) information.

11 This U. S. General Accounting Office study examined funding and staffing for OHV recreation at four areas managed by the U. S. Bureau of Land Management (BLM) and on four Forest Service ranger districts in the Intermountain West and California between December 1993 and June 1995.

12 In 2004, the total budget of the USDA Forest Service was 4,723 million dollars; this budget will decrease by an estimated 660 million dollars in 2006 (OMB 2005). The national 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).

13 We recognize that our current analysis of stakeholder perspectives and interest groups is incomplete. This lack of knowledge and understanding contributes to the wickedness and uncertainty of the unmanaged recreation problem. We make no claims of representing the entire population of stakeholders or their views in a manner that generalizes across the Front Range of Colorado.

14 Recreational activities categorized as in between motorized and non-motorized tend to involve some form of non-human mobility and/or some type of "noisy' recreation technology other than traditional OHVs including car camping, horseback riding/equestrian sports, mountain biking, recreational target shooting, geo-caching, paint ball gaming, technical rock climbing, and hunting. In addition, 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 extremism and an attitude of conquering nature; these new developments bring controversies and challenges for national forest managers (Ewert 2001; Hollenhorst 1995). For example, geocaching employs GPS technologies and internet communication to orchestrate a type of off-trail, hide-and-seek treasure hunt in the backcountry. The secretive and clandestine nature of geocaching makes it difficult to monitor both the individuals who hide and those who seek the caches (Frawley 2005). These recreation activities contribute to the social complexity and wickedness of unmanaged recreation, and deserve further research attention beyond the scope of this article. This article focuses on motorized and non-motorized recreation visitors in the interest of space and time. We recognized that many other types of outdoor recreation are important and relevant for understanding and addressing unmanaged recreation.

15 There are five primary groups of motorized recreation visitors on the National Forest lands who either operate off-highway motorcycles (OHMs), all-terrain vehicles (ATVs), four-wheel drive jeeps, trucks, or other passenger vehicles (4x4s), over-snow vehicles such as snowmobiles (OSVs), or personal watercraft (PWCs) and other watercraft such as jet boats. Personal water craft are operated on lakes, rivers, and reservoirs some of which are managed as public waterways, and are highly maneuverable and capable of traveling at high speeds. The appropriateness of operating snowmobiles and personal watercraft on public lands continues to be a question for debate and should be considered an important aspect of the motorized recreation issue (Davenport and Borrie 2005; Estes 2001; Smith and others 2001). These five categories of motorized recreation are not homogeneous. Recreation conflicts are common within and between the various motorized groups and should be investigated by recreation researchers in the future. To make the analysis presented here manageable, we focus on insights from interviews and participant observation

with national forest visitors who operate 4x4s and ATVs in Colorado's Front Range. The first author become acquainted and informally affiliated with two locally organized 4x4 recreation clubs to conduct interviews and participant observation. Documents available on the internet that express the general views and positions of the various interest groups were reviewed to supplement the analysis.

16 People who recreate on the National Forest lands who do not belong to any organized group are important participants in the problem. Recreation managers may have no formal relationship with most unorganized recreation visitors and are uncertain about the type and extent of socialization and education regarding a sport or activity for those visitors. Lone recreation visitors and those visiting the forest in small informally organized groups for all activities should be included in future research on the social context of recreation on National Forest lands.

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