



Research Article

Muddling through it: Analyzing public land manager perspectives on recreation allocation

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ABSTRACT

Demand for recreation on public lands has outpaced supply in many highly popular locations in the United States of America and globally. The task of distributing these limited recreation opportunities among individuals or groups (known as allocation) has long plagued recreation managers. However, limited empirical information is available concerning best practices for selecting an allocation mechanism (e.g., permits available through first-come, first-served, open reservations, lotteries, etc.) that best meets the management objectives and constraints of a given site—including temporal considerations of booking windows. Thus, managers are left with little in the form of best practices for navigating the natural trade-offs that exist between the available allocation mechanisms. This research seeks to illuminate how recreation managers across federal and state agencies approach the allocation of recreation resources for their management areas by asking what has gone both well and poorly when allocating these resources, as well as what limitations may exist to achieving equity and efficiency during these processes. Semi-structured, in-depth interviews with 50 recreation managers across the U.S. reveal that managers have nuanced concerns when making allocation decisions, with numerous trade-offs identified. Managers highlighted goals and objectives including variety and flexibility, and observed success when effective communication was maintained internally and externally. Managers encountered challenges related to the design and enforcement of allocation mechanisms, as well as in public education efforts. The findings highlight the potential value of collaborative planning with visitors when making recreation allocation decisions, as well as varying recreation allocation systems across space and time.

Management Implications

- This research distills the recreation allocation conversation into a tractable story for managers to utilize when communicating the nuances of allocation decisions to the public, and can help support collaborative planning by articulating the nuances of why allocation is needed as well as trade-offs that exist when developing and implementing suitable systems.
- Managers highlighted the need for variation and flexibility in allocation approaches, suggesting the potential for variation in

types and design of recreation mechanisms across space and time to provide opportunities for different recreators to realize their preferred experiences across a regional spectrum.

- National-level guidance could clarify what equity means in an allocation context to provide support to managers faced with difficult allocation decisions.

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1. Introduction

The previous 60 years has seen spirited debate concerning how limited wildland recreation opportunities (e.g., river permits and backcountry permits) should be divided among the recreating public in countries with complex public land management contexts, such as the U.S. Historian Roderick Nash summarized the stakes of recreation allocation in dramatic, albeit apt, terms:

Deny access to a wilderness to a person who lives it intensely, and you have significantly diminished the quality of his life. Remember, too there is no civilized substitute for a wilderness experience. Parenthetically, neither is there a satisfactory substitute for a person who one is in love. The stakes in the matter of wilderness access are not greatly different ... because of the emotional dynamite underlying wilderness allocation. (Nash, 1981, p. 21)

The task of distributing limited public land recreation opportunities among individuals or groups (known as allocation) has long plagued recreation managers in the U.S., beginning with early permit systems on western rivers (Nash, 1977). While the U.S. has a vast amount of public land for visitors to enjoy, there is a complex web of statutes and regulations that in some cases place restrictions on entry to these public lands, thus differing from other models around the globe such as open access regimes. Today the issue remains fraught, with noted allocation issues remaining unresolved across many countries without universal public access (Greatrex, 2024; Kwak-Hefferan, 2023; Rosalsky, 2023), and no universal system or guidance for managers to base decisions on. In the U.S., many of the nation's most iconic and high-quality recreation experiences are subject to use limits, and therefore necessitate allocation of limited opportunities. Those hoping to raft the Grand Canyon, camp in Yosemite Valley, visit Glacier National Park, or take a ferry to the Statue of Liberty must obtain a permit, reservation, or ticket from a limited pool. Every system of allocating these recreation experiences requires manager decision-making.

The need for greater understanding of the manager experience of allocation is at the root of some of these issues, with questions around how recreation managers make these difficult decisions needing clarification as well as what strategies have been successful and what obstacles exist during the process. Even as research emerged to improve understanding of the visitor perspective and experience concerning allocation beginning in the 1980s (Danley, 1980; Loomis, 1980; McCool & Utter, 1981; Shelby et al., 1989), research on the manager experience has lagged. Thus, the purpose of this present research is to create a baseline understanding of the U.S. recreation manager experience with outdoor recreation allocation.

1.1. Context for recreation allocation research in the U.S.

Early academic discourse on recreation allocation varied from the applied to the bizarre. Noted neo-Malthusian and eugenicist Garrett Hardin (Hardin, 1969) proposed using a physical test “to restrict the wilderness to physically vigorous people” (p. 24), calling the latter method “inherently sensible” (p. 24). While Hardin's suggestion for physical tests as means of allocation was not heeded by managers (though noted by Stankey and Baden (1977) in their U.S. Forest Service report summarizing the issue), his call for market-based rationing was echoed by policy suggestions from the U.S. Federal Reserve Bank (Bechter, 1971). Along with pricing, additional allocation strategies followed, including reservations, lotteries, and queuing or first-come, first-served (Shelby, 1981). As recreation managers trialed different strategies, research followed to support the construction of formal definitions within the burgeoning field and examine the efficacy of various allocation mechanisms.

