Allocating Recreation with Fairness at the Forefront:

A RESEARCH-BASED PLANNING AND MANAGEMENT GUIDEBOOK

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Background and Acknowledgements

Recreation managers across the U.S. from both federal, state, and local agencies are often faced with the complex task of distributing recreational opportunities in areas where use is limited for one reason or another. Whether these opportunities are for limited campsites, backcountry hiking, multi-night river floats, or vehicle entry to an area with limited parking, managers must determine how to fairly and equitably distribute, or allocate, these opportunities among the public. Calls for an allocation framework were first voiced as use limits began to be implemented at an increasing rate in the 1970s (Behan, 1976), and continued in the 1990s, with Shelby (1991) stating, "The single greatest improvement in use allocation policy would be introduction of a rational planning or decision-making framework. The crucial step is to formulate the public policy goals and objectives a use-allocation system should accomplish and then use them as criteria for judging the effectiveness of different alternatives. Such an approach is no more than good professional practice" (p. 12).

This guidebook aims to help recreation managers think through the nuances of distributing recreation opportunities with fairness and equity in the forefront and provide a recommended framework for allocation design in a river context. The information in this guidebook is supported by a systematic review of the recreation management literature, as well as qualitative interview data from 50 recreation managers across the U.S. We also explore the primary concerns of managers regarding allocation, user groups and stakeholders that must be engaged throughout the process, and allocation strategies that have gone well and poorly. We consider the pros and cons of several rationing techniques, with support of constructed case studies regarding allocation decisions, and discussions of balancing equitable and efficient allocation outcomes. The primary goal of this guidebook is to provide a concise reference guide for managers and planners as they approach allocation decisions and to summarize the research insights on this topic to date.

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Introduction to Varying Allocation Strategies

Once recreation use is limited or a recreation manager is faced with implementing a use limit (whether due to an approaching pre-determined capacity outlined in prior management plans, or due to addressing capacity as required by certain statutes like a 1986 amendment to the Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)), the question of how to distribute, or allocate, this use to the public must be addressed. The topic of recreation use allocation has been broken into two components in this document: **allotment**, which involves the distribution of use opportunities between groups (e.g., non-commercial and commercial users), and **rationing**, which involves the distribution of individual use opportunities within groups (e.g., via lotteries, advanced reservations, or first come, first served) (McCool & Utter, 1981). Frequent allotment techniques that have been discussed in the literature previously are historic use, even-split, even-pool, and common pool (see Box 1). When it comes to rationing, there are a variety of terms and strategies worth reviewing (see Box 2).

Each allotment and rationing technique has different trade-offs that managers must consider in conjunction with the nuanced needs of both their resource and user base (both current and aspiring)

Box 1. Allotment techniques overview

Historic use[a]
"Allotments based on established use levels of the different sectors at the time a use level is set."

Even-split[a]
"An even-percentage split (i.e., 50- 50) between groups."

Even-pool[a]
"A variation of a 50-50 percentage split beginning with that split and allowing for any unused or cancelled permits/launches to be placed in a pool to be available to other sectors for that particular season. The system would begin the following year with the original 50-50 split."

Common pool[b]
Also called the "freedom of choice" technique, this approach "allocates all of the use to individuals or groups without distinguishing whether they intend to take a commercial or non-commercial trip (none of the use is allocated to outfitters), leaving the choice to the applicants who receive a permit."

[a] Definition from McCool and Utter, 1981

[b] Definition from Whittaker and Shelby, 2008

Box 2. Rationing terms and strategies

Reservation
An advance assurance of a recreational activity or opportunity for a specific area, date, and/or time slot. Reservations may need to be obtained for vehicles or visitors to enter a campground or park area (backcountry or frontcountry), or to attend a tour or event.

Lottery
A rationing mechanism that randomly distributes limited available opportunities (or permits) for activities that are highly demanded. Participants must apply to the lottery in advance of the desired activity, during the lottery window.

> ***Early access lottery***
> A type of lottery that grants lottery awardees an advanced window (called an early access period) to book a reservation for a highly demanded recreational opportunity. Early access periods open prior to general public reservation periods.

Booking window
The amount of time between an advanced reservation and actual participation in a recreational opportunity. Booking windows are typically expressed as number of months, weeks, or days prior to the first reservable date that may be booked.

First come, first served
A system where visitors may have to wait in line for recreational opportunities to become available. These recreational opportunities cannot be reserved in advance and must be reserved onsite. [Synonyms: Queuing, Walk-up, Metering]

Pricing
The implementation of required fees, or the increase in the amount of a fee, that users pay to participate in a recreational activity or enter an area in an attempt to reduce use to a desired level based on visitors' willingness or ability to pay.

(McCool & Utter, 1981; Shelby et al., 1982; Cable & Watson, 1998). For example, while using a common pool allotment system—wherein users acquire a permit and then decide whether to hire an outfitter to utilize their permit—may be an option that allows for changing private and commercial use over time, it also makes it harder for commercial outfitters to plan their businesses. Additionally, while moving a use opportunity onto an advanced reservation rationing system might allow non-local users to plan their trips in advance and remove some staffing needs for certain areas, it also makes it harder for local users to gain access that they may have obtained more spontaneously under a first-come, first-served rationing system.

The multifaceted tradeoffs amongst these various options make it difficult for recreation managers to design allocation systems and select amongst these strategies. When considering tradeoffs, the recreation rationing spectrum articulated by Rice and Phillips (2023) may be helpful, which advises offering multiple rationing strategies (e.g., campsites allocated through a combination of reservations and first come, first served) and/or booking windows (e.g., river permits made available 6-months and 2-months in-advance) to ensure that tradeoffs between rationing strategies are recognized and that the diversity of visitors' preferences and needs concerning access is recognized.

