BEYOND FUZZY FEELINGS- FURTHERING RECREATIONAL ECOSYSTEM SERVICES

A Thesis in
Recreation, Park, and Tourism Management

by
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The act establishing the world’s first federal protected area, Yellowstone National Park, imparts that the area be “set apart as a public park or pleasuring-ground for the benefit and enjoyment of the people”. The challenge of managing protected areas to purvey benefits through visitor experiences has since been a major subject of research within the fields of recreation and leisure. Driver and others have advocated for the Benefits Approach to Leisure (BAL) on the grounds that it can serve as an efficient means of maximizing the benefits visitors receive from protected areas. However BAL largely ignores the tradeoffs managers must make with concern to ecological and visitor wellbeing. In an emerging body of literature, use-values inherent with recreation are often referred to as recreational ecosystem services (RES). In this frame, recreational outcomes in protected areas are analyzed in the context of the ecological process through which they are provisioned. These services are those nonmaterial outcomes humans obtain from the natural world such as spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences. Though a union between the management concepts of RES and the BAL has the potential to bridge gaps in both theories, no study has explored a means of linking these theories or their methods. This thesis focuses on both research concerning benefits achieved and services provided, and puts forth a means of coalescing them in future research, through the introduction of the Recreational Ecosystem Services Framework (RESF). This is achieved through an exploration of the foundations of both concepts and a case study in which the RESF is applied.
TABLE OF CONTENTS

LIST OF FIGURES ................................................................................................................. v

LIST OF TABLES ................................................................................................................... vi

ACKNOWLEDGEMENTS ..................................................................................................... vii

Chapter 1  Introduction ............................................................................................................ 1

Problem Statement ........................................................................................................... 2
Theoretical Background ................................................................................................... 2

Chapter 2  Literature Review ................................................................................................... 4

The Evolution of the BAL ................................................................................................. 5
  Recreation Experience Continuum ................................................................................. 5
  The Social-Psychological Model ............................................................................... 5
  Recreational Opportunity Demand Hierarchy .......................................................... 7
  Benefits-Based Management ..................................................................................... 7
  Outcomes-Focused Management .............................................................................. 9
    Applications of OFM and the broader BAL ..................................................... 9
    Shortcomings of OFM and the broader BAL .................................................. 10

Recreational Ecosystem Services ..................................................................................... 11
  The Emergence of Ecosystem Services .................................................................... 11
  Recreational Ecosystem Services ............................................................................. 12
    Disservices ........................................................................................................ 13
    Attainment of RES ......................................................................................... 14
    Strengths of RES ......................................................................................... 15
    Measuring RES ............................................................................................... 16

Connecting BAL and RES ............................................................................................... 18
  Synthesis of Need for a United Framework ............................................................. 18
  Synthesis of Theory .............................................................................................. 20
  Synthesis of Outcomes and Services .................................................................... 21
  A Synthesized Framework ....................................................................................... 24
    Example: Ice Climbing .................................................................................... 24
  Conclusions .............................................................................................................. 27

Chapter 3  Case Study .............................................................................................................. 30

Introduction ...................................................................................................................... 30
  Purpose of the Study ................................................................................................. 31

Literature Review .............................................................................................................. 31
  Outcomes Focused Management ....................................................................... 31
  Outcome Interference and Displacement ............................................................... 33

Methods ............................................................................................................................ 35
  Setting ..................................................................................................................... 35
  Study Methods ....................................................................................................... 37
LIST OF FIGURES

Figure 2-1: The Recreational Ecosystem Services Framework .............................................. 27
Figure 3-1: Recreational Opportunity Demand Hierarchy ...................................................... 33
Figure 3-2: The greater String and Leigh Lake Area with an inset of String Lake Road and available parking lots ........................................................................................................... 37
Figure 3-3: The Recreational Ecosystem Services Framework proposed in Chapter 2 applied to String and Leigh Lakes ........................................................................................................ 49
LIST OF TABLES

Table 2-1: The assessment of outcomes across domains through BAL and CES frameworks .................................................................................................................................................. 23

Table 3-1: Most Commonly Reported Motivations for visiting the SLL area Reported by Respondents and Representative Quotes for each Motivation ........................................................................... 42
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Chapter 1

Introduction

Climb the mountains and get their good tidings, Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you and the storms their energy, while cares will drop off like autumn leaves.

– John Muir, Our National Parks, 1901

In his own way, the naturalist John Muir was the first social scientist to work in our national parks. Muir keenly understood the human compulsion towards nature and the benefits that humans subsequently derive from experiences in the out of doors. The passage above is teeming with themes present in the recreation experience preference (REP) scales compiled by Manfredo, Driver, and Tarrant (1996) and contains the near definition of recreational ecosystem services (RES). This is not to suggest that Muir was a psychological savant of sorts, but simply to say that we have known that protected areas provide benefits to individuals for quite some time and, yet, are still undecided as to how to measure these outcomes.

This is an attempt to further a tradition, a science started by Muir and his contemporaries, of assessing the benefits of outdoor recreation in protected areas. In the last century, this avenue of research has grown with the increase in park visitation and today it finds itself at somewhat of a junction. In one direction, recreation social scientists are following a reliable, well-trodden path blazed by the pioneers of benefits approach to leisure (BAL). Others have opted to break a new trail with hopes of building a bridge to the ecological and biological sciences by evoking ecosystem services (ES) in the recreation context. Finding oneself at this junction means weighing a tradeoff between wisdom and innovation, safety and risk. In such a position, there is an inevitable want for a compromise—a best-of-both-worlds scenario. It is the intention of this thesis to provide the foundation for such an ambition.
Problem Statement

We know that people benefit from outdoor recreation in protected areas, but we remain unsure how best to measure these outcomes. Further, no management framework to date has provided a means for fully understanding how the various negative side effects of increased park use contribute to the production of these benefits. The two primary schools of thought surrounding recreation benefits—the BAL and RES—both contain theories and tools that can help pave the way for an improved means of identifying and quantifying these outcomes. However, very little effort has been made on either front to combine these two perspectives. This thesis will combine an extensive literature review and data collected in a popular national park to build a framework to unite benefits and services, invoke their respective advantages, and help the field of protected area social research go beyond the intangible benefit— to transcend the fuzzy feeling.

Theoretical Background

This thesis, as referenced above, will pull from two theoretical backgrounds: the BAL and RES. The BAL owes its origins to recreation social science and Driver, who championed a benefit-centric approach to outdoor recreation in the 1970s (e.g. Driver & Toucher, 1970; Driver & Brown, 1975; Driver, 1976a; Driver, 1976b). The central motive of the theory is to provide a model for the production of positive outcomes of outdoor recreation experiences, considering antecedent conditions and intervening conditions en route to a goal-object determined by personal motivations (Driver & Toucher, 1970). This goal-object can take the form of an improved condition, the prevention of a worse condition, or the realization of a satisfying psychological experience (Driver & Bruns, 1999). It is set apart from other theoretical approaches to
management in its prioritization, not of demanded recreational opportunities, but the final psychological, social, or physiological products of the recreation. The delivery of these products, or benefits, is viewed as a production system in which inputs such as policy, labor, capital, values of stakeholders, and consumer preferences interact in a common environment and produce intangibles like leadership, enhanced family bonds, and social mobility (Driver & Bruns, 1999).

The production system of benefits in natural protected areas is rooted, however, in environmental processes. For this reason, others have formulated a different means of theorizing the creation of these same benefits as ES. The concept of ES also came to being in the 1970s (Potschin, Haines-Young, Fish, & Turner, 2016). It is broadly defined as the benefits humans obtain from the environment (Costanza, 2016). RES are therefore the benefits obtained through recreation in natural environments. Boyd and Banzhaf (2007), similar to Driver and Bruns (1999), illustrate the provision of RES as a supply chain, where ecological inputs are manipulated by managers and policy to produce a service. RES theory largely ignores, however, the social component of recreational benefit production, therefore leaving a gap in its associated frameworks. The goal of this thesis is to draw from the social strength of the BAL and the ecological strength of ES in the creation of a new management framework rooted in RES. A review of the existing relevant literature is presented first with a proposed framework produced through a synthesis of the literature. This is followed by a case study from Grand Teton National Park (GRTE), Wyoming driven by the presented literature and, finally, a path towards future research is outlined.
Chapter 2

**Literature Review**

Protected areas are a place of convergence. The social meets the ecological. Natural and cultural history blend together. Yet, less obvious is the interaction between managers and visitors. The visitor enters a park with a goal. Perhaps, they wish to meet new friends or, conversely, find solitude. Whatever their desired outcome, it is the job of the manager to assess their capacity to provide such a service. Is it in line with the area’s mission? Do the natural environment and mandate of the management agency allow for the activity required to obtain the outcome? What are the social and ecological impacts of the pursuit of a given goal? Management frameworks based in the BAL have historically guided managers in their answering of these questions within North American protected areas. Benefits-based management (BBM) seeks to provide for the responsible provision of visitors’ sought benefits (Lee & Driver, 1999). Later it was adapted to include disbenefits as well, giving rise to outcomes-focused management (OFM) (Driver, 2008). By blending this framework with the theories of ES, however, we can build a stronger management framework that draws from the social-centric strengths of OFM and the ecologically driven strengths of ES. This chapter presents the unique historical progressions of both ideas, relaying how each progression will inform a combined ES/OFM framework, and will finally present a theoretical means of blending their respective theories.
The Evolution of the BAL

Recreation Experience Continuum

The development of the Recreation Experience Continuum (REC) signaled the first meaningful attempt to mold the BAL into a management framework (Driver & Toucher, 1970). It is seminal to understanding the link between CES and the BAL as it identifies what factors influence user experiences and benefit achievement in a recreational setting (Driver & Toucher, 1970). In the REC, the amount of benefit, or utility, a user derives from an experience is the product of three factors: antecedent conditions (e.g. freshly fallen snow or stress in the workplace), intervening variables (i.e. crowding or an area closure), and the difference between expectation and actual experience. These factors determine whether a user experiences a surplus or deficit of utility between what was expected and what was achieved. The outcomes of benefit achievement feed into future antecedent conditions, thus creating a continuum. The most salient contribution of REC to the BAL is a framework that links activities, settings, and motivation to benefits while considering the impact of intervening variables.