McCool and Utter (1981) provide the seminal work toward the former goal by delineating allocation into two sub-categories: allotment and rationing. Allotment refers to the allocation of limited recreation

opportunities (e.g., campsites, river permits, parking spaces, etc.) between groups (e.g., commercial and non-commercial users, different activity styles, tribal and non-tribal members, etc.). Following allotment decisions, rationing is then required to allocate limited opportunities within groups (McCool & Utter, 1981). Early research on rationing via reservations was conducted by Magill (1976) in the context of campgrounds. Research examining lotteries was primarily conducted on Wild and Scenic Rivers in the western U.S. (e.g., Loomis, 1980; McCool & Utter, 1982; Welsh, 1998). In many early studies, first-come, first-served was typically used as a baseline condition to which other strategies were compared (e.g., Burnett III, 1973; Magill, 1976; Stankey, 1979). Along with efficacy, other areas of research interest included equity (including the impacts of systems on visitation; e.g., Crompton & Chuan Lue, 1992; Glass & More, 1992; Phillips & Rice, 2024), willingness to try systems (Danley, 1980; Shelby et al., 1989), and visitor preferences for systems (Dimara & Skuras, 1998; Fleming & Manning, 2015; McCool & Utter, 1981, 1982; Rice et al., 2024). However, research on manager perspectives concerning rationing has lagged behind (with the exception of Wikle, 1991)—leaving this portion of the allocation experience largely unexplored.

1.2. The need for manager perspectives

Managers are generally considered understudied in social science exploration of recreation management, when contrasted with the amount of research focused on recreationists and park visitors. While very little research to date sheds light on the manager perspective on allocation, recent research of managers' perspectives on visitor use management (Fefer et al., 2018; Moyle et al., 2014; Rice et al., 2021) provides important insights concerning the necessity of understanding the manager point-of-view. Fefer et al. (2018) note a gap in recreation management research associated with research directly studying managers: “We recognized a gap in the recreation research, where qualitative studies focused on decision-makers themselves have been neglected” (p. 1564). Rice et al. (2021) argue that while much effort has been made to understand the social, ecological, and managerial components of the protected area setting, the human element of the managerial setting is important to monitor—though often neglected: “Managers and park partner organizations not only maintain and steward park resources, but they too, are park resources ...[enduring] very real impacts from increased visitor use and shifting recreation trends” (p. 66).

The limited research insights available on manager perceptions of allocation stem from Wikle (1991), wherein the author finds divergent perceptions of acceptable rationing policies between river recreationists and managers. The findings stem from 1) a survey of 1400 river recreationists on the Missouri River in Montana, the Colorado River in Utah, the Current and Jacks Fork Rivers in Missouri, and the Allagash Wilderness Waterway in Maine and 2) a survey of 100 river managers across 50 rivers managed by state and federal agencies in the U.S. Specifically, Wikle (1991) finds managers to be significantly less accepting of rationing via advance reservation and merit (i.e., weighted lottery) than the river recreationists—likely “tied to administrative difficulty” (p. 392) related to implementing these particular rationing mechanisms, such as implementing a lottery, deciding how to design a reservation system (e.g., booking windows and method of making reservations), and deciding how the lottery should be weighted. With the majority of research on this topic focusing on the visitor perspective, these limited findings underscore the need for more research on the manager experience of allocation. Thus, the questions we seek to address through this present study are.

- 1) What are the primary concerns of managers when making allocation decisions?
- 2) When creating or trialing recreation allocation systems, what has worked well and what obstacles exist?

- 3) What limitations do managers face when attempting more efficient and equitable allocation strategies and what policy or technical limitations exist to this end?

2. Methods & analysis

2.1. Participant recruitment

Following previous qualitative research focused on better understanding the manager experience and manager perspectives (Fefer et al., 2018; Moyle et al., 2014; Rice et al., 2021), we addressed this research gap by conducting in-depth semi-structured interviews with recreation managers at federal and state agencies that have experience with allocating recreation resources to explore the goals and objectives that these managers have in mind when designing allocation systems and the obstacles and limitations they face when attempting more efficient or equitable allocation strategies. A purposive sample of 50 recreation managers that allocate use was identified via a U.S. Forest Service (USFS) community of practice on recreation allocation and public recreational policy for each management area. All participants were recruited by USFS staff via email. If a recreation manager did not have experience or knowledge regarding the research questions, but knew other staff that potentially did, we used snowball sampling to contact these recommended staff members (Palinkas et al., 2013). Initial contact with agency staff was made via email, and interviews were conducted either on the phone or via Teams.

An initial email was sent to the list of potential interview participants outlining the project and requesting an interview. The study purpose and goals, who was conducting it, and a list of contact information if participants had any questions were included, along with a link to sign up for an interview time slot (Dillman et al., 2014). Additionally, the email let participants know that all interview transcriptions and analysis would be kept confidential, including participant names, agencies and roles. This level of confidentiality was viewed by both the research team and the USFS project partners as a necessity to ensure candor in discussions with managers. A second email was sent as a reminder after two weeks if no response was given, emphasizing why hearing from this participant was critically important to this study (Dillman et al., 2014). If no response was given within four weeks of the initial email, a final email was sent as a reminder that the study would be drawing to a close shortly.