1 Getting Started

The need to allocate recreation is triggered when a use limit (sometimes also referred to as a visitor capacity) is implemented or desired conditions for management objectives are not achievable due to visitor use. While much guidance exists for determining a use limit (see the IVUMC Visitor Capacity Guidebook), or if a use limit is needed in the first place (see the IVUMC Visitor Use Management Framework), there remains little guidance on how to design an allocation strategy in the wake of a use limit. When considering the design of a rationing system, we heard several insights directly from managers. When it comes to getting started on the design of a rationing system (or strategy), there is a need to consider potential user groups, engage Tribes in government-to-government consultation (if applicable), and consider the main resource concerns.

Considering all users while recognizing differences

During our interviews with managers, the "general public" was mentioned in most answers in some way, and it was stressed that ultimately all user groups (and potential user groups) must be considered as recreation on public lands is generally publicly accessible. However, managers also made it clear that there was a need to recognize the differences across all users (see Box 3 for different user groups and types of individuals and organizations engaging in recreation rationing discussions). Importantly, when considering different user groups and the process of making rationing decisions, several managers pointed to the need to map out and analyze the differential political power and influence that may exist in these processes, and to ensure that all voices

Box 3. Parsing the general public

Users who are local and non-local, guided and unguided, and doing different activities (e.g., climbers, trailrunners, overnight backpackers) may be impacted differently by rationing.

Potential users who either do not know about a recreation opportunity or do not feel welcome to participate need to be engaged, including underserved communities and disadvantaged groups that struggle to navigate allocation systems (e.g., those without internet).

Advocacy groups, gateway communities, tourism entities, outfitter guide businesses, local governments, federal and state elected officials, private landowners, neighboring land management agencies, and internal agency specialists will have varying opinions on rationing decisions.

are being heard equally, not just the "most and loudest" or those with time and energy to engage in these often-lengthy processes. Collaborative groups that start at the beginning of a proposed action and work together through the decision-making process and implementation was pointed to as an option for gathering detailed and thorough input. Whether planning collaboratively or not, considering underrepresented populations who have historically been overlooked when determining allocation and rationing is important.

Sovereign Nations are different

Tribal consultation is a crucial aspect of the planning process, with managers noting that tribes must be consulted at a government-to-government level as rightsholders rather than as stakeholders, as they are sovereign nations with treaty rights in certain areas. Developing relationships with tribal nations, early and often, was noted as a best practice – and navigating the complexity of working with tribal nations in a respectful and effective way is discussed in detail in the recently released Tribal Action Plan (USFS, 2023).

Insights from Managers

Throughout this guidebook, we have included boxes detailing results stemming from our interviews with managers. These "Insight from Managers" boxes provide insights from managers to managers.

Insights from Managers

Primary concerns when making allocation decisions

Ecological

Ecological concerns were mainly related to degradation and protection of the resource—whether that was water quality, air quality, soundscape, wilderness character, or wildlife related. Some managers were concerned with the impact on the resource due to increased recreational use, using campsite and trail conditions and social trail development as indicators of these impacts. Several managers also pointed out that many of the recreational uses and users have changed since the original plans for their areas were written, and thus resource impacts have changed in response to unforeseen changes in use.

Social

Many managers were also concerned with social aspects of allocation outcomes, predominantly with the user experience quality and overall equity and fairness within allocation systems. 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 isn't, able to navigate these systems.

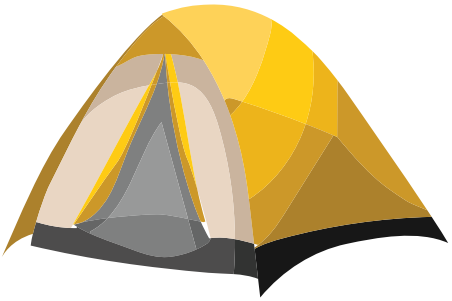
Managerial

Managerial concerns were related to policy alignment and planning processes, spatial and temporal displacement of users, safety messaging and visitor education, no-show and cancellation issues, and appropriate capacities. Additionally, providing appropriate commercial use opportunities for public access while balancing this with both private use opportunities and tribal treaty rights was seen as a challenge by many. Importantly, political acceptability and precedent-setting were concerns for several managers, as well as allocation system complexity within and across agencies and the flexibility of both systems and Recreation.gov administrators to accommodate future unknowns. Running through all three categories was the overarching concern of balancing resource protection with maximum recreational access and enjoyment.

2 Designing a Strategy

This section focuses on the actual designing of an allocation strategy. This includes selecting a rationing strategy (e.g., reservations, lottery, etc.), but, as revealed through our systematic review of the research and manager interviews, it is much more nuanced than that. Designing a recreation allocation strategy includes many vital decisions, such as selecting booking windows, setting fee amounts, selecting or designing a booking interface, and many others. Here we detail manager perspectives on this process and what the research tells us about various rationing strategies.

In our interviews, managers identified four core inputs, or design principles, to a successful allocation strategy: ***variety***, ***communication***, ***flexibility***, and ***system functionality***. These core design principles can be applied in any recreation context and should be used as waypoints to guide managers and planners throughout the process of designing an allocation strategy.



Insights from Managers

Things that went poorly or obstacles that existed when designing or trialing allocation systems

Education

The transition from manually- and locally-managed to automated- and nationally-managed allocation systems has in some cases significantly reduced managers ability to educate visitors about the recreation resource and appropriate behavior, their ability to guide appropriate trip planning, as well as their ability to communicate with visitors to ensure that expectations match the reality of the experience. The need to educate visitors was noted concerning 1) why use is being restricted, 2) the varying trade-offs managers must navigate when designing a rationing system, and 3) the workings of the rationing system.