The Social-Psychological Model

Quantifying the surpluses or deficits of benefit achievement is not implicitly explained in REC, creating a major shortfall for managers hoping to implement benefit-based strategies in recreation areas. For this reason, REC quickly evolved into the more defined Social-Psychological Model of Recreation Demand and Benefit (Driver, 1976a;
Driver & Brown, 1975; King & Richards, 1977). This model requires data to be gathered concerning users’ desired motivations for their chosen activity through surveys or interviews. Reasonably similar motivations and desired benefits could then be statistically combined into “Expected Consequences Scales” (later called Recreational Experience Preference [REP] scales). These REP items are groups of consequences that prove to be both conceptually and empirically similar (Driver, 1976a). For example, “to have thrills”, “to experience excitement”, and “to feel exhilaration” can be combined into the broader domain of “Excitement” (Manfredo, Driver, & Tarrant, 1996).

Although the Social-Psychological Model overcame the issues previously encountered in measuring and collecting user preferences, it failed to fully address what motivates one to pursue a given activity, setting, or benefit. Borrowing from the motivational psychology literature, Driver and Bassett (1977) categorize the inputs of preference formation into four domains: the personal incentive to achieve a benefit through a particular opportunity, the expectancy that a particular opportunity will gratify a preference, the availability of the opportunity, and the tendencies of the user’s personality. Driver and Knopf (1977) tested this theory of recreational preference formation to find that personality traits influence the type of activity one pursues, how often they pursue it, and the importance of the various consequences, or benefits, they hope to achieve from it. Their findings highlight the psychological considerations that must be observed to create a management framework for the provision of RES. In creating an RES framework, it must be considered that these traits, along with visitor behavior, can be determining factors in whether an outcome is seen as either a service or disservice, as discussed by Belaire, Westphal, Whelan, and Minor (2015).
Recreational Opportunity Demand Hierarchy

Understanding the link between the outcome, or RES one seeks and the reason for their recreational pursuit is best understood as a function of demand. The ranking of importance of specific benefits implies varying levels of demand. In the Recreational Opportunity Demand Hierarchy (RODH) (Driver & Brown, 1978) opportunities are placed in a categorical ladder, based on user demands, creating a flow of demand from recreation activity to setting and situational attributes to specific psychological outcomes and, finally, the outcomes that flow from satisfying experiences. This means of examining demand allows for further specificity of opportunities. For example, Graefe, Ditton, Roggenbuck, and Schreyer (1981) observed that users participating the same activity, rafting, had different motivations based on setting (the river on which they recreated) suggesting that while all demanded the same activity, their chosen setting, or secondary demand, created a rift in motivations and benefits sought. Knopf and Lime (1984) found similar results, with floaters on Alaska’s Delta River seeking to learn new things, develop new skills, and avoid crowds significantly more than those on Arizona’s Salt River.

Benefits-Based Management

The foundation set from RODH eventually lead to Benefits-Based Management (BBM) (Driver, 1997; Lee & Driver, 1999). BBM presents a demand-side approach to recreational zoning by identifying the beneficial outcomes of recreation (Cerveny et al., 2011; Harshaw & Sheppard, 2013). By focusing on user demand, BBM advances the
central tenant of the RODH. Yet unlike its predecessor, instead of focusing on activity and setting first, BBM begins by identifying benefits and then manipulates the components of the setting to achieve those benefits through a given activity (McCool, Clark, & Stankey, 2007). In their original outline of the framework, Lee and Driver opt for an adaption of Ewert’s (1986) domains of benefits: physical, social, and psychological. More recent work, however, has opted towards the domains of personal, social, economic, and environmental benefits (Driver & Bruns, 1999; Driver, 2008). The objective of BBM is to facilitate the achievement of target benefits through management actions (Weiler, Moore, & Moyle, 2013).

However, before the framework of BBM can be adapted for RES, further definition of “benefit” is needed. Working within the RODH, Haas, Driver, and Brown (1980) compiled ten psychological outcome domains for wilderness recreation. Brown (1981) formally defined psychological benefits as “subsequent outcomes resulting from immediate experiences and provide the reasons for people to participate in specific activities in specific settings” (pp. 13). Here Brown again reinforces the logical progression from activity and setting to motivation and benefit present in the RODH. Driver and Harris (1981) expanded this benefits definition, however, as something that can be created either through the creation of an improved condition or desired change in state or through the prevention of a worse condition.
**Outcomes-Focused Management**

Driver (2008) provided the most recent iteration of the BAL entitled Outcomes-focused management (OFM). The primary distinction between OFM and BBM is the acknowledgement that outcomes from recreational experiences can be negative (Driver, 2008). Therefore, a management framework must consider costs alongside benefits to maximize positive outcomes to visitors. Driver and Bruns (2008) categorize these outcomes into the following domains: psychological, personal development and growth, personal appreciation and satisfaction, psychophysiological, household, community, economic, and environmental. Within each domain sit possible positive and negative outcomes.

The evolution from BBM to OFM provides two essential tethering points in the creation of a unified BAL and ES framework: the recognition of negative outcomes and the formulation of encompassing domains. These two additions create critical parallels to the disservices recognized in the ES literature and the domains allow for integration with the subdomains of CES. In order to understand how the two might be applied in conjunction, it is therefore useful to first understand how OFM and the broader BAL have been implemented in research and management to date.

**Applications of OFM and the broader BAL**

Due to its promise as a practical, efficient management tool, research framed in the BAL has been highly prolific. Benefits-based analysis has been carried out through qualitative (e.g. Bengston, Fan, & Celarier, 1999; Beh & Bruyere, 2007; Wyman & Stein,
10

2010), quantitative (e.g. Stein, Denny, & Pennisi, 2003; Hendricks, Schneider, & Budruk, 2004; Leahy, Shugrue, Daigle, & Daniel, 2009), and mixed-methods approaches (e.g. Godbey, Graefe, & James, 1993; Stein, Anderson, & Thompson, 1999; Moyle, Weiler, & Moore, 2014; Moyle & Weiler, 2017). BBM has been integrated into studies at nearly every scale of protected areas, ranging from urban settings (e.g. Borrie & Roggenbuck, 1995; Allen, Stevens, & Harwell; 1996; Allen & McGovern, 1997; Baldwin, 2000; Hurtes, Allen, Stevens, & Lee, 2000; Ho et al., 2005; Stodolska, Shinew, Acevedo, & Izenstark, 2011) to wilderness areas (e.g. Paxton & McAvoy, 2000; Roggenbuck & Driver, 2000; Borrie & Birzell, 2001; Holman & McAvoy, 2004).

Shortcomings of OFM and the broader BAL

Despite its broad management and research applications, OFM has drawn critics for a variety of perceived shortcomings. Critiques of the BAL derive, in part, from an array of methodological and conceptual concerns that have been brought forward, including: 1) the assumption that visitors act rationally in protected areas (More & Kuentzel, 1999), 2) a disregard of full consideration of “disbenefits” (More & Kuentzel, 1999), 3) the lack of recognition that recreational experiences are temporally dynamic (Roggenbuck, 2000), and 4) the failure to account for external factors that affect visitor experience (More, 2002). Other literature has pointed toward issues associated with the implementation of OFM, including: 1) identifying the relationships between inputs and outcomes of recreational opportunities (Pierskalla, Lee, Stein, Anderson, & Nickerson, 2004), 2) the lack of a definitive framework for managers to follow (McCool, Clark, &
Stankey, 2007), and 3) linking physical experiences with psychological benefits (Manning, 2011a). Finally, the task of measuring desired benefits can prove costly and requires a certain expertise in social science research, though this process is becoming increasingly simpler and cost-effective (Barić, Anić, Tončić, & Bedoya, 2015).

This is not to say, however, that the academic community has concluded that managing areas for the maximization of benefits is a fruitless pursuit. Indeed, research and public interest on recreational benefits related to human well-being is increasingly prolific and well documented (Pröbstl-Haider, 2015; Williams, 2017). Yet, in some academic spheres terminology is shifting toward a lexicon more appropriate for the land managers grappling with a dual-mandate of use and preservation. Protected areas provide services, and we are beginning to understand that it is the supply of these ES that managers and planners facilitate. For this reason, some park managers and researchers are opting to frame their management regimes in accordance to ES.