In total, 50 interviews were conducted with individual recreation managers during October and November 2023. Two of the managers interviewed were from state agencies, 3 interviews were conducted with staff from a non-profit organization that administers a voluntary allocation system on behalf of managing agencies and the remainder of interviews were conducted with federal land management employees. Federal agencies represented among interviewees included the Bureau of Land Management (7), National Park Service (4), U.S. Fish and Wildlife Service (1), and U.S. Forest Service (33). Types of recreation allocated by these interviewees included campsites, river access, trail access, wilderness camping, tours, and hunting opportunities. Interviews lasted between 19 and 63 min, averaging 38 minutes. 50 additional managers who were asked to participate in an interview did not respond, including managers from the U.S. Forest Service (34), National Park Service (9), Bureau of Land Management (5), California State Parks (1), and Parks Canada (1).

2.2. Interview facilitation and analysis

A semi-structured interview guide of 10 questions was utilized to structure these interviews, with pre-determined contextual follow-up probes included to guide the conversation (e.g., What limitations do you face when attempting more efficient allocation strategies? What about policy or technical limitations?). Specific terms used in the interview questions (e.g., allocation, allotment, rationing, equity) were

defined prior to the interview in a viewable chat box to clarify any ambiguity for the participants (see definitions in McCool & Utter, 1981; Secretary's Order No. 3406, 2022). Respondents were asked permission to record the interviews, and they had the right to refuse participation at any time. Interviews were recorded with interviewee consent, with prior Institutional Review Board approval (IRB #96-23).

Interviews were then transcribed using Otter.ai, and coded and analyzed using NVivo software to identify common themes and sub-themes related to the main research questions about allocation decision making. These themes were coded following the guidance of Rubin and Rubin (2012), and emerging themes were systematically organized using an inductive thematic analysis driven by the data (Braun & Clarke, 2012; Saldaña, 2014), rather than using an a priori theory to deductively code interview data. For a theme to rise to the level of saliency, it needed to arise, at a minimum, across three interviews. The more a theme came up across interviews, and the more it was emphasized across interviews, the more saliency it garnered in our analysis. Intercooder reliability was performed within the research team to ensure proper coding of emergent themes to increase the reliability of the coding (Rose & Johnson, 2020). Check coding with several participants was performed to ensure that the interviewees agreed with summarized results, and consisted of sharing the coded interview findings with several interview participants and presenting these findings over a video chat in a presentation format, followed by discussion and identifying any discrepancies.

Confidentiality of subjects was maintained throughout the study, and no names were included in the transcripts, analysis or reports for this study, using anonymous quotes in project reports. To ensure candor among interviewees and protection from potential internal or public scrutiny, any identifiable information (e.g., names, position titles, management areas, and agency affiliations) were removed and will not be linked to any quotes, discussions, write-ups, or presentations, as defined in the interview consent section of this study's Internal Review Board approval (IRB #96-23). To improve the credibility, dependability, and trustworthiness of the research team, a collaborative approach was utilized following strategies outlined by Lincoln and Guba (1986) and Guba and Lincoln (1994). The research team consisted of federal agency social scientists and managers with extensive backgrounds in recreation management, as well as university researchers with significant expertise in recreation management. By working together collaboratively throughout the interview process, multiple levels of iterative coding and discussions improved the quality of the data and analysis.

3. Results

Participants were asked about their primary concerns (Research Question 1) and what has gone well and poorly (Research Question 2) when allocating recreation, as well as obstacles and limitations to efficiency and equity (Research Question 3). Importantly, participants typically mentioned the basic motivation for developing rationing systems as being about balancing resource protection with maximum recreational access and enjoyment, in a way that is consistent with policy and planning processes. Of primary relevance herein, once a decision to allocate recreation was made, managers reflected broadly about the goals and objectives of an allocation system, as well as obstacles encountered throughout the process and limitations to achieving efficient and equitable allocation systems. Both the goals and objectives, and the obstacles and limitations can be organized into three broad categories which align with the approach to management outlined in the IVUMC Visitor Use Management Framework: *engineering*, *education*, and *enforcement* (U.S. Interagency Visitor Use Management Council, 2016). While this framework was not chosen prior to analyzing the data, after coding emerging themes, it became clear that the emerging core themes (e.g., system design, communicating with and learning from the public, and enforcing these systems) were similar to the IVUMC Visitor Use Management Framework's approach, and the authors chose to organize the results using this terminology to make the results more applicable to

the management community—as these are terms commonly used in practice. The U.S. [Interagency Visitor Use Management Council \(2016\)](#) defines engineering as, “site design, construction, and maintenance ... most commonly employed to modify the location and spatial distribution of use and to increase the ability of sites to withstand use” (p. 47). Education is defined as “... most commonly employed to modify visitor behavior, adjust visitor attitudes and expectations, and alter the spatial and temporal distribution of use,” and enforcement is defined as “regulations with enforcement ... to implement all management strategies” (p.48). [Table 1](#) provides an overview of our findings, and in the subsequent sections we provide additional details and illustrative quotes within each theme.

3.1. Goals and objectives

3.1.1. Engineering

Participants stress the need for equitable and fair allocation systems. When *engineering* or designing such systems, many participants highlighted the objective for allocation systems to be accessible, both logistically and financially. Manager 19 noted:

What we think about now is equitable access. So does our permit system allow for people with or without internet access, with or without the time to go to a visitor center, with or without the money to pay a reservation fee, you know, trying to provide the range of opportunities for the predictable range of public needs.

Equity concerns were mainly related to barriers caused by online-only systems, reservation and application fees, language, and type and timing of access that may impact who is and is not able to navigate these systems.