Engineering and Design

Managers across a variety of recreation resources noted the constraints they faced when trying to design, or transfer, their rationing system in Recreation.gov, which one manager noted "meant some compromise in terms of nuances of the systems that folks may have had wanted to have in place." Additional engineering and design failings included the inability for systems to properly manage and penalize no-show visitors, visitors "rigging" the system in their favor (creating equity concerns), and the inability to adapt to the needs of locals.

Enforcement

Enforcement challenges are largely related to these engineering and design limitations and often stemmed from the inability of managers to adopt or enforce a no-show policy and 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.

Reservations

What we know: Insights from a systematic review of the research to-date.

Many visitors appear satisfied, or at least willing to try, reservation systems (Kottke & Gardner, 1975; Dvorak et al., 2012; Jenkins et al., 2021). In some cases, reservations were preferred compared to other rationing techniques, including among boaters in Hells Canyon (Danley, 1980), frontcountry campers in California (Magill, 1976), and commercial boaters on the Middle Fork of the Salmon River (McCool & Utter, 1981). Willingness to attempt making a reservation was found to be contingent on the perceived chance of success among Hells Canyon boaters (Shelby et al., 1989a), while acceptance of reservations was found to be contingent on the associated fee among backcountry visitors to Yellowstone National Park (Oosterhous, 2000). Demand for reservations among campers was also found to vary depending on campsite attributes (Rice & Park, 2021). Important differences in preferences and/or use of reservations were also found based on visitor demographics. Higher-income (Rice et al., 2022; Schwartz et al., 2012), higher-educated (Dimara & Skuras, 1998), and more urban (Schwartz et al., 2012) recreationists were found to be more likely or willing to pursue, or preferring of, reservations. The opposite trend was found for those unable or unwilling to plan further in advance (Schomaker & Leatherberry, 1983; Shelby et al., 1989a) and more local visitors (Dimara & Skuras, 1998). Additionally, even in cases where reservations were accepted by visitors, there was a noted preference among visitors that some permits be made available on a first-come, first-served basis.

Pros	Cons
Works well for individuals or groups able, or preferring, to plan ahead	May constrain individuals with relatively lower incomes, less outdoor recreation experience, or living in more rural settings
Provides individuals with the security of knowing they have an opportunity secured	Results in some amount of "no-shows" (i.e., permits or reservations that go unused)
Requires less labor once a reservation portal or system is successfully implemented	Requires reservation portal or system to support administration

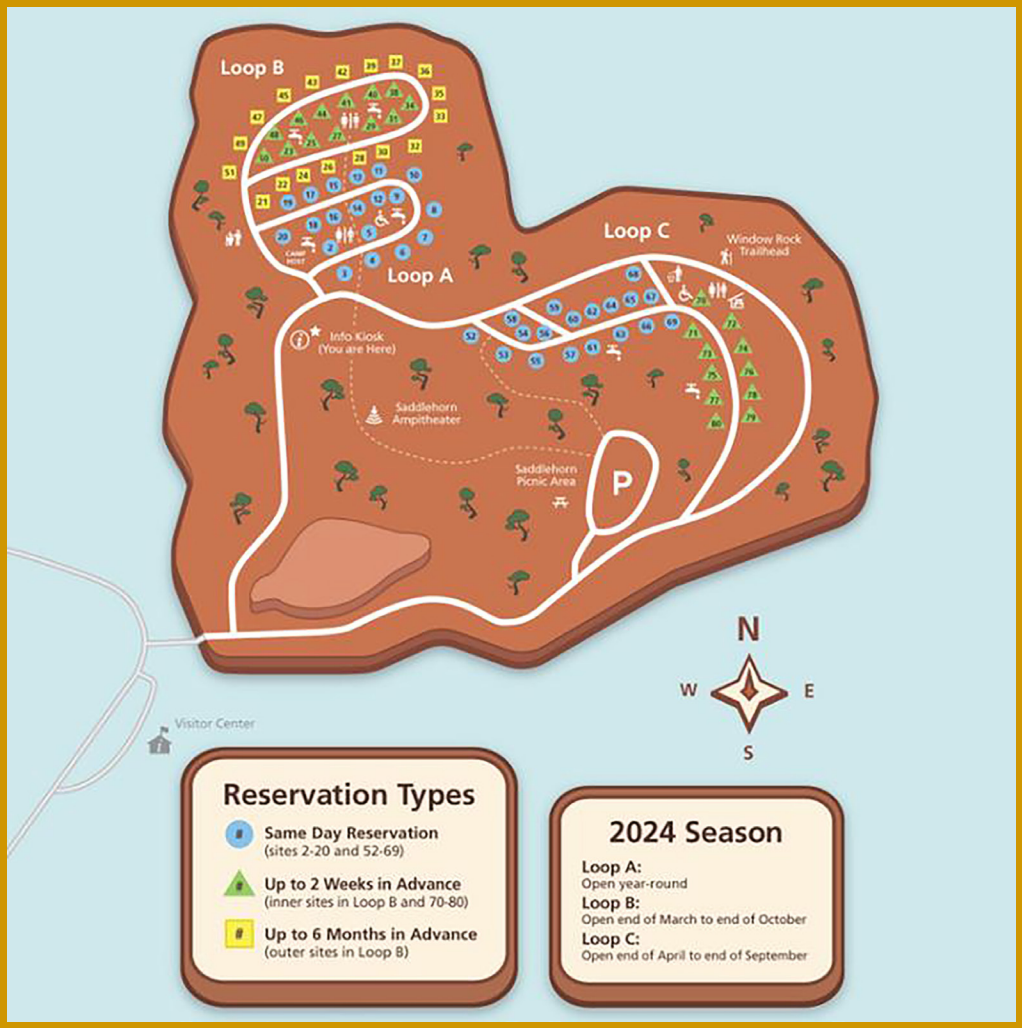
Suggestions for implementation:

Utilize multiple booking windows to better meet the needs of recreationists with varying preferences and needs.