**Recreational Ecosystem Services**

**The Emergence of Ecosystem Services**

ES and their inputs are central to our understanding of coupled human and natural systems (CHANS) (Fu, Wang, Su, & Forsius, 2013). Within this classification of services three major sections exist: provisioning, regulating and maintenance, and cultural. While the first two sections largely involve material consumption and/or passive absorption of environmental outputs, cultural ecosystem services (CES) include “all the non-material,
and normally non-consumptive, outputs of ecosystems that affect physical and mental states of people” (Potschin & Haines-Young, 2016). The 2005 Millennium Ecosystem Assessment (MEA), a major assessment of humans’ impact on the planet and springboard for ES management implementation funded by the Global Environment Facility, the United Nations, and the government of Norway, further distinguished CES into the following sub-domains: cultural identity, heritage values, spiritual services; inspiration, aesthetic appreciation of natural and cultivated landscapes, and recreation and tourism (MEA, 2005). It is well established that the delivery of these services in protected areas often requires managerial trade-offs with the supply of provisioning and regulating and maintenance services (Rodriguez et al., 2006). Similarly, trade-offs have been shown to exist among CES sub-domains (Ament, Moore, Herbst, & Cumming, 2017). In this way, the groups of coprovisioning or codependent services, also known as “bundles”, provided by protected area managers can be supplied in accordance with both visitor demand and the directives and mission of the area itself. As noted by Cronon (1996), emotions of a sublime nature and sheer terror can be coprovisioned in wilderness all within the same experience. Therefore, these bundles can exist on a personal level, as both negative and positive outcomes, and vary in their magnitude depending upon the person.

Recreational Ecosystem Services

An extensive amount of research has been carried out in the past decade concerning the provision of CES in parks and protected areas. Though much of this research has evaluated the sub-domain of RES, studies have examined every cultural sub-
domain within recreational contexts. This necessitates the point that a distinction must be drawn between recreational opportunities being ecosystem services unto themselves and ecosystem services being derived through recreation. To date, no typology has been universally adopted to differentiate the definitions, though the MEA (2005) defines CES as the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences. It follows then, for the purposes of our discussion and proposed framework, RES refer to the outcomes people obtain from ecosystems through recreation. In this adopted MEA definition, a trail is not a service unto itself, but the service is the physiological, social, or psychological outcome derived through interacting with the trail and the surrounding environment. This definition is strikingly similar to that of the positive outcomes described by Driver (2008) in his outline of OFM, the one obvious difference being the specification that RES must be derived through natural ecosystems (Martin, Mongruel, & Levrel, 2018). However, RES studies have examined human constructed infrastructure in natural environments from artificial coral reefs (Belhassen, Rousseau, Tynyakov, & Shashar, 2017) to urban green infrastructure (Sikorska, Sikorski, & Hopkins, 2017).

**Disservices**

An additional shared strength of both OFM and RES is their common capacity to capture negative outcomes. Though this was the driving force that led to the evolution from BBM to OFM, few studies have examined negative outcomes within the standard line of recreation literature. Within the CES literature, however, such research is
emerging, albeit in a different framework and with an ecological lens. Ghermandi, Galil, Gowdy, and Nunes (2015) find negative recreational outcomes from a jellyfish outbreak in the Mediterranean Sea. Similarly, Arnberger et al. (2017) find that invasive insects are prohibiting the attainment of recreational benefits in an urban forest. Tengberg et al. (2012) report that declining marine biodiversity leads to a loss of CES such as cultural identity and social integration. In their case study, scarcity of certain fish species in the Arafura and Timor Seas led to few opportunities for women to harvest together and therefore a diminished social integration.

**Attainment of RES**

The Tengberg et al. (2012) study presents a rather extreme example of what sets RES apart among the range of ES. Recreational benefits are somewhat unique in the way they are obtained. Unlike, for instance, the control of tick-borne illness provided by opossums (Keesing et al., 2010), RES require direct human physical or psychological engagement with the environment in order to reap the benefit (MEA, 2005). While enjoying a lower risk for infectious disease does not necessitate coming into contact with a pink-nosed marsupial, finding social integration through community marine harvesting requires active participation by the beneficiary, just as finding one’s inner peace from fly-fishing requires actually stepping into the stream.
Costanza et al. (2014) put forward a framework for ecosystem services’ production of human well-being. In this conceptual model, ES often interact with social, built, and human capital to produce an overall level of human well-being. Though this largely disregards the unique RES requirement of the receiving agents’ interaction with the natural capital, it provides clearer model of how personal benefits are generally derived from the natural world.

The fact that ES encompasses both the ecological and social aspects of protected area management stands as its primary advantage over BAL directed management (Willis, 2015). Given Stenseke and Hansen’s (2014) finding that recreation management is more often delegated to biologists than social scientists, framing benefits within an ES framework creates a more translatable unit of measurement across disciplines. This is especially important in the context of trade-offs. Turner, Odgaard, Bocher, Dalgaard, and Svenning (2014) find that bundle of services containing carbon storage, hunting, and nature appreciation services in Denmark corresponded to lower levels of agricultural services and sense of place. Therefore, making management decisions surrounding trade-offs between these bundles of services in protected areas requires a capacity for conversion and comparison. This is often carried out through the monetization of services’ value. For example, Jenkins, Murray, Kramer, and Faulkner (2010) calculated the dollar value of ecosystem services associated with wetland restoration in the American South, comparing and aggregating the relative values of ES associated with climate change mitigation and recreation. Analysis of the balance between provisioning,
regulating, and cultural ecosystem services have been made at local (e.g. Sanon, Hein, Douven, & Winkler, 2012), regional (e.g. Queiroz et al., 2015) national (e.g. Turner et al., 2014), and continental levels (e.g. Maes, Paracchini, Zulian, Dunbar, & Alkemade, 2012). In the case of the United States’ national parks, which operate under a dual mandate of preservation and recreation, weighing tangible and intangible ecological and social benefits and costs presents a significant challenge (Sax, 1980). However, if we return to the foundational studies of the BAL that surveyed river recreationists in the American Southwest (e.g. Graefe, Ditton, Roggenbuck, and Schreyer, 1981) the useful applications of ES in national park settings become rather apparent. In a region infamous for aridity, maximizing the benefit of water is of obvious importance. Therefore, an ES framework can be implemented to assess the consumptive and nonconsumptive utility of water resources as they pertain to service domains ranging from agricultural and energy to recreation and wildlife. Additionally, these services can be correlated into coprovisioning and codependent bundles.

**Measuring RES**

Daniel et al. (2011) note the lack of consideration CES often receive in the analysis of these bundles. The authors argue that to gain a truly comprehensive understanding of the human-nature interaction, it is imperative to examine cultural services. For instance, to understand the value of a river’s in-stream flow, the biophysical services along with the inherent cultural values (e.g. intrinsic, scenic, recreational, etc.) must be considered. Such values can be derived through monetary quantification (either
directly or indirectly), non-monetary quantification (i.e. through Likert scales), or qualitative analysis; thus, creating a spectrum of valuation methods ranging from direct to indirect measurements of services (Daniel et al., 2011).

Analyzing recreational benefits as CES also opens up a variety of indirect tools of quantification. Pastur, Peri, Lencinas, Garcia-Llorente, and Martín-López (2016) quantified the provision of CES in Southern Patagonia by analyzing geo-tagged digital images available publicly online. Ala-Hulkko, Kotavaara, Alahuhta, Helle, and Hjort (2016) studied the fulfillment of CES demand by analyzing the spatial link between service providing areas and service benefiting areas in Finland. Hutcheson, Hoagland, and Jin (in press) used a travel cost model to quantify the value of environmental education in New York City’s Hudson River Park. In total, Hirons, Comberti, and Dunford (2016) identified eight purely-revealed preference methods for quantifying CES, including: shadow and hedonic pricing, travel cost/time, production function approaches, photographic analysis, quantitative modeling, geographic information systems (GIS)-based approaches, and integrated assessment modeling.

Because ES frames benefits as the product of ecological inputs, these can be analyzed to understand the capacity a certain protected area holds to purvey a bundle of services. Boyd and Banzhaf (2007), therefore, suggest the creation of recreational benefits operates like a supply chain, not unlike the manufacturing of any other good or service. The benefits one might experience from ice climbing, for example, are a product of direct ecological inputs, like a frozen waterfall, and provisioning inputs, like surface water availability. Following this example, the capacity for a certain park to provide
exhilaration through ice climbing can be calculated indirectly by analyzing topography, climate, water availability, and a likely incalculable array of other ecological inputs.