To achieve this desired goal of an equitable and accessible allocation system, there was a tendency for participants to highlight the need for

Table 1

Goals and obstacles when developing and implementing recreation allocation systems.

	Goals and objectives	Obstacles and limitations
Engineering	- Ensuring recreation allocation opportunities are logistically and financially accessible with variable and flexible systems. - Getting input from visitors and system administrators early in the process. - Balancing commercial use and private use, and honoring tribal treaty rights. - Encouraging visitors to use their recreation opportunities (i.e., limit no-shows).	- Lack of allocation-system templates, and national-level guidance. - Conceptualizing and operationalizing equity. - Politics, resistance to change, and fear of setting the wrong precedent. - Navigating user group tradeoffs - Creating customizable and nuanced online recreation allocation systems. - Addressing the no-show issue, and exploitation of the system.
Education	- Conveying why an allocation system exists, and how it works. - Setting expectations about the correspondence between the allocation system and the recreation experience. - Educating managers, system administrators, and visitors.	- Distinguishing the nuances of, and reasons for, recreation allocation. - Lack of expertise in facilitation, communication, outreach, and public relations. - National-scale administrative platform reduces interactions between visitor and local manager.
Enforcement	Consistency between design and implementation.	- Creating enough capacity to implement allocation systems. - Potential need for revenue-generating mechanism (i.e., fee) to build capacity.

variety in design to meet visitors' varying preferences and needs. For one river manager interviewed, variety was operationalized as using both a lottery and a rolling release of reservations to ration permits (Manager 11). For a campground manager interviewed, it was operationalized as holding 25 % of campsites for first-come, first-served use and releasing the remaining sites through a reservation system (Manager 18). For one wilderness manager, this meant requiring permits in some areas and not requiring permits at others (Manager 2). Other managers noted the success of instituting multiple booking windows (Manager 10, Manager 15, Manager 41, and Manager 7). As stated by Manager 15, “We want to give people the ability to plan ahead and we want the ability for people to be a little more spontaneous.” Thus, managers noted tiered booking window systems where 50 % of reservations were released, for example, six months in advance, while an additional 25 % were released one month in advance, and a final 25 % were released two weeks in advance. Additionally, several participants brought up concerns related to the spatial and temporal displacement of users resulting from recreation allocation—due to the failure to secure a permit for the desired area or time.

Providing appropriate commercial use opportunities for public access while balancing this with both private use opportunities and tribal treaty rights (as tribes are sovereign nations with treaty rights that the U. S. federal government has an obligation to honor) was seen as another important general goal. To this end, some level of collaborative planning and stakeholder interaction was considered important. As Manager 49 mentioned, it is crucial that users and stakeholders “actually understand what visitor use management is and why we allocate, so that they can support an allocation plan and see their own role in contributing to how an allocation plan would be designed so that it is equitable among affected parties.”

Flexibility in design and nimble rationing systems, including websites or other mechanisms used for rationing, was noted as a keystone for both ease of management and visitor experience. In one instance, this was exemplified by a system that allowed un-used commercial river permits to roll over to non-commercial use, if not claimed (Manager 35). In a Wild and Scenic River setting, this was typified by a system that is flexible to the varying travel patterns of hunters during hunting season (Manager 27). On another river system, flexibility in rationing was noted as a key means of ensuring tribal access (Manager 23). When describing their area's adaptive management plan, Manager 40 noted, “It's threading that needle between having enough of a plan and enough rigidity that it can't change by the stroke of a pen ... but the plan basically gives us the space to say, if you didn't get it right, you can fix the number. And it provides some leeway there.”

Participants voiced the shared observation that success is unlikely if a system is difficult to navigate, is perceived as unfair, or fails to reflect the nuanced needs of a resource and its users. The ability to navigate a recreation allocation system highlights a basic engineering need that a system works, from a technical standpoint, for both managers and visitors. Regarding ease of administration, several participants noted that moving toward a more technologically advanced online system would increase efficiency (e.g., phone reservations and in-person analog systems were considered inefficient). Generally, most existing (and generally all future) recreation allocation systems have moved to an online system administered through [Recreation.gov](#) (an online, nationally-scaled platform). An online system is considered desirable, particularly if arrangements can be made to support those who struggle to access and use online systems, for a variety of reasons. For instance, some managers mentioned that the consistency of the interface across recreation opportunities may be easier to navigate for visitors, and additionally the online option was generally seen as more accessible for those who are not local to the unit. As Manager 46 mentioned, “We have a lot of folks that just don't show ... I'll go walk around the campground and people are like, why are all these sites empty, they're reserved, but they're empty. And to me, that's a disservice to not only the resource, but the recreating public.”

3.1.2. Education

Parallel with, and after, allocation system design, *educating* visitors was noted as critical, specifically concerning: 1) why use is being restricted, 2) the varying tradeoffs managers navigate when designing a rationing system, and 3) the workings of the rationing system. Further, managers observed the importance of communicating with visitors to ensure that expectations match the reality of the experience. One river manager used an analogy of dining offerings to illustrate how poor outcomes can arise when expectations do not match experiences in situ, stating that visitors to a Taco Bell have one expectation of quality for a cup of coffee, while visitors to Michelin star restaurant (which may require a reservation months in advance) have a very different expectation. When a visitor expects a Michelin star experience, i.e., for a highly sought after wilderness permit, and has an experience more akin with a crowded, noisy frontcountry area, there is likely to be a negative expectancy disconfirmation (i.e., a mismatch between what is expected and what is received) (Manager 27).