Ensure flexibility in the system for special uses and cultural access (e.g., thru-hikers, hunters with state-issued permits, tribal members, etc.).

Pair with other methods such as setting aside a portion of opportunities for walk-ups, offering first-come, first-served options for cancellations, or conducting an initial lottery for high-demand opportunities.

Conduct a survey of visitors and prospective visitors concerning their preferred and maximum booking windows (see Rice et al., 2024).



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Case Study

In 2024, Colorado National Monument launched a redesigned rationing strategy for campsites in the Monument's Saddlehorn Campground—based on research findings concerning the need for diversity in booking windows. Through their new strategy, managers expanded reservation opportunities to three booking windows: six months in advance, two weeks in advance, and same-day. This re-design was intended to meet the needs of a broader diversity of visitor preferences and needs, by allowing opportunities for those planning further in advance and those unable to plan or wishing for a more spontaneous experience. Under the new system, same-day campsites are released for reservation at 8 AM Mountain Time and hopeful campers can monitor real-time availability of same-day campsites on Recreation.gov. Those without an internet connection can call to make reservations over the phone. Such a strategy is a useful example of the Recreation Rationing Spectrum in action, wherein a diversity of booking opportunities helps a greater swath of the public access recreation opportunities. The Monument paired their newly launched design with a well-broadcast press release and a suite of graphic maps explaining the new design.

Lotteries

What we know: Insights from a systematic review of the research to-date.

Preferences for lotteries were dependent on both the activity style being studied and the decade in which the study was conducted. Related, evaluations of lotteries were found to be strongly influenced by ideals of fairness. Willingness to try and acceptability were found to be influenced by perceived fairness and chance of success (Shelby et al., 1989b). In some cases, lotteries were preferred by users when contrasted with other rationing methods, such as goose hunters in Vermont (Glass & More, 1992) and both private boaters and lottery rejectees on the Middle Fork of the Salmon River in Idaho (McCool & Utter, 1981). In a study of the allocation currencies of river runners in Hells Canyon, results suggested that floaters who were able to arrange trips on short notice and those with more river running experience felt that a lottery favored them, where perceived chances of success under a lottery system was influenced by notification lead time (Shelby et al., 1989a). Another study found that turkey hunters in Minnesota preferred a lottery in a few high-demand areas (Schroeder et al., 2018). In other cases, lotteries were the least preferred—or among the least preferred—rationing techniques, such as wilderness users in California, Minnesota, Montana, Utah, and Wyoming (Stankey, 1973; 1980). Interestingly, a more recent study on boater satisfaction with various U.S. permitting systems and preferred methods for awarding permits found that a lottery weighted by number of failed attempts was the overwhelming favorite, with only 10% of respondents preferring the equal-odds lottery (Phillips, 2023).

Pros	Cons
Reduces inequalities stemming from personal, interpersonal, and structural barriers	Requires lottery portal or system to support administration
Works well for individuals or groups able, or preferring, to plan ahead	Acceptance of lotteries is concentrated among those uses that have historically used lotteries and are most often rationed via lottery (e.g., rafting)
Perceived by the public to be generally more fair than other rationing systems	Public acceptability of lotteries wains when chances of winning a lottery begin to approach zero

Suggestions for implementation

Limit the number of concurrent lotteries an individual can enter on a local, regional, or national level to reduce no-show behavior.

Consider rolling lotteries. For example, permits could be allocated through two lotteries (each containing 50% of all available permits), one 6 months prior to the start of the season and one 4 weeks prior.

Pair with the ability to reserve cancellations on a first-come, first-served basis using a waitlist system or secondary lottery.

Consider the possibility of a weighted lottery for extremely high demand opportunities, but understand that this comes with additional decisions (i.e., weighted based on number of failed attempts versus purchasing points).

Consider geofencing as a way to increase local and regional opportunities and support more spontaneous access (e.g., the Bureau of Land Management's geofenced lottery system for "The Wave").

Case Study

When agencies have the resources and ability to control the design and implementation of lotteries, positive outcomes often emerge. One such case exists in a state in the western U.S. where a fish and game agency uses lotteries to allocate hunting permits for big game in areas where permits are limited. This agency assigns a unique ID to each person as a means of tracking success, weighting odds in future years, and preventing "ballot stuffing." Additionally, data from the previous year's lotteries are made publicly available and are prominently displayed on the lottery webpage to help hunters make informed decisions. If a hunter is unable go on a permitted hunt, cancellations are then made available on a first-come, first-served basis.

First come, first served

What we know: Insights from a systematic review of the research to-date.