**Connecting BAL and RES**

Calculating the ecological services that promote a bundle of outcomes is, of course, only a portion of the total equation. The provision of recreational services is the product of CHANS (Liu et al., 2007). The decision-making of other recreationists and the managers, themselves, also influence goal achievement (e.g. Park, Lee, & Peters, 2017). Therefore, if we are to manage protected areas for the benefit and enjoyment of the people, we must consider both those benefits provisioned by humans and those tendered by nature. The maximum benefit from the waterfall must be unlocked by land managers offering the appropriate access, policy, signage, and an infinitely long list of other inputs for example, in concert with the ecological components. Chan, Satterfield, and Goldstein (2012) argue that RES are better thought of as the intangible benefits facilitated by both cultural and provisioning services. While this brings us toward a more honest understanding of how recreational benefits are cultivated, it still lacks the crucial social link to the planning for the provision of RES.

**Synthesis of Need for a United Framework**

By their very definition, RES exclude those benefits provisioned by human systems (MEA, 2005). Considering both social and ecological sources of visitor
outcomes, the BAL framework presents a more holistic list of benefit domains. Yet, the valuation of benefits tendered by the natural environment lacks significant rigor in its valuation within the BAL. Watson, Cordell, Manning, and Martin (2016) argue that, in the case of designated wilderness areas, calculating these ecological benefits is vital towards ensuring future protection. Additionally, Yli-Pelkonen (2013) found that RES seeking visitors in Helsinki’s urban parks were also motivated by social benefits facilitated through human infrastructure.

However, Canedoli, Bullock, Collier, Joyce, and Padoa-Schioppa (2017) note that the bulk of CES studies do not inform actual management decisions, leading to a gap between the literature and practice. In large part, this is a product of a systemic lack of standardization. Boyd and Banzhaf (2007) argue that accounting units of ES have largely failed to measure contributions to human welfare.

Given the superior range of valuation methods and ecological consideration presented by the RES framework and the consideration of interfering factors present in the REC, the standardized REP scales of the Social-Psychological Model, the more complete outcome domains of OFM, and the consideration of outcome sources offered by the broader BAL, a union between the frameworks is needed to better analyze visitor experience in protected areas. By joining the unique strengths of ES and frameworks, a united framework can advance recreation-focused social science and management.
Synthesis of Theory

The thesis is a simple one: by combining the best qualities of OFM and RES, a better framework for evaluating benefits obtained by park visitors can be derived. To put forward such a framework requires the identification of how each management strategy might aid the other. In terms of theory, the primary strength of RES is the acknowledgement that the attainment of benefits can be foiled by an array of inhibiting factors. Biological factors such as invasive species (e.g. Arnberger et al., 2017), management decisions such as energy development (e.g. Gee and Burkhard, 2010), and social elements such as crowding (e.g. Villamagna, Mogollón, and Angermeier, 2014) can interfere with the attainment of services. Research framed in the BAL has largely failed to identify outcome-interfering variables, with the exception of conflict. Though Driver and Toucher (1970) directly allude to this in their first paper on the REC, virtually nothing has examined intervening conditions within the benefits approach to date.

In contrast, OFM provides a more holistic definition of outcomes (or services) than what is typically utilized in the RES literature. Though the ES framework at large recognizes the existence of both benefit-interfering factors and negative services (e.g. van Wilgen, Malitte, & Cowling, 1998; Dunn, 2010; von Döhren, & Haase, D., 2015), this concept has scarcely been applied to RES. If an input such as fresh snow fall has the capacity to provide positive services to downhill skiers, it would certainly hold true that the same input would lead to a disservice to traditional bicyclists. Though subtle, this recognition is imperative from a managerial perspective, for the magnitude of services
and disservices provided by various inputs must be considered in order to yield a net-benefit (Nowak, Stevens, Sisinni, & Luley, 2002).

Synthesis of Outcomes and Services

Measuring these services and disservices in a meaningful way requires standardization, a common issue for both frameworks. Few studies framed in the BAL use the same array of REP scales or benefit domains. Most lack a common definition of what constitutes a benefit. As noted by Driver (personal communication, February 2, 2018), many studies mistakenly overlap the unique definitions of recreational motivations, experiences, and benefits. Benefits are products of experiences, just as experiences are the products of motivations. CES studies have a similar disagreement in their conflicting use of the word “service”. Some refer to service as the provisioner of the benefit, while others refer to it as the benefit itself. As previously noted, however, the MEA (2005) adopts the latter definition. Likewise, studies framed in an ES framework fail to agree on a common typology of CES or RES sub-domains. No counterpart to REP scales and domains exists in the CES literature.

This is not to say that the typology of benefits presented through the BAL’s outcome domains are not transferable to RES studies. Table 2-1 presents the OFM outcome domains (Moore & Driver, 2005) with representative recreation studies rooted in OFM and RES. For each outcome domain, one study is framed within OFM and the other relies on the ES framework. Comparing the outcomes revealed (or proposed) through the studies framed in either OFM or ES, it is found that both disciplines can offer
the other a unique range of useful theory and methods, yet both fit within the auspices of the REP scale-derived benefit domains. In fact, as a whole, studies framed in a CES framework have done a more thorough job of measuring outcomes, as opposed to the consistent measuring of experiences or motivations within BAL studies. It is important to note that a depth of studies have evaluated the outcomes of recreation outside of the BAL or ES frameworks, yet for the purposes of comparing these selected frameworks other such studies have been excluded.
Table 2-1: The assessment of outcomes across domains through OFM and CES frameworks

<table>
<thead>
<tr>
<th>Outcome Domain</th>
<th>BA/L Study</th>
<th>Authors</th>
<th>Outcomes</th>
<th>CES Study</th>
<th>Authors</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>Application of OFM on the McInnis Canyons National Conservation Area</td>
<td>Bruns, Driver, Hopkins, &amp; Peck, 2008</td>
<td>-Restored mind from unwanted stress</td>
<td>Evaluating the attractiveness and effectiveness of artificial coral reefs as a recreational ecosystem service</td>
<td>Belhassen, Rousseau, Tynyakov, &amp; Shashar, 2017</td>
<td>-Relaxation</td>
</tr>
<tr>
<td>Personal appreciation and satisfaction</td>
<td>Application of OFM on the McInnis Canyons National Conservation Area</td>
<td>Bruns, Driver, Hopkins, &amp; Peck, 2008</td>
<td>-Improved physical fitness</td>
<td>The role of human, social, built, and natural capital in explaining life satisfaction at the country level: Toward a National Well-Being Index</td>
<td>Vemuri &amp; Costanza, 2006</td>
<td>-Life satisfaction</td>
</tr>
<tr>
<td>Psychophysiological</td>
<td>Application of OFM on the McInnis Canyons National Conservation Area</td>
<td>Bruns, Driver, Hopkins, &amp; Peck, 2008</td>
<td>- Improved physical fitness</td>
<td>Integrating community gardens into public parks: An innovative approach for providing ecosystem services in urban areas</td>
<td>Middle, Dzidic, Buckley, Bennett, Tye, &amp; Jones, 2014</td>
<td>-Improved nutrition</td>
</tr>
<tr>
<td>Community</td>
<td>Application of OFM on the McInnis Canyons National Conservation Area</td>
<td>Bruns, Driver, Hopkins, &amp; Peck, 2008</td>
<td>-Improved cultivation of aesthetic appreciation for the area</td>
<td>Social–ecological memory in urban gardens—Retaining the capacity for management of ecosystem services</td>
<td>Barthel, Folke, &amp; Colding, 2010</td>
<td>-Community resilience -Social-ecological memory -Local economic growth</td>
</tr>
<tr>
<td>Environmental</td>
<td>Application of OFM on the McInnis Canyons National Conservation Area</td>
<td>Bruns, Driver, Hopkins, &amp; Peck, 2008</td>
<td>-Increased resource stewardship and protection</td>
<td>The forest has a story: cultural ecosystem services in Kona, Hawai’i</td>
<td>Gould et al., 2014</td>
<td>-Environmental identity</td>
</tr>
</tbody>
</table>
A Synthesized Framework

In order to create a framework that brings together the strengths of both OFM and CES analysis and implementation, we must consider the existing frameworks for the creation and assessment of recreational benefits. Based on the available literature, Potschin and Haines-Young’s (2011) ecosystem service cascade mode, Driver and Toucher’s (1970) REC, Driver and Brown’s (1978) RODH, and Driver’s (2008) expanded OFM model of recreation opportunity production have been chosen. Together, these frameworks and our review of the literature combine to create a Recreational Ecosystem Services Framework (RESF) (Figure 2).

Hypothetical Example: Ice Climbing

Potschin and Haines-Young (2011) present a model that, similar to Driver (2008), flows as a variety of inputs into a single bundle of outputs. They fail, however, to include social or managerial inputs. For this reason, the function of setting provided by Driver and Brown (1978) and Costanza et al. (2014) has been included. In addition, it was determined that the hierarchal cascade model presented by Potschin and Haines-Young (2011) and Driver and Brown (1978) represents an actuate depiction of the provision of RES. Finally, Driver and Toucher (1970) allow for the possibility of limitations to the provision of services and the creation of a feedback loop from outcomes to future recreational visits.
The workings of this managerial framework can be followed through the previously described example of ice climbing. The cascade leading to the bundle of recreational outcomes begins with a biophysical structure or process, in this case a northern forest stream. The function of this stream is a waterfall, frozen by the provisioning service of a cold climate and shaped by a distinctive shale geologic formation. Our frozen waterfall sits within the managerial setting of a state park, with trail access leading from a nearby parking area. The social setting, at a hypothetic moment in time, consists of two groups of climbers. One group is a beginner’s class led by a guide and the other consists of two independent expert climbers. Both groups are utilizing the various aspects of the setting to engage in ice climbing. The first group is largely motivated by learning new skills and meeting new people. The latter group is seeking an experience of challenge and solitude.