Education requires effective communication, and participants noted that communication needs to flow among managers, between managers and system administrators, and between managers and the public. Some best practices surrounding communication included: maintaining regular communication (whether through an online or in-person working group or other means) between units managing access to single rationed resource (i.e., designated Wilderness area), ensuring that visitors have access to local staff for questions or concerns (especially when a local rationing system is transferred to Recreation.gov, facilitating, whenever possible, opportunities for visitors to interact with rangers prior to starting their recreation experience), and making sure that administrators of Recreation.gov understand the unique context of a given recreation resource and that information on Recreation.gov is clear and accurate. Manager 29 pointed out that providing users with multiple and diverse opportunities to provide input on a potential allocation system is crucial because “anything we do, especially recreation, it's not the projects or the limitations that people get upset about. It's the surprises.” In this way, Manager 29 is emphasizing that being clear and transparent with visitors can help ensure that experiences more align with expectations, and thus reduce the likelihood of negative disconfirmations (or bad surprises).

3.1.3. Enforcement

Finally, a general goal of an allocation system, which was mentioned by many managers, is that it is *enforceable*, or generally the design of the system is consistent with the implementation. As Manager 7 noted, “It's just a matter of operationalizing that [system] on the ground, and how do we communicate it. How do we enforce it?. It's quite a lot to deal with. I see people struggling with, you know, how are we actually going to enforce this on the ground?” This goal, while seemingly straightforward, is highly complex for managers, who are often also balancing many other duties besides managing an allocation system. Ensuring that visitors are not making multiple reservations in different locations during the same time frame, ensuring that visitors are cancelling reservations they do not intend to use, and following up with those who have broken the rules, are all time-consuming tasks that require a presence on the ground that many recreation areas do not have the capacity for. Managers in this study consistently highlighted the desire for a system that is enforceable within the specific constraints of their management areas, rather than a system that does not provide the real time feedback to effectively allocate visitor use and protect the resource.

3.2. Obstacles and limitations

3.2.1. Engineering

Once participants reflected on achieving the desired goals and objectives of a recreation allocation system, they were then asked about obstacles they have faced and limitations to efficient and equitable systems, which were highlighted across the engineering, education, and

enforcement categories. Limitations related to *engineering* and design included both conceptual and applied. Conceptually, there appeared to be a struggle related to just getting started and developing consistency in allocation systems across units. Manager 38 suggested:

Nationally, we should have some sort of a stack of five templates, or systems for allocation, allotment, rationing, equity, all of the things ... But if we had some templates to work off of, rather than everybody trying to create something from the ground up, we could start moving more towards some common systems.

Ultimately, while many managers acknowledged that each individual recreation area has different challenges and needs and thus require different plans, many others still highlighted the need for greater policy direction at a national level; there was an indication that managers felt overwhelmed by the challenging task. Manager 28 suggested, “I wish somebody would just come here, evaluate this mess, and say, this is what we think you should do ... and tell us where we're lacking and give us ideas and tools for improvement.”

As managers approached the increasingly stressed need to ensure that recreation allocation systems are both accessible and equitable, there was a struggle to define and measure equity. For example, respondents cited a lack of objective data to define whether or not access was equitable, and a lack of clear processes and standards to help define success in moving towards equitable allocation. Manager 49 asked, “Who's the arbiter of equity?” Manager 26 asked, “How do you allocate a scarce resource equitably? Who does that? How do you make sure you're using the right information and that you're using the right conduits to do that?” They later explained that “there aren't really any good tools for this at this point. We're kind of muddling through it and really leaning hard on our partners who do really great equity work.” Respondents also acknowledged that the process of allocation is, by definition, exclusionary, and that some groups (e.g., private/commercial users, wealthier users, tech savvy users, those with more flexible schedules) may have an advantage in navigating the process. As Manager 21 put it, “it takes a skill set to navigate any allocation system.”

As managers approach implementing a new recreation allocation system, or potentially changing an existing one, broad forces such as politics, resistance to change, and the fear of setting the wrong precedent were discussed. As Manager 4 noted:

I think there's a real fear of like precedent setting, in ways that you can't quite anticipate ... we don't want to change anything, because we're afraid that it's going to end in a disaster ... I think it's helpful to respond as much as possible to trends and people's interests and their abilities and all this stuff. And try to keep in touch with that and make little adjustments to make things more efficient whenever possible. But I do think there is a bit of fear in tweaking a system that's very well established and seems to work okay.

Other managers pointed to politics and the diversity of interests involved in allocation decisions as an efficiency challenge, with Manager 28 stating, “It all comes down to politics. And that is so frustrating to me.” Perhaps exacerbating the concern related to changing existing systems is the recognition of numerous tradeoffs between elements of the system design and user groups, with generally uncertain outcomes. Manager 40 emphasized, “It's not clear to me all of the unintended consequences that we have and who we are and aren't catering to and who is and isn't able to navigate that system.” One tradeoff example mentioned was that a first-come, first-served system might reduce no-shows, but also potentially favors local users, while advanced reservations allow users to plan ahead but may lead to no-shows.