A first-come, first-served (FCFS) approach was preferred by, and more beneficial to, local residents who could more easily access, or wait to access, the recreation resource with limited planning (Behan, 1976; Dimara & Skuras, 1998), as well as younger people with more flexible schedules (Dimara & Skuras, 1998). Consistent with this finding, a study of river users across four states found that a FCFS approach was perceived to affect non-local users most negatively (Wikle, 1989). The potential benefit of FCFS approaches to local populations was reflected in the Grand Canyon, where 74% of all hiking permitees using the Inner Canyon were from the states surrounding the Grand Canyon (Behan, 1976). Research has found that user's acceptability of an allocation system is correlated with the perceived ability to access the resource (Danley, 1980), and this general finding is evident within the context of research on FCFS approaches. Indeed, Shelby et al. (1989a) found that perceived chances of success under a FCFS system were influenced by distance to the Snake River in Idaho; thus reinforcing findings from other research that acceptability of FCFS approaches is influenced by proximity to the resource. While distance to the resource appeared most salient to perceptions of FCFS approaches to recreation allocation, some research items highlighted the potential influence of different types of recreation activities or experiences. For instance, for wilderness users who prefer low-use intensities in sensitive environments, a FCFS option of allocation was among the least popular (Bultena et al., 1981; Stankey, 1973), and within the context of the potentially rivalrous activity of goose hunting less than 7% of respondents felt that a FCFS approach was appropriate (Glass & More, 1992).

Pros	Cons
Helps locals gain access to proximate recreation resources, on which they may heavily depend for outdoor recreation	Does not provide individuals with the security of knowing they have an opportunity secured prior to arrival
Reduces the probability of no-shows	Generally lower acceptance among non-locals
Reduces the technological barriers for visitors	Requires the handling of cash on-site or an alternative such as QR codes (e.g., YourPassNow) which requires Wi-Fi or mobile data coverage

Suggestions for implementation

First-come, first-served designs should only be used alone in cases of low recreation demand. In cases with a high likelihood of, for example, a campground filling up or all river permits being allocated, first-come, first-served rationing should be paired with another strategy.

Consider local-dependence. If locals are limited in their ability to utilize a recreation resource which they depend upon for outdoor access, first-come, first-served strategies can help them retain access.

Implement a monitoring protocol in conjunction with first-come, first-served systems to examine the need for a more confining form of rationing.

Case Study

A Bureau of Land Management field office in the rural American West conducted public scoping to inform the redesign of their river permit allocation. Through this public scoping process, it became clear that the current reservation system created a barrier for local residents who depend on the river for high quality outdoor recreation. Local residents reported limited capacity to plan far in advance and difficulty competing with the larger public for permits within the current reservation system. In response, managers adapted their rationing strategy to allocate 15% of all river permits allotted for non-commercial use on a first-come, first- served basis (made available at the local field office) one-week prior to the start date. Through this action, the managers were able to ensure both national and local access to the river.

Pricing

What we know: Insights from a systematic review of the research to-date.

Although there were isolated examples of support for pricing as a mechanism (e.g., among campers, LePage et al., 1975), pricing-based approaches – for example through increased user fees – were largely unpopular among the various recreation groups included in our analyses (e.g., Fleming & Manning, 2015). As such, authors cautioned that "new outdoor recreation pricing policies should proceed cautiously and only with appropriate research and monitoring" (Bamford et al., 1988), and concluded that in many instances "it is clear that peak pricing is not supported" (Fleming & Manning, 2015). Some research indicated that other mechanisms – for example lottery or first come, first served – were perceived as more preferred than increasing fees (Glass, 1992). An exception to the general dislike of pricing appears to occur when increasing fees is viewed as a means of reducing crowding and achieving preferred social conditions (e.g., Jakus & Shaw, 1997; Kainzinger et al., 2019; Kotke & Gardner, 1975), or to increase quality of services (e.g., Moeller et al., 1974). Fees that were assessed to recreationists were also evaluated more favorably than passing along the cost to tax payers (e.g., Shoji et al., 2021). Reactions to fees were linked to perceptions of fairness; those who perceive a system as fair are more likely to support its implementation (e.g., Danley, 1980; Shelby et al., 1989b); conversely, respondents were also more likely to support a system regardless of perceptions of fairness if they felt they were likely to succeed (e.g., Danley, 1980; Shelby et al., 1989b). Concerns related to equity were also raised, as fees are likely to impact low-income recreationists disproportionately compared to higher-income recreationists (e.g., Bamford et al., 1988).

Suggestion for implementation:

Proceed with caution. There is limited public, political, or agency support for pricing as a means for rationing recreation resources.

Pros	Cons
Differential pricing can disperse use	Generally not accepted for public land management
Increases revenue through the implementation of higher fees	Pricing mechanisms exclude individuals based on ability to pay
	Rigorous and resource-intensive to establish an efficient price point

3 Final Thoughts

Insights from Managers

Limitations faced by managers when attempting more efficient allocation strategies

Technology
While in some cases moving toward a more technologically advanced online system increased efficiency compared to an "in-house" system, these online systems were also limiting due to lack of customizability.

"No-show" challenge
Systems don't always incentivize cancellations (e.g., with refunds), and cannot easily enforce rules against no-shows and overbooking. This issue was sometimes connected to the potential value of online rationing systems, as these may provide a way to effectively deal with the no-show issue.

Need for robust planning and communication
The challenge of effectively communicating with the public about both the nuances of navigating and reasons for these allocation systems was highlighted by managers, as well as the lack of capacity and skills needed to be effective communicators with diverse publics.

Lack of resources and data
Perpetual staffing issues were noted to make on-the-ground enforcement and implementation of recreation allocation systems challenging (e.g., having enough presence on the ground to ensure that visitors are following the rules).

Politics
The influence of politics on how recreation is allocated was highlighted by some managers as a limitation to efficiently allocating recreation resources.