Various components of the ecological, managerial, and social settings can intervene with the realization of the sought outcomes of these motivations, however. Warming conditions might cause the ice to turn weak. Bitter cold might make climbers uncomfortable. A wolverine in the area might lead to an array of reactions from awe to fear. A trail closure might lead to no climbing at all, or having to settle for a lesser ideal substitute setting or activity. The amount of climbers in the area may lead to a reduced sense of solitude for the expert climbers or increased sense of security for beginner climbers. These factors, combined with the cascade of other inputs, provision a unique bundle of outcomes. One hypothetical bundle might include the following: a more holistic sense of wellness, improved problem-solving ability, improved social resilience,
increased personal stress, loss of environmental quality, increased anthropocentric noise, increased local tax revenue from visitors, etc.

These bundles of outcomes then become inputs in their own right, as they then flow back into the framework, thus creating two feedback loops. One loop concerns the future actions of visitors, while the other informs future management of a given resource. It follows that the outcomes of a particular experience may affect the future decisions made by visitors (Kil, Holland, Stein, & Ko, 2012). Additional support for this assumption comes from the recreation economics literature and the concept of the rational recreationist (Davis, 1963). A recreationist is likely to use information gained from past experiences to attempt to maximize net gain on a future outing. Differences in motivations and outcomes could then lead to changes in the selection of future recreational settings. Additionally, the provision of outcomes will ultimately determine future management of the area in question, perhaps through visitor feedback (Schirpke et al., 2018). This, in extreme circumstances, can lead to changes in the biophysical structure of the area (e.g. mineral extraction, road building, landscape grading, etc.).
Conclusions

Balvanera et al. (2016) note a “cultural divide” that persists in ES research. While an abundance of high-quality biological information exists concerning culturally important species, there is a significant knowledge gap concerning their associated cultural services, including RES. The same could be said for abiotic resources such as water or climate. Tscharntke et al. (2012) find that management is crucial for the provision of ES, cultural or otherwise. If we are to best manage protected areas, we will
require data concerning the services provisioned through recreation. It is the goal of the RESF to bridge the cultural divide presented by Balvanera et al. (2016) and Milcu, Hanspach, Abson, and Fischer (2013).

By including the strongest elements of both frameworks, the RESF presents itself as a tool for the global academy—for application across continents and disciplines. Decades of research by Driver and others led to the careful creation of OFM, which today stands as an intrepid, innovative approach to protected area management. Yet even this model has weaknesses (Pierskalla et al., 2004; McCool, Clark, & Stankey, 2007; Manning, 2011a). Thus, the door has been opened to construct a better, more complete framework for reaching toward the ultimate goal of providing for maximum enjoyment while minimizing impact.

The truth of the matter is that we have been moving toward a homogeneous model by way of convergent evolution of these respective theories for the last four decades. Whether we call them outcomes or services, the syntax is of little consequence. Both are principally those benefits that accrue to visitors in recreational, natural settings. The manager’s task of providing these benefits while balancing trade-offs does not change with the acronyms. Indeed, perhaps the one primary take away from this review of the literature is that by moving toward a united framework we can make more informed decisions concerning trade-offs. The RESF is nothing more than a gateway to better management. It, too, will likely be challenging to implement fully, but considering the scope of social and ecological factors considered in the framework, it provides a practical model of providing RES.
To apply this framework to both research and management, however, will require careful consideration of how unique profiles of protected areas can fit within the auspices of its individual components. The following chapter examines visitor experience in a national park setting using a qualitative approach and applies the RESF to frame the themes presented in the analysis of visitor interviews.
Chapter 3

Case Study

Introduction

No two national parks are same in nature, nor are they homogenous social-ecological systems unto themselves. Varying resources are more attractive than others, making some lakes, wildflowers, and birds more desirable. Over time and experience, visitor recreational preferences change (Lindhagen & Hörnsten, 2000). Yet parks within the National Park Service (NPS) system have a fixed supply of the biophysical structures and provisioning ES they are managed to protect. If demand for glacial lakes rises, more cannot be simply constructed and supplied to meet the trend. Additionally, emerging recreational opportunities (i.e. slack-lining, stand-up paddleboarding, BASE jumping, etc.) often present management challenges for the NPS as their impact and appropriateness are weighed (Metcalf, Miller, Mkumbo, Depper, & Thomsen, 2017).

These coupled factors prompt the issue of scarcity, along with the increased possibility of negative visitor experiences and resource damage. In the parks and recreation literature, we have long focused on benefits, or services, but there is a lack of research about the outcomes of recreation more broadly—considering both negative and positive outcomes (Driver, 2008). Within the scope of ecosystem services, however, such “disservices” have been better documented, therefore providing a means of analyzing these illusive costs (i.e. Zhang, Ricketts, Kremen, Carney, & Swinton, 2007; Plieninger et al., 2013)


**Purpose of the Study**

This study seeks to understand what is drawing visitors to the popular String and Leigh Lakes (SLL) area within Grand Teton National Park (GRTE), Wyoming and identify any factors that may be interfering with the realization of visitors’ RES. In this way, we seek to gain insight into what effect the influx of visitation is having on the attainment of the outcomes visitors are pursuing in the SLL area. Given the limited social science data about the SLL area, this study employs a qualitative approach to understanding visitor experiences in this area. Moreover, we wish to revisit OFM and the RODH as they relate to protected area management. The SLL area and the qualitative nature of our study provides a clear avenue for applying both the motivations domains compiled by Manfredo, Driver, and Tarrant (1996) and the levels of recreationists’ demand as outlined by Driver and Brown (1978). To our knowledge, the effect crowding and displacement have on experience and outcomes is largely unexplored, especially with concern to OFM and RODH. Given critiques of both management frameworks, we ask how they might be refined and enhanced into more robust, practical management models by blending them with the theory of ES.

**Literature Review**

**Outcomes Focused Management**

Lee and Driver’s (1999) benefits-based management (BBM) begins by identifying recreational benefits and then manipulates the components of the setting to achieve those
benefits through a given activity (i.e. Kil, Holland, & Stein, 2010; Gómez & Hill, 2016). OFM builds on BBM by managing for the outcomes, whether positive or negative, humans hope to achieve when they enter a recreational setting (Driver, 2008). Driver and Brown’s (1978) recreational opportunity demand hierarchy (RODH) provides a framework for implementing OFM (Figure 2), in which visitors connect activity, setting, and motivation to achieve a recreational outcome (Peterson & Driver, 1990).

However, the assumption that visitors act with the purpose of achieving certain outcomes has been criticized. More and Kuentzel (1999) challenge OFM’s assumption of rational action in recreation, arguing that recreationists act largely irrationally. Pierskalla and Lee (1998) reject the OFM assumption that recreationists are purposeful in pursuing physiological and psychological goals through their experience. On the other hand, Davis (1963) finds difficulty in accepting that “behavior involving investments of hundreds of dollars in equipment and expenditures of major sums of money and leisure time in travel and actual pursuit of the recreation is not guided by the norms of rationality” (pp. 241-242). More recently, Svarstad (2010) finds that not only do individuals conform to both personal and societal rationality in their recreation decisions, but they also seek specific psychological and fitness outcomes from the activity and settings they choose. Within this research, we carefully consider the critiques of OFM in our design, while also relying upon Davis and Svarstad’s theories of rational recreation. Furthermore, we rely on the primary strength OFM: taking BBM one step further through its recognition that benefits are not the only outcomes of recreational experiences, acknowledging that costs (or negative outcomes) can also occur (Driver 2008).
Outcome Interference and Displacement

Jacob and Schreyer (1980) introduced the concept of goal interference within the context of conflict. In the event of conflict between visitors, the authors suggest four possible sources: 1) activity style, 2) resource specificity, 3) mode of experience, and 4) lifestyle tolerance. Though the authors make no mention on how crowding in an area can cause goal interference, Watson (2001) found that goal interference via crowding can occur through each of the four sources. Additionally, research framed in ES has broadly
reported how aspects of the natural setting can interfere with CES attainment (i.e. Amberger et al., 2017; Ghermandi, Galil, Gowdy, & Nunes, 2015; Tengberg et al., 2012).

In our analysis, we will apply Owens’ (1985) theory that conflict is a cumulative effect of social interaction that endures as a psychological state, thus preventing the expected outcomes from accruing to a recreationist. Owens’ (1985) process of social interaction includes a final step in which crowd-sensitive users are displaced to less crowded areas. Clark, Hendee, and Campbell (1971) define displacement as an invasion and succession process that occurs as recreationists respond to changes in the physical and social environment. To date, three types of displacement have been identified: intrasite, intersite, and temporal (Kuentzel & Heberlein, 1992; Hall & Shelby, 2000). Intrasite displacement occurs when users move to another location within a single site. Intersite displacement occurs when users leave the area to participate in the activity elsewhere. Temporal displacement occurs when the time of visitation is altered by adverse changes in the recreational environment. All forms of displacement are types of coping behavior, where recreationists’ experience is changed by interfering factors within the setting (Manning, 2011b).