With regard to the more detailed aspects of designing a recreation allocation system, a frequently cited limitation to efficient and equitable approaches and obstacle to flexibility and variability was online systems (despite the recognized value of an online system). Regarding equity, Manager 1 noted that “the more that we rely on internet-based allocation systems, that will continue to be an equity challenge, as long as

there are inequities in access to internet.” Previous research has shown that disparities in access to and adoption of high-speed internet exist between socioeconomic groups in the U.S., which became particularly evident during the COVID-19 pandemic (Frost, 2021; Gallardo & Whittacre, 2024). Participants spent significant time addressing the primary online option available to managers (i.e., [Recreation.gov](#)). While it was recognized that a custom online system may be challenging to develop, largely due to capacity and funding issues, and many managers felt that transitioning to [Recreation.gov](#) helped create a more consistent user interface for users, administering the allocation system through [Recreation.gov](#) was seen as potentially limiting for a variety of reasons, including a mediocre user interface, and a lack of customizability. Manager 26 summed this up when they said, “There’s always technical glitches, you know, running a big system like this, having to go through our mandated service provider. They’re great to work with, but they have technical capacity limitations too, so in a system at scale, it’s just those things that might be small things you need to work around, just became bigger.” The national-level scale that [Recreation.gov](#) is applied to is seen to result in limitations; that is, what is gained in scale is lost in nuance. As stated by Manager 11, design limitations prohibited them from adding a third booking window for permits: “I wanted to have a two week out release, but [Rec.gov](#) could only support two [total booking windows].” Another manager added, “There has been a unified effort to get all of the systems into [Rec.gov](#) ... [but] that also can be a barrier in terms of what’s working within that system, and what the developers are able to do is more limited than what those individual permit systems could do” (Manager 25).

The lack of a nuanced online system impeded some efforts to address the varying needs of different local contexts. Manager 6 stated:

One of the things I’m afraid of is that you end up putting these places into a pre-existing model that works for [Rec.gov](#). And there could be, you know, local needs or local concerns, other stakeholder concerns that need to get built into the architecture of these future systems, like a future allocation system. And we’ve experienced this, [Rec.gov](#) said, “Yeah, we can’t build that for you. We’re just we’re not going there.”

The limitations of the online system available to managers has cascading implications, such as potentially complicating public relations and expectation setting. Manager 15 suggested “I think one of the things that was surprising at first was the functionality of [Recreation.gov](#). And in what they could or couldn’t do. That was one of those learnings of like, it would have been great to have them [[Recreation.gov](#)] involved much earlier. So that we weren’t designing a system and talking to the public about a system that we then couldn’t deliver.”

Additional engineering and design limitations, which were sometimes related to the use of a singular online system, included the inability to properly manage and penalize no-show visitors, and the ability for visitors to rig the system in their favor—creating equity concerns. Managers struggled to find ways to adopt (or enforce) a no-show policy, to prevent visitors from booking multiple permits for the same time period, or to incentivize visitors to cancel their unused reservations if multiple permits were booked.

3.2.2. Education

Managers highlighted obstacles and limitations related to the *education* and communication needs of developing and implementing recreation allocation systems, which spanned education with the public and education with other managers. Regarding public-facing education, many participants highlighted the challenge of effectively communicating with the public about the nuances of navigating, and the reasons for, various recreation allocation systems. For instance, Manager 12 highlighted the challenge of conveying to the public that different recreation resources are influenced by their designation type (e.g., the difference between a city park, state park, and federal wilderness area). Generally, participants highlighted the lack of capacity and the lack of

skills needed to be effective communicators with diverse publics. Manager 6 suggested that some of this might stem from a lack of social science backgrounds for many managers, stating:

I think a lot of time these decision makers in these places, if they’re already really focused on recreation or access, public uses, you know, maybe they’re more focused on timber, they came from the grazing world or whatever, they see a lot of these social issues as really difficult and really messy, and don’t want to get in there, and stick with it and work it out. It’s easier to sort of look at a bunch of really scientific studies, and bug reports from biologists and say, okay, this is what it is. But the social recreation management, managing people is not that. So kind of understanding of social science.

Compounding the communication and education challenges with the public is the potential lack of connection between the agency and diverse populations, perhaps due to language barriers, negative views of government, and/or disinterest in outdoor recreation activities. Manager 49 highlighted, with some hypothetical questions and sentiments, how community concerns can make conversations about allocation especially difficult: “Will the cost go up, will the access be reduced? I don’t want you to regulate me, you’re the government, I don’t trust you, you know?”

Managers also noted that education is challenged as rationing systems transitioned from manually- and locally-managed to automated- and nationally-managed; largely because there is less presence on the ground (e.g., at visitor centers, backcountry rangers, in-house administered lotteries/reservations), and managers are less likely to interface with visitors. For example, instead of visitors calling to make a reservation and pick campsites, where a manager would be able to explain the nuances of a potential trip plan and the corresponding regulations, reservations are now mostly booked on [Recreation.gov](#), which does not always provide the detail that can be gleaned from a conversation with a land manager.