Insights from Managers

Limitations faced by managers when attempting more equitable allocation strategies

Accessibility and inclusivity considerations
Broad issues related to accessibility and inclusivity were discussed, often centered on a variety of intersecting socioeconomic and cultural constraints. Socioeconomic constraints related to a lack of monetary resources among visitors and included lack of access to reliable high-speed internet, inability to purchase necessary gear and permits, lack of a flexible work schedule or vacation time, and issues related to travel to and from recreation sites. Cultural constraints included a lack of connection between agencies and diverse populations as a result of language barriers or a lack of trust in government entities.

Planning and policy hurdles
Managers felt that there was a degree of subjectivity with regard to equity that limited their capacity to equitably allocate access. For example, respondents cited a lack of objective data to define equitable allocation, and a lack of clear processes and standards to help define success in moving towards equitable allocation. Institutional inertia problems, the time and effort required to make meaningful change due to policy and legal hurdles, difficulties soliciting stakeholder and community input, and the intricacies of Recreation.gov requirements were all seen as barriers to equity.

Operational challenges
These largely revolved around lack of resources related to both staffing and funding. 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). A lack of staffing was traced to remote locations, relatively low pay, and a lack of affordable housing. In addition to staffing issues, a lack of monetary resources was cited in difficulty implementing equity-related policies on the ground.

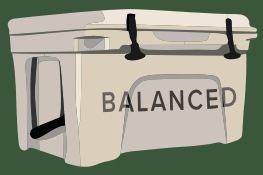
A framework for selecting allocation strategies on rivers

Using a multi-night river trip as a metaphor, we can conceptualize both the inputs into allocation systems, as well as obstacles that exist when attempting to reach equitable outcomes using these systems. If an allocation system is the raft that we will be taking on our float trip, we need to load it with gear, tools, and food to get us safely to camp each night. In this theoretical framework (Phillips, 2024), we are loading our allocation system with six design principles that river managers highlighted as important when creating an allocation system: equitable, flexible, accessible, balanced, data-driven, and meets agency requirements.

Equitable: Equity and fairness were highlighted as a key aspect of any allocation system, but from different perspectives, for example between private and commercial users, locals and non-locals, and in the context of planning horizons.

Flexible: Allocation systems must be flexible from both a user perspective (e.g., planning horizons, last-minute changes) and a manager perspective (e.g., adaptive management plans, adjustable systems).

Accessible: Managers discussed accessibility in the context of user confusion, the cost of permits/ reservations and required gear, and technology considerations such as reliable internet access and computer literacy.



Balanced: Allocation systems must strike a balance between public access and preservation of the resource, as well as between private and commercial use.

Data-driven: Public input and appropriate capacity setting were highlighted as key to any allocation system, as well as a solid understanding of stress points within the recreation area.

Meets agency requirements: Allocation systems must be designed to be consistent with relevant agency policies, the designation of the recreation area (e.g., Wilderness, Wild and Scenic River), must provide relevant safety messaging, and be consistent with the Recreation Opportunity Spectrum (ROS) setting.

These attributes are what make an allocation system function and help us reach our goals, which include equitable outcomes for our users. This goal can be thought of as the sandy beach that lies at the end of our trip. To get there, we will likely encounter some whitewater rapids, which while not impassible, are still significant challenges that require training, scouting, and support to navigate. The challenges, as highlighted by managers, to including equity considerations in the decision-making process for river recreation use allocation were accessibility and inclusivity limitations, operational challenges, and planning and policy hurdles, which are the three rapids that we must navigate to reach equitable outcomes.

ACCESSIBILITY & INCLUSIVITY CONSIDERATIONS

Accessibility and inclusivity considerations, both due to management decisions as well as external systemic barriers in society generally, were a critical obstacle that many of these river managers felt were limiting their ability to reach equitable allocation outcomes.

OPERATIONAL CHALLENGES

Operational challenges such as staffing issues, lack of funding, and overall capacity were other major barriers.

POLICY & PLANNING HURDLES

Planning and policy hurdles were felt across agencies and rivers, from constraints within third-party system policies and contracts, to plan revision time commitments and fear of precedent-setting, all the way to lack of equity guidance at a policy-level.

As we move through the river canyon, we acknowledge that even if we would like to make these decisions in an apolitical environment, this likely is not entirely realistic, as politics are a part of the landscape that we move through day to day. As many of the managers interviewed for this study highlighted, allocation-related decisions do not always get made in a political vacuum, with its influence occasionally extending into both allotment and rationing decisions. Thus, we must navigate this political landscape to the best of our ability, rather than simply ignoring its existence. Loading our system with the tools we need, and using the knowledge we have to scout the rapids and overall landscape ahead will help us reach the equitable outcomes we seek at the end of the trip.

As you complete each draft of your new allocation design strategy, use the Recreation Allocation Checklist found in Appendix A to audit your system using the principles and manager insights provided in this guidebook.

Key Takeaways

- ✓ **Diversifying rationing strategies leads to better outcomes.** Through utilizing multiple rationing strategies or multiple booking windows, managers are able to meet the needs of a broader swath of recreationists and improve fairness within their systems. Strive for a Recreation Rationing Spectrum (see Rice & Phillips, 2023).

- ✓ **Lean into flexibility.** Designing for flexibility emerged as a major theme in our manager interviews. Systems tend to work best when they are elastic in response to complex recreation behavior. For example, flexible strategies might allow for re-allocation of cancellations, be nimble to the interface of other, overlapping rationing strategies (e.g., a river permit system that overlaps with a sought-after hunting permit), or adhere to established tribal treaty rights of tribal communities or the unique needs of specialty recreation groups.