Although an ample amount of research has examined displacement, there is a lack of research examining it as an outcome interfering variable, from either the BAL or ES approach (i.e. Schneider & Wynveen, 2015). Though conflict has been examined as an interfering factor, crowding and displacement have largely been excluded from OFM framed studies (i.e. Watson, 2001; Villamagna, Mogollón, & Angermeier, 2014). To examine these relationships, to better understand what is drawing visitors to the SLL area as opposed to other settings of GRTE, and to examine what components of OFM and
RODH can be improved upon, two overarching research questions guided the study, including:

RQ1: What factors are motivating visitors to travel to SLL?

RQ2: What factors are potentially interfering with visitors’ attainment of services in the SLL area?

Methods

Setting

GRTE is located in the northwest corner of Wyoming, just south of Yellowstone National Park. Within GRTE, the greater String and Leigh Lake (SLL) area (Figure 3-2) is located north of Jenny Lake and accessed via three parking lots, and associated trailheads, located on String Lake Road. This area, specifically, is experiencing an influx of recreation demand. New forms of recreation (i.e. stand-up paddleboarding and pack rafting) and existing uses (i.e. hiking and picnicking) attract an array of visitors who all recreate within an area with a fixed amount of resources like parking, picnic tables, and lakeshore.

The popular eastern shore of String Lake is adjacent to String Lake Road. String Lake is surrounded by the 3.7 mile String Lake Loop Trail, a popular and easy hike with sweeping views of the lake and the Teton Range. The parking area of String Lake Road provides access to the Leigh Lake Trail, a 0.9 mile path that leads to the southern edge of Leigh Lake with connections to the Valley Trail and Paintbrush Canyon Trail. The
southern parking lot on String Lake Road provides access to Jenny Lake via the String Lake Trail. From any of the parking lots, Trapper Lake, Bear Paw Lake, and Holly Lake can be accessed through slightly more strenuous day hikes. Additionally, Laurel Lake and Hanging Canyon can be reached via social trails and serve as popular hiking destinations.

Leigh Lake cannot be accessed via motor vehicle, thus providing a more backcountry experience. It can be reached by either hiking the Leigh Lake Trail (0.9 miles) or paddling from String Lake and portaging to Leigh Lake (~1 mile). The western shore of Leigh Lake hosts four backcountry canoe campsites. The eastern shore has a group camping site accessed via the Valley Trail. Climbers and mountaineers can also access Mount Moran by hiking or paddling to its base at the northwest corner of Leigh Lake.
Study Methods

Semi-structured exit interviews were conducted with both day and overnight backcountry users in the SLL area. Data collection took place from July 21st, 2017 to September 9th, 2017 for a total of fourteen sampling days. This sampling window was selected to coincide with peak visitation to GRTE. A rove approach was selected over an interception point, due to the many pedestrian access points to the area and the need to capture a variety of user groups exiting the area by way of multiple trails. All of the

Figure 3-2: The greater String and Leigh Lake Area with an inset of String Lake Road and available parking lots. Credits: ESRI and the Grand Teton Association.
interviews took place along a predetermined route that followed the section of the String Lake Loop Trail that passes along String Lake’s eastern shore (see Figure 1). The area was selected due to its proximity to exit points from String and Leigh Lakes. In total the route covered 1174 meters (0.73 miles) of trail, passing all six designated parking lot access points to String Lake, all popular beach areas, the boat launch, one of two picnic areas, and access trails from Leigh and Jenny Lakes. To reduce bias and improve validity in the interviewing process, only three trained university researchers were selected to administer the interviews.

**Random Sampling**

As a means of randomizing the study, a series of measures were taken to reduce selection bias. The rove took place only in a north to south direction along the trail, as to best randomize the possible intercepts. At the beginning of each sampling day a random number between 1 and 20 was generated using an iPad application “The Random Number Generator” by Nicholas Dean Apps. This number determined both the start time of the sampling day and the time between rove intercepts. For example, if the random number was 14 and sampling was to begin at 8 AM, then the first rove would begin at 8:14 AM and, after finishing an interview, the interviewer would rove for 14 minutes before attempting another intercept. This elapsed time would pause if the interviewer reached the end of the designated rove before the time had expired and would then continue once the rove was begun once again at the north starting point.
Each sampling day, three to four user groups were randomly selected as for interviewing, using a random number scheme. The user groups targeted by interviews were identified by NPS staff as the primary users in the area and included day hikers, beach goers, canoeists and kayakers, paddleboarders, backpackers, and picnickers.

Interviews

Semi-structured interviews were conducted in accordance with a U.S. Federal Office of Management and Budget (OMB) approved instrument containing 36 questions. The beginning of the interview contained questions concerning visitors’ travels in GRTE as a whole, with a second, larger, battery of questions about the SLL area (Appendix 1). Because no previous social science data had been collected in the immediate area, questions were kept rather open to gain a broad understanding of visitor use, motivations, experience, and flow in the greater SLL area. Each interview was recorded on a digital voice recorder and limited demographic data (e.g., group size) were also collected via a Qualtrics survey platform.

Following the 2017 field season, the interviews were transcribed. To begin the process of coding the transcriptions, six randomly selected interviews, encompassing a representative array of user groups (both day and overnight recreationists), underwent inductive open coding to gain an understanding of the general themes and patterns present therein (Gorden, 1992; Saldaña, 2016). This interpretive coding process assisted in the creation of a code book. Most of the codes were derived from themes within responses to specific questions. For instance, the question, “How does this visit to Grand
Teton National Park fit into your broader travel plans?” elicited responses reporting other national parks visited or the magnitude of the trip. Activities, settings, and motivations were recorded in accordance to the framework of OFM. The cast of motivations was adapted from Manfredo, Driver, and Tarrant (1996) and Manning (2011b).

All of the interviews were coded in accordance with the developed code book, and then check coding was completed by two additional individuals not directly involved with the study, a method derived from Holly, Hallo, Baldwin, and Mainella (2010). Fifty representative quotes were selected and presented to the individuals along with a map of the SLL area and the code book. The coded themes were then revisited in accordance to the results of the check coding process.

**Results**

**Respondent Characteristics**

In total, 62 interviews were completed in full, with 7 rejections (due to, for example, personal time restraints), for a response rate of 89.9 percent. The sampling was ceased once it was determined that the study had reached saturation, well beyond the average number of interviews in similar qualitative studies (Mason, 2010).

Of the GRTE visitors interviewed, 21 of the 62 respondents were visiting the park for the first time. Nine of the respondents were locals, living within an hour drive of SLL. Interviewees visited from 24 different states and six countries. The median respondent age was 46 years old. The median number of adults per group was 2 and the median
number of children in a group was zero. Thirty-two respondent groups were visiting the SLL area for the first time on the day of the interview. Within the SLL area, the majority of visitors reported the greater String Lake area as their primary destination, with others going to Leigh and Jenny Lakes.

Interview respondents who had been visiting String Lake for more than ten years noted the growing number of new uses of the area: stand-up paddleboarding, beach going, and smartphone photography. The majority of local visitors were aware of increased use, and many of the first-time visitors were also aware of the limited parking and beach area. However, few non-local visitors planned their trip to the SLL area prior to arriving in GRTE.

Activities

To address the motivating factors of visitors to the SLL area we first analyzed the interviews to uncover what aspects of the SLL area were drawing visitors to the lakes. Though day hikers, picnickers, stand-up paddleboarders, canoeists, kayakers, backpackers, and beach users were identified by NPS staff as the primary users of the area, we identified a wide range of participated activities, since many groups participated in multiple forms of recreation. Participants also reported wildlife viewing, swimming, photography, and climbing/bouldering as activities they were taking part in while at the SLL area.
Motivations

Using the Recreation Experience Preference (REP) scales related to visitor motivations put forth by Manfredo, Driver, and Tarrant (1996), respondents’ reported motivations for their visits to the SLL area were coded. In doing so, we recorded all reported motivations, allowing for more than one to be noted per respondent. In Table 2, the motivations are paired with a representative quote that was coded, along with the count of the motivations reported among respondents.