3.2.3. Enforcement

The suggestion that many contemporary recreation allocation systems reduce the interactions between the local manager and the visitor relates to the challenges of *enforcement* and implementation. Respondents cited both low staffing levels, and a high level of staff turnover, as reducing their capacity to implement equitable allocation strategies, and forcing the adoption of efficiency-seeking activities that ultimately undermined equitable allocation (e.g., no in-person permitting, inability to limit no-shows, inability to accept cash payments). When discussing limitations to equitable allocation, Manager 8 highlighted their lack of capacity to deal with this topic, stating: “I need people who are at a place to think about these things to inform me. I’m just trying to make sure the outhouses are clean some days, I don’t have time.” This quote is representative of a frequent sentiment that managers are often needing to act reactively rather than proactively, given limited capacity to engage in planning processes, as their time is devoted to day-to-day operations. Participants noted that resource constraints were particularly acute in remote locations, where relatively low pay and a lack of affordable housing are common.

Managers highlighted the interrelationship between the need for capacity to enforce recreation allocation systems (particularly limited-use permits), and the embrace of some kind of revenue-generating option. Managers described a somewhat circular, spiraling process wherein 1) a use limit or user capacity is implemented, in part, due to a lack of capacity (e.g., staffing) from the agency to limit impacts stemming from visitor use, and thus, 2) a non-market-based rationing system (i.e., a system not based on “pricing out” some visitors) must be implemented to equitably ration the now-limited public use opportunities, and then, 3) it is quickly recognized that additional staff are needed to administer, coordinate, enforce, and provide education around the system, and therefore, 4) a fee must be added to the use permit in order to pay for additional staff—thus, ultimately, leaving some visitors “priced out” of

the opportunity. Crucially, the use limit serves the function of a justification for a fee to support staffing; all the while, staffing was the original need for the use limit. In the end, a more efficient approach might be to charge the fee without a use limit. This is captured, in part, by Manager 40 describing their experience as a manager implementing such a system:

The other big obstacle for us has been, what is the elephant in the room, which is that a permit system is not a magical bullet ... period. Like it doesn't reduce work. It doesn't. It just changes the work we do. But most importantly, what we learned was that a successful permit system has a long term financial sustainable component. Because it takes staff and it takes people and, and for us, we went through a special recreation permit fee proposal through FLREA [Federal Lands Recreation Enhancement Act] We were able to navigate that, and now we have a fee in place Passing that fee on to the public, I lost a lot of sleep over it.

The potential use of a fee to address capacity issues can also be rife with uncertainty, and potentially damaging to the relationship with the public. Manager 15 highlighted that while an allocation system's design may include important aspects that were incorporated after public input, that the associated fee proposal may not always be approved (due to specific and challenging processes for getting a fee approved), leaving the managers without the capacity to properly enforce the allocation system.

Recreation allocation, in general, requires coordination on the part of the government agency to design, develop, and implement some rationing approach (e.g., a permit system, a reservation system). The required coordination needed for recreation allocation may be impeded by a broad range of factors. Manager 13 quipped: "There's nothing efficient about working with the government"; this moment of levity underscores a couple of opportunities facing managers. One is the potential value of conveying the multifaceted challenge to the public, to raise awareness about the tradeoffs and limitations influencing recreation allocation systems and design decisions. The second, relatedly, is the value of collaborative planning with the interested public around issues of recreation allocation. We turn to these opportunities in our discussion.

4. Discussion

More than fifty years after recreation allocation began to be investigated in earnest, it is clear that the nuance and complexity of the task is recognized by public land managers today. As many managers have pointed out, more and more recreation areas have moved to permit-based or other allocation systems, with online systems being used for distribution and implementation. The impetus for increased recreation allocation systems is a broad and often sharp increase in demand for wildland recreation and the associated physical, emotional, social, and mental health benefits. Consequently, visitors are passionate about recreation allocation decisions, and consensus may be elusive. This highlights recreation allocation as a wicked problem (Rittel & Webber, 1973) without a singular 'correct' solution, but instead a range of solutions that are perceived differently by diverse stakeholders due to different values, problem framings, and views on competing tradeoffs and uncertain knowledge. Considering the nuanced perspectives of managers, potential opportunities for facilitating the challenging task of muddling through recreation allocation emerge.

4.1. Managers and recreators muddling through it together

Some participants expressed a desire for more high-level, or national guidance, on how to address recreation allocation issues. These calls for more prescriptive solutions signal a potential embrace of the rational-comprehensive model of planning (Braybrooke & Lindblom, 1963; McCool & Ashor, 1984), whereby managers systematically formulate

objectives and identify alternatives using an expert-driven approach to planning. Expert insights, built upon applied experiences, are valuable in addressing recreation allocation. For instance, best practices such as flexibility (Graefe et al., 2011) and variety (Rice & Phillips, 2023) have been previously suggested by recreation researchers, and those objectives for recreation allocation systems were reiterated herein as important. However, prescriptive solutions, broadly provided, are elusive and potentially undesirable, given the need to understand local context, the potential value of regional variation in approaches (as discussed below), and the large amount of discretion that managers have in making decisions (indicating the lack of an existing singular solution to addressing recreation allocation).

Therefore, as managers look to apply best practices in recreation allocation, they will likely be faced with the need to interact with diverse publics and visitors to muddle through the challenging task. A collaborative model to planning has long been suggested in complex decision-making environments with diverse interest groups, which are often "highly politicized" (McCool & Ashor, 1984, p. 5). The goals and reasons for collaborative planning are well established, including working directly with visitors and the public to negotiate differing values, developing creative solutions by embracing the opinions of both practitioners and the public, enhancing mutual learning with shared learning spaces, relationship building, and ultimately creating an understanding for why a decision was made (even if people don't agree with it) (Armatas & Borrie, 2025; Stern et al., 2021).