- ✓ **Outdoor recreationists care about fairness.** Recreationists' inclination toward (or acceptance of) a particular allocation system appears to be mediated by perceptions of fairness. This trend was found across goose hunters and river rafters propensities toward a lottery (Glass & More, 1992; Utter, 1979). Danley (1980) also found this trend to hold true for acceptance (or lack thereof) for all forms of rationing among boaters in Hells Canyon. Shelby et al. (1989b) go on to conclude that "acceptability of a system is strongly determined by whether the system is perceived as fair" (p. 67). Given these results, it is critically important that managers collect data concerning how their allocation systems perform in terms of fairness so that adjustments to the systems can be made and communicated to the public.

- ✓ **Be cognizant of resource availability.** Use limits are often instituted as a result of limited managerial capacity (i.e., staffing, budget, etc.) to limit recreational impacts through other means, such as engineering or education. However, the allocation systems put in place to implement these use limits are also often very resource intensive. It is important that planners and managers do not exacerbate limited capacity through the rationing process.

- ✓ **Transparency improves system navigation and fairness.** Recreation allocation is difficult and complex, and these qualities trickle down to the visitor as they attempt to access rationed recreation opportunities. Maximizing transparency concerning levels of demand (i.e., occupancy rates or how far out reservations are usually booked), administered booking windows, lottery odds, and other system attributes can increase clarity and help visitors make more informed decisions.

- ✓ **Communicate the how and why.** The data is clear concerning the need to pair a newly launched or newly redesigned allocation strategy with robust communication concerning how to navigate the system and why the system has been designed in this way. For the former, graphic maps and infographics can help visitors understand when and how to book or enter lotteries.

Insights from Managers

Data needs identified by managers

In terms of the data or information needed for informed allocation decisions, four main themes were identified: guidance, impact data, use data, and resources.

Guidance
There was a strong consensus regarding the need for higher-level guidance on allocation decisions, which should include a range of allocation approaches, their intended/unintended consequences, and the various factors to take into consideration. Managers emphasized the critical need for consistent guidance on methodologies for collecting and analyzing visitor use data to inform allocation decision-making. They also called for more involvement of social scientists in the allocation decision-making process, either through having in-house social scientists or by contracting external expertise.

Use data
While many managers utilized permit and visitor use data from sources like Recreation.gov or National Visitor Use Monitoring Program, there is a growing demand for richer and more comprehensive data on visitor use and behavior. This included information on visitor numbers and patterns, demographics, preferred activities, duration of stay, and compliance with regulations. No-show data would be useful but difficult to obtain.

Impact data
Some managers expressed the need for, or were already engaged in, monitoring the biophysical impacts of visitor use (e.g., water quality, wildlife disruption) to guide their allocation decisions.

Resources
Limited capacity and resources such as staffing and funding pose significant obstacles to accessing the needed data and information for allocation decision-making.

Further Reading & Resources:

Interagency Visitor Use Management Council, "Visitor Use Management Framework," 2016

Interagency Visitor Use Management Council, "Visitor Capacity Guidebook," 2019

Interagency Wild and Scenic Rivers Coordinating Council, "Steps to Address User Capacities for Wild and Scenic Rivers," 2018

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Appendix A

The Equitable Recreation Rationing Checklist

The purpose of this checklist is to help managers audit their recreation rationing designs and ensure that these designs align with the best practices outlined in this guidebook, following the provided framework for selecting allocation strategies on rivers. Once you have drafted a design, consider completing this checklist. If your design does not meet one of the design principles, consider the hints provided below for a redesign.

Design Principles:

The key for a successful launch of a newly-designed allocation system rests on the principles guiding the design process. Based on feedback from managers experienced in allocation, we've narrowed these principles down to six: equitable, flexible, accessible, balanced, data-driven, and meets agency requirements.

✓ **Equity-forward**: This design prioritizes equity and fairness by focusing on 1) meeting varying groups' preferences and needs, 2) prioritizing transparency, and 3) utilizing multiple rationing strategies (e.g., reservations and lotteries, or multiple booking windows).

- If not, consider which groups of potential visitors may have the most difficulty accessing opportunities through your newly-designed system (e.g., locals, non-English speakers, individuals with less free time during the workday, individuals with less technological literacy or technology access, etc.) and what changes focused on improving communications, transparency, and diversity within the system may be most beneficial.

✓ **Flexible**: This design recognizes the nuance inherent to recreation management and allows for flexibility concerning extreme events (e.g., floods), seasonality (e.g., hunting seasons), and tribal access.

- If not, consider gathering an interdisciplinary team to discuss past extreme weather events experienced in your area, seasonal user groups (e.g., hunters, anglers, thru-hikers, etc.), and tribal access.

✓ **Accessible**: This design prioritizes accessibility in terms of both physically accessing a permit (e.g., intuitive web design/application process, transparent odds of success, considering potential visitors' physical and cognitive disabilities) and cost of the permit (e.g., fee for permit, gear cost and availability, amount of free time, etc.).

- If not, consider auditing the accessibility of your newly-designed system. Where can accessibility be improved? What are the "lowest hanging fruit" ripe for improvement? Is there an opportunity to reduce fees, create a gear library, or make the process of obtaining a permit less of a time burden on the visitor?

✓ **Balanced**: This design balances commercial and non-commercial use and balances recreation access with resource conservation.

- If not, or if you are looking for improvement, consider examining how other similar recreation areas in the U.S. and abroad have managed to balance these competing access mandates.

✓ **Data-driven**: This design is based on the best available visitor use data for this recreation area

- If not, consider any data your unit collects concerning visitation rates, demographics, visitor ecological impacts, or visitor experience. If your unit is currently using Recreation.gov, utilize data available in your manager dashboard or publicly available at https://ridb.recreation.gov/

✓ **Meets agency requirements**: This design has been cross-checked with agency goals and requirements outlined through policy, secretarial orders, etc.