Table 3-1: Most Commonly Reported Motivations for visiting the SLL area Reported by Respondents and Representative Quotes for each Motivation

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Representative Quote</th>
<th>Number of respondents reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoy Nature/Beauty</td>
<td>“We just wanted good scenery ...” – Respondent 9</td>
<td>45</td>
</tr>
<tr>
<td>Escape/Solitude</td>
<td>“That's kind of the whole reason. To get away from the city and enjoy some time away...” – Respondent 40</td>
<td>17</td>
</tr>
<tr>
<td>Relax/Rest</td>
<td>“I just really like being out on the canoe. It’s really nice and really relaxing and serine...” – Respondent 62</td>
<td>16</td>
</tr>
<tr>
<td>Quiet</td>
<td>“I figured it would be nice and a quiet place to relax and have my own space...” – Respondent 67</td>
<td>15</td>
</tr>
<tr>
<td>Temperature</td>
<td>“The lake is gorgeous. It's very clear. The water is warm ...” – Respondent 46</td>
<td>14</td>
</tr>
</tbody>
</table>
To address what factors are potentially interfering with visitors’ experiences in the SLL area, we examined those themes identified as possible outcome interfering variables. Several types of conflict were identified in the interviews, with fourteen cases reported overall. The most common user conflict existed between canoeists/kayakers and stand-up paddleboarders. This was reported only in one direction, with canoeists and kayakers reporting conflict with stand-up paddleboarders. One canoeist went as far as to propose a ban against conflicting users:

“String Lake has gotten so noisy—so unbelievably noisy. I personally think—even though this is really awful—the only way to deal with it, is to ban stand ups, they have taken over the lake. They come with a certain attitude: “I’m at the beach. I’m hanging out. I’m getting sun.” String and Leigh Lakes has totally shifted. It's madness out here. Fortunately, you can head over to Leigh and escape...” – Respondent 63

“Sitting on the water, in the paddleboards, talking to my friend ...” – Respondent 38

Outcome Interfering Variables

Conflict

Togetherness

Safety
it if you go way back by Moran because no one wants to paddle that far.” – Respondent 14

Outside of user conflicts, few others were reported. No large mammals (i.e. bears, bison, etc.) were reported to have conflicted with respondents, however four respondents did identify negative interactions with birds or insects. Conflicts with park management or polices ranged from backcountry fire restrictions to parking regulations. One respondent found issue with the location of the water craft inspection station:

“This new water check point's a pain in the ass. You have to loop around [from String Lake] and go back to Moose there. They're doing a water craft check now. There's a water craft check station that's specially new this year.” – Respondent 58

Crowding

Thirty respondents—nearly half of the overall sample, reported some level of crowding in the SLL area. The impact of crowding had varying results on visitor behavior, often coinciding with the perceived severity of crowding. Some respondents noted that the entire park was crowded, limiting the amount of destinations they could visit, perhaps funneling them into the SLL area:

“...The Grand Teton Park is victim of its success. Campgrounds are full. Parking are full. The infrastructures are not enough, but not enough to accept certain amount of visitors.” – Respondent 27
Others noted that the crowding was expected and changed their behavior as a result, moving to Leigh Lake in an attempt to find more solitude:

“With the research [about visiting the area] we did, it was exactly as we thought. There was a lot of people here, we knew if we paddled and portaged, we would be able to get away from everybody and we were able to do just that.” – Respondent

Still, some respondents noted that the crowding was forcing them to leave the SLL area altogether.

“We're fixing to get going because it's crowding out.” – Respondent 51

**Displacement**

Due to the amount of visitors who reported crowding or conflict as reasons they changed behavior, we further examined the theme of displacement. We coded interviews for both spatial and temporal displacement. Instances of other coping strategies were identified in the coding process, however it was determined that the interview questions did not sufficiently recognize other forms of coping. Spatial displacement was subdivided into intersite (from or to another area in GRTE) and intrasite (within the SLL area). The most common intersite displacement occurred between Jenny Lake and String Lake:

“We tried Jenny Lake first but they were full, this was the next spot.” – Respondent 21

The most common intrasite displacement was from String Lake to Leigh Lake, for example:
“I would say, we kept continuing past String Lake cause there was a lot of activity. And so that's when we got to Leigh Lake, it was nice to see there was only one to two people that were participating.” – Respondent 2

Temporal displacement most commonly consisted of respondents getting to the SLL area earlier than they would otherwise in an attempt to “beat the crowd”. However, others left the area earlier than they otherwise would:

“We're only going to stay here for a little while cause we know it gets crazy later. Then go elsewhere.” – Respondent 5

**Discussion**

Visitors are drawn to the various ecological and social settings the SLL area offers to participate in a number of activities based on a variety of motivations. The diversity of recreational opportunities, paired with a highly scenic biophysical setting, coincides with a growing number of visitors to area.

**Outcome-Interference**

An analysis of the themes present throughout the SLL area interviews revealed that visitors are driven to the area to pursue a diverse array of activities with the hope of satisfying a range of motivations. In part, this variety of activities is supported by the variety of recreational settings that exist in the recreation area around String Lake. There appears to be a number of outcome-interfering variables that are influencing the
recreationist’s experience in the area as they pass through Driver and Brown’s (1978) RODH. Reports of experience attributes such as crowding, conflict, and displacement reflect both the density of use in the SLL area and also reflect the possibility of a shift or addition in RES from those derived from preconceived motivations. Based on Owens’ (1985) theory of conflict, conflict from stand-up paddleboarders likely leads to outcome-interference. Supported by the interview responses, results suggest displacement is leading to similar interference.

The level of intersite displacement, either to or away from SLL, reflects visitors’ lack of information regarding both parking capacity and potential for crowding. It could also signal a lack of acceptable substitute areas. Respondents reported being displaced from Jenny Lake to String Lake and from String Lake to Leigh Lake due to crowding, however we were unable to capture visitors who were displaced from the greater SLL area to other areas of the park. Additionally, we were unable to gain a sufficient understanding of how displacement was affecting visitors’ achievement of the benefits they were seeking through their motivations of visitation. Based on the interviews, however, it might be that these factors (i.e. perceived crowding and conflict) vary according to user group. This needs to be examined through future research of this and other protected areas, drawing from previous literature in both BAL and RES.

Visitor Behavior

We found no evidence of visitors acting irrationally with regard to responses to outcome-interfering variables. Instead, we found visitors react to crowding and conflict
by shifting their behavior. Within the sample, the resulting displacement described by respondents suggests that these visitors were following rational thought processes. Following Loomis and Walsh’s (1997) explanation of recreation elasticity, a visitor with lower sensitivity to increased costs (e.g. crowding) will have overall inelastic visitation demand specific to the SLL area and might stay in the area despite crowding or user conflict. Conversely, a visitor with elastic demand will be pushed out of the market and into a different recreation area within GRTE. No matter the recreationist’s decision, their experience will provide information that will inform future decision-making. In this way, outcomes derived with or without the impact of outcome-interfering variables will affect recreation behavior in the future, therefore feeding new information into future decisions, and therefore into the RODH.

Applying the RESF

Based on our findings that 1) visitors’ chosen settings and motivations were, at times, affected by outcome interfering variables and 2) visitors are changing their behavior in response to the variables in the pursuit of a goal, we are able to present the interview themes within the RESF. As seen in Figure 3-3, String Lake’s shallow water and forested ecological setting inform the management of the area. The managerial setting then facilitates the unique recreational opportunities and social conditions of String Lake, made clear through the interviews. Visitor’s activities are informed through unique sets of motivations, which are then strained through intervening factors, both social and ecological, such as crowding and bear presence. Furthermore, the activities of
other recreationists were reported as conflicting with certain users’ motivations. All of these factors contribute to the creation of services and disservices among SLL visitors. Those outcomes then inform future visitor decision making, and, if studied with greater depth, how the setting is managed in the future.

Figure 3-3: The Recreational Ecosystem Services Framework proposed in Chapter 2 applied to String and Leigh Lakes

**Study Limitations and Future Research**

In previous literature, the BAL and OFM have been critiqued for a variety of methodological concerns. More and Kuentzel (1999) have proposed that visitors do not act rationally in protected areas. Similarly, Roggenbuck (2000) identified a failure to
adequately account for external factors that affect visitor experience. Others have put forward implementation concerns, such as successfully linking inputs and outcomes (i.e. Pierskalla et al., 2004; Manning, 2011a). Some of these limitations were addressed directly through this study, including: rationality, the inclusion of costs, and an improved framework. Others must be addressed through future research. Very little has been examined as to how outcomes of a recreational experience mesh with the motivations initially sought. Such research would do much for the understanding of how visitors react to outcome interfering variables. We plan to return to the SLL area and examine how immediate outcomes, not sustained or long-term outcomes, coincide with reported motivations.

**Conclusion**

Results from this study indicate that motivations to visit the SLL area reflect the diverse pool of user groups that take advantage of the array of settings found in the area. For some, visiting SLL was a pursuit for solitude and adventure. Meanwhile, families often sought the unique setting of String Lake for the safety provided by its shallow water and the other families using the area for a similar purpose. The result of this mix of motivations led to our conclusion that future research at the SLL area and similarly positioned areas must address whether visitors’ desired outcomes are being interfered upon.

Additionally, our results suggest that goal interference extends beyond conflict to include displacement and crowding. Within the context of OFM, we are titling these
factors “outcome-interfering variables”. Through the interviews, clear themes of crowding, conflict, and displacement emerged. The most often reported motivations of enjoying nature, solitude, and quiet, present the possibility of outcome interference given the outcome-interfering variables that emerged in concert. Given what we know about visitor behavior, we conclude that recreationists will act in accordance to their unique demand elasticity and available information to reach outcomes both initially sought and adjusted for depending on outcome-interfering variables encountered.