The need for incorporating visitor input was expressed by managers in this study, and is potentially more important now with an influx of new users and technologies (Rice, Taff, et al., 2022; Taff et al., 2021). But the challenges of communication, education, and working with visitors on developing recreation allocation systems were also mentioned, which align with broader challenges commonly mentioned regarding federal agencies collaborating with the public (e.g., time intensive with long timelines, limited expertise in facilitation, employee turnover). While the authors do not have readily available solutions to the broad challenges of collaborative planning, there is likely value in continuing to work, as agencies currently do, toward collaborative arrangements. Creating working groups that walk through the allocation process from design through implementation, collaborating with local affinity groups to see who might be missing from the table, and asking for feedback (both positive and negative) are all ways that managers in this study suggested future communication could improve.

The work presented herein can support collaborative planning in one specific way, which is distilling the recreation allocation conversation into a tractable story. Managers expressed a challenge of articulating the nuances of why allocation is needed, as well as the challenges associated with developing and implementing a suitable allocation system. Through our analysis, we frame the conversation simply, in terms of objectives and goals and obstacles and limitations (Table 1). Additionally, the nuances related to trade-offs (e.g., online versus in-person permitting), potential uncertainties in design (e.g., planning to implement a fee to support capacity needs only to have the fee rejected), and unintended consequences (e.g., displacement of users) are apparent, and can be used in interactions with the public while managers muddle through the task of recreation allocation.

4.2. Spatial and temporal variation of recreation allocation approaches for different recreators

While we suggest that prescriptive, national-level guidance may be unrealistic for the purposes of informing recreation allocation decisions within varied local contexts, there may be an opportunity to clarify whether consistency in decision-making (given similar circumstances) is the goal, or variation in experiences and diversity in decisions is the goal. For instance, if two recreation allocation scenarios are similar, in terms of the recreation resource (e.g., a high alpine zone), and the demand, use, and associated impacts, then managers must determine

whether the goal is for both places to have similar recreation allocation approaches (e.g., a permit system), or different approaches (e.g., a permit system, and a first-come-first served approach). Existing research has highlighted that variation in recreation rationing approaches could be beneficial to supporting a diverse range of recreators (Rice & Phillips, 2023), and the insights from managers in this study appear consistent. Even though managers noted the goal of variation in how recreation allocation systems are designed (e.g., multiple booking windows), the same principle of variation in types (and design) of recreation mechanisms across space and time may provide opportunities for different recreators to realize their preferred experience across the spectrum of recreation experiences. In other words, if the five most popular high alpine hikes with similar conditions in a hypothetical region allocate use in different ways, then recreators with diverse preferences (e.g., planners, spontaneous recreators, solitude seekers, social-experience seekers) maintain the opportunity to experience a charismatic high-alpine hike.

Any changes in the future to existing allocation systems, or the implementation of new allocation systems, must be approached with an open mind by recreation managers. Learning from past experiences through research such as this study, taking a systems approach to some of these topics and thinking regionally, clarifying what equity means in an allocation context, and reaching out to current and aspiring recreation communities could allow recreation managers to create more balanced and equitable systems for allocating recreational use.

4.3. Limitations and future research

While managers with a wide range of positions within each agency were interviewed to add nuance to this discussion, these differential experiences may make it difficult to extrapolate next steps for agency leaders. Regarding research implementation, during transcription we discovered that there were several times when a word or phrase was accidentally used when asking a question (e.g., “technological” instead of “technical”). While this occurred infrequently, it is important to note in case this changed the meaning of the question. Additionally, there is a possibility that those with more mixed or unclear opinions may not have responded to an interview request, and those with stronger opinions on this particular subject decided to participate, which could have caused us to miss other important themes. Future research could probe deeper into what equitable and efficient outcomes actually look like in a recreation allocation context. One previous study demonstrated that visitors have different perceptions of fairness in the context of recreation fees (Zou et al., 2024), and these perceptions could be further explored alongside those of recreation managers to ultimately create better management guidance in the future.

5. Conclusion

The equitable and efficient allocation of recreational opportunities in the U.S. has long been a topic of discussion for those who study or are faced with these allocation-related decisions, but few studies have addressed the concerns of recreation managers. We investigated both the concerns and success stories that recreation managers across the U.S. have experienced when faced with recreation allocation decisions in their areas, and obstacles to achieving efficient and equitable outcomes. Managers articulated both goals and objectives (e.g., flexibility and variation), as well as obstacles and limitations (e.g., addressing no-shows, navigating politics), related to engineering, education, and enforcement of recreation allocation systems. The findings highlight the potential value of muddling through the recreation allocation challenge with visitors via collaborative planning, as well as the potential benefit of varying recreation allocation systems regionally and temporally.

CRedit authorship contribution statement

Kelsey E. Phillips: Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation. **Christopher A. Armatas:** Writing – review & editing, Writing – original draft, Validation, Methodology, Funding acquisition, Formal analysis, Conceptualization. **William L. Rice:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Sharon Suiwen Zou:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis. **Nicholas Pitas:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis.

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Data availability

The data that has been used is confidential.

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