- If not, consider checking with regional or national office staff concerning locating any relevant policies or rules.

Adaptive Capacity:

The obstacles, as highlighted by managers, to including equity considerations in the decision-making process for river recreation use allocation were accessibility and inclusivity limitations, operational challenges, and planning and policy hurdles, which are the three rapids that we must navigate to reach equitable outcomes. Your design must have the adaptive capacity to overcome these challenges.

✓ **Accessibility and inclusivity**: This design has been created with input or feedback from a broad range of stakeholders and users. It also considers not only current users, but also prospective, aspirational, and/or future users of the resource.

- If not, consider soliciting feedback from possibly overlooked stakeholders or user groups and holding a public design charrette to receive input on your newly-designed system and solicit feedback. Also, consider examining national and regional use trends for emerging recreation activities.

✓ **Operational challenges**: This design is mindful of 1) current staffing capacity, and conservative estimates of future staffing capacity at the unit, 2) vulnerabilities related to reliance on knowledge or skills held by one or two individuals, and 3) current bandwidth to properly communicate this newly-designed system.

- If not, consider the core reason(s) for instituting a use limit in the first place. What problems is the use limit intended to solve? Are there strategies that might improve these problems in a less capacity-intensive fashion? Additionally, consider making an archive of information concerning how your system was designed, who was involved, what tools were used, etc.

✓ **Planning and policy hurdles**: This design 1) considers third-party design constraints (e.g., functionalities within Recreation.gov), 2) is conceived with a clear timeline for plan revision, and 3) follows agency guidance concerning equity goals.

- If not, consult with Recreation.gov, create a clear timeline for revision, and/or review agency guidance (e.g., definitions of equity, legislative mandates, etc.).

Communication:

As you approach the end of your design journey, it is vital that you develop a strategy to communicate to the public and that allows the public to effectively communicate with you.

✓ **Have you communicated with the public?** The newly-designed system has been released to the public through a press release, a website was launched dedicated to defining the system and answering frequently asked questions, and graphic maps and/or infographics were created to complement this communication.

- If not, work with your public information officer (or equivalent) to get started on a communication strategy.

✓ **Can the public communicate with you?** A person or team has been designated to field inquires from the public concerning the newly-designed system and a press release and dedicated webpage clearly convey how to contact the team.

- If not, schedule a team meeting to decide how you will make yourselves available and who will be made available for public inquiries.


Equitable Outcomes
POLITICS
POLITICS
OPERATIONAL CHALLENGES
ACCESSIBILITY & INCLUSIVITY CONSIDERATIONS
POLICY & PLANNING HURDLES
BALANCED
MEETS REQUIREMENTS
USS ALLOCATION SYSTEM
FLEXIBLE
ACCESSIBLE
DATA DRIVEN
EQUITABLE

Appendix B

Methods

Systematic Review

A systematic review of literature related to visitor preferences and needs regarding recreation allocation was completed using the PRISMA framework. Boolean-based keyword search term inquiries of relevant databases, journals, and websites were performed using the PICO framework.[1] Research items that met our listed inclusion criteria were recorded in a spreadsheet, where they were charted across various fields including Title of Research, Study Year, Publication, Type of Study, and Research Questions. Quotes from each paper relevant to our study objectives were placed into columns corresponding to their primary findings and findings related to the preferences and needs of visitors concerning recreation allocation. These results statements relevant to our study objectives were then inductively coded by team members. Data from the systematic review was then summarized, analyzed, and inductively coded for themes in association to the research objectives.

Manager Interviews

In-depth semi-structured interviews were conducted with 50 recreation managers—from field rangers, line officers, regional planners, and national resource specialists who have experience with allocating recreation resources across the U.S.—to explore the principles and strategies that these managers use to design their respective allocation systems and the limitations they may face when attempting more efficient or equitable allocation strategies. An initial study sample was obtained using a purposive sample of recreation managers that allocate use, identified via USFS project partners or via recreational policy for the management area and contacted by USFS staff via email, followed by snowball sampling. A semi-structured interview guide of approximately 9 questions was utilized to structure these interviews, with pre-determined contextual follow-up probes included to guide the conversation if need be. Seven supplemental questions were asked if the recreation manager was a federal or state agency river recreation manager as part of the master's thesis of Kelsey Phillips, a graduate student at the University of Montana. Any terms from the study utilized in the interview question (e.g., allocation, rationing, equity) were defined prior to the interview in a viewable document to clarify any ambiguity for the participants.

Interviews were conducted on video call or via phone and lasted between 30 and 60 minutes each. Interviews were then transcribed using Otter.ai, and coded and analyzed using NVivo software to

1 Preferred Reporting Items for Systematic reviews and Meta-Analyses. See Systematic Reviews: a Simplified, Step-by-Step Process © 2021 by Emily P. Jones & Michelle Cawley

identify common themes and subthemes related to the main research questions about allocation decision making and limitations to equitable and efficient allocation strategies amongst recreation managers. These themes were inductively coded following the guidance of Rubin and Rubin (2012), and emerging themes were systematically organized using the Glaser and Strauss's (1967) "grounded theory" method. Member checking was performed to ensure that several interview participants agreed with the summarized results, and intercoder reliability was performed within the research team to ensure proper coding of emergent themes to increase the reliability of the coding (Rose & Johnson, 2020). Confidentiality of subjects was maintained throughout the study, and no names are included in any reports or in the analysis or transcripts for this study. 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).

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