For this reason, we suggest the RESF be applied to future study of visitor use in the SLL area and their management. This framework takes into account both the presence of outcome-interfering variables and the feedback of information derived from recreation experiences, into future decision making. Furthermore, by applying this framework to unique situation at SLL we have illustrated how decades of recreation and ES research regarding visitor and consumer behavior can be blended in an applied manner. Though the RESF is not all-encompassing, it provides a practical means by which managers and researchers can examine the recreational outcomes of social-ecological systems in protected areas like SLL.
Chapter 4

Conclusion

Perhaps more than all, I was animated by a mountaineer's eagerness to get my feet into the snow once more, and my head into the clear sky, after lying dormant all winter at the level of the sea. But in every walk with Nature one receives far more than he seeks.

– John Muir, Steep Trails, 1918

I conclude with Muir, just as I started with Muir, to illustrate how far we have progressed in our assessment of the benefits of outdoor recreation. His romantic view of the mountaineer is clearly simplified, yet it is remarkable to recall just how long this remained the prevailing way of framing recreational benefits. It was not until 2008 that Driver introduced OFM, acknowledging negative outcomes in a recreational management framework. For a century, the disbenefit, or disservice, had been largely ignored while we focused on gauging only the benefit. It is now, and perhaps has always been, obvious to the critic that every walk in nature does not provide one with far more than they seek. Indeed, some walks in nature are dampered by crowding or boomboxes or poor signage. This thesis has provided further insight into both how the benefits sought through recreational motivations in protected areas might differ than the revealed outcome and how we might better quantify and frame these services in the future.

The RESF is the culmination of this pursuit. Never before has there been a published attempt to unite the BAL and ES in a meaningful way. By fusing these two theories into a common framework, pulling from the strengths of both to complement each other’s weaknesses, we can now allow for a greater communication of recreational outcomes across disciplines, more standardized quantification of outcomes, better
integration of both management and ecological systems into research, and a full integration of outcome interfering variables. Future research can utilize this framework to better examine social-ecological systems by beginning with an ecological analysis of the biophysical structure and its associated provisioning and regulating ecosystem services, then using that data to inform the social science research of the human setting, and finally tracking the setting driven motivations to their subsequent outcomes.

**Future Research and Lessons Learned**

Though the case study from Grand Teton National Park provides a fruitful first step in our application and refinement of the RESF, next it must be utilized through a quantitative approach that is paired with ecological measures as well. Future studies should go further to pair social and ecological data in their examination of the services being sought and those that are being realized. Of course, they must also consider the management goals of the protected area in their analysis. Additionally, both the literature review and case study has highlighted a need for more research into the nature of outcome interfering factors and how, and perhaps if, they lead to disservices. In this same vain, future research must also examine the determinants of how people perceive outcomes as either services or disservices. The broadened array of methods brought to light by the formulation of the RESF will be critical to obtaining answers to these and a myriad of other unanswered questions about the production of RES.

Perhaps this is the most intriguing finding of this thesis. There is so much more to explore within the realm of recreational services, and the RESF only magnifies that truth.
The development of this thesis has been somewhat of a struggle in that the fusion of the BAL and ES is a rather large-scale task, allowing for many deep and futile dives into literature from both theoretical backgrounds. Bringing this piece fruition has been an exercise in focus—in sorting through fifty years of research to provide the best means of fusing the two together. Though it has meandered at times, each bend in its path has been calculated and purposeful—adhering to, what is at times, the rugged terrain of this cross-disciplinary research field. The RESF is a direct product of this terrain, crafted by the environments in which the BAL and ES theories evolved. Thus let this serve as a keystone in the long going construction of the state of knowledge on recreational benefits. May it help us better refine and define what Muir felt. May it help us better manage our parks. And may it help us continue to strive beyond fuzzy feelings.
References


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Appendix

Grand Teton National Park Qualitative Semi-Structured Interview Guide for String and Leigh Lakes 2017

Script for approaching visitors:
“Excuse me, my name is __________. I am conducting a short interview for Grand Teton National Park to better understand the types of experiences visitors seek while recreating here. Participation is voluntary and your responses will be anonymous. It will take about ~15 minutes to complete. Are you 18 years of age or older and willing to participate?”

If NO: “Do you mind if I ask, what is the primary activity you will be taking part in during your time at the String and Leigh Lakes area?
Thank you for your time and consideration. I hope you enjoy your visit.”

If YES: “I’d like to record our conversation so I can share this information with the park later. Is this OK with you?”

If NO: “Do you mind if I ask, what is the primary activity you will be taking part in during your time at the String and Leigh Lakes area?
Thank you for your time and consideration. I hope you enjoy your visit.”

If YES: “Are you ending or starting your visit to the String/Leigh Lakes today?”

If ENDING: “Excellent, we will begin the interview now.”

If STARTING: “Okay, thank you for your time, but we are seeking visitors that have already experienced the area. Have a wonderful time in Grand Teton National Park.”

General Grand Teton National Park Visit Information First we would like to know a little bit about your trip to GRTE, followed by questions about your experience at String/Leigh Lakes today.

1. Can you describe how this visit to Grand Teton National Park fits into your broader travel plans (PROBE, for example is this one of many national parks in the area that you plan to visit)?

2. Including this visit, how many times have you been to Grand Teton National Park? (PROBE, if visited previously, how long ago was your last visit?)
3. Where did you start your travel, today? (PROBE, for example did you travel from Jackson, Wilson, or Yellowstone National Park today, to arrive in Grand Teton National Park?)

4. Regarding your overall trip (e.g., not just today), did you and your personal group stay overnight away from your permanent residence, either inside Grand Teton National Park or within the nearby area within 3-hour drive of the Park? (PROBE If YES, where did you stay, and why was that location selected (e.g., was that location selected because it would influence the time you hoped to arrive at the Park?))

5. Can you describe how many nights you and your personal group plan to stay in or within a 3-hour drive of Grand Teton National Park, and will you be staying at the location you previously described each night?

6. Can you describe your primary source of information about visitor activities in Grand Teton National Park? (PROBE, describe how helpful this source was, and how long before this trip you used this source?)

7. What is your primary destination during your visit to Grand Teton National Park today?

8. Can you describe the other areas of the park you visited, or plan to visit today? (PROBE, why did you chose to visit those areas?)

9. Were you unable to visit a particular site or sites in Grand Teton National Park today? If YES, what site or area were you unable to visit? (PROBE, If YES, what reasons prevented you from visiting those sites?)

10. While planning for this visit today, can you describe how parking availability affected your behaviors, activities chosen, or locations visited? (PROBE If affected, please describe where, what activities it impacted, and your resulting behaviors.)

Visitor Activities Specific to String and Leigh Lakes Next, we’re specifically interested in your experience at the String and Leigh Lakes area today.

11. Please describe the reasons why you chose to visit String/Leigh Lakes today?

12. Including this visit, how many times have you been to String/Leigh Lakes? (PROBE if visited previously, how long ago was your last visit, and did you visit the String/Leigh Lakes area during your last visit?)

13. What was your primary destination during your visit to String/Leigh Lakes today, and please describe why you sought that area? (PROBE, what are the qualities of that area that drew you to that destination?)
14. Please describe the primary activities you participated in at String/Leigh Lakes during your visit today (e.g. kayaking, hiking, backpacking, day hiking, etc.)? (PROBE, have you done this activity previously at String/Leigh Lakes? If YES, when? If YES, how frequently?)

15. Please describe if these activities were affected positively or negatively by the behaviors of other visitors in the String/Leigh Lakes? (PROBE, did visitors participating in other activities here influence your experience, and if so, how?)

16. What was your primary source of information about visitor activities, specifically regarding String/Leigh Lakes? (PROBE, describe how helpful this source was, and how long before this trip you used this source?)

17. Once inside Grand Teton National Park, please describe your experience with the Park’s information, such as signage or kiosks for example, for accessing the String/Leigh Lakes area?

18. Once here at the String/Leigh Lakes area, please describe your experience with the Park’s information, such as signage or kiosks for example, for seeking your desired experiences in the area? (PROBE, were there enough signs, and enough information?)

19. How much time did you plan to spend at String/Leigh Lakes today? Did you stay that entire length of time? (PROBE If NO, please describe what influenced you to shorten or lengthen your visit here.)

20. Please describe your expectations for your visit and experience to String/Leigh Lakes today?

21. When you think of the experiences you had while at String/Leigh Lakes, did they meet your expectations? (PROBE, please describe why or why not, and what positively or negatively influenced your experiences and expectations here?)

22. Please describe what you enjoyed most about your experiences at String/Leigh Lakes?

23. Please describe what you enjoyed least about your experience at String/Leigh Lakes?

24. Please describe how experiencing a sense of wilderness fit into your reasons for visiting String and Leigh Lakes?

25. Overall, how would you describe the quality and availability of the facilities at String/Leigh Lakes? (PROBE, what facilities specifically, did you find to be good, or insufficient for you or your personal group’s needs?)

26. Were you and everyone in your group able to access all of the activities, services, or programs you were seeking today at String/Leigh Lakes? If not, what could
have made the access easier for you and your personal group, and specifically, what locations and activities, services, or programs need improvement?

27. Overall, how would you describe the condition of the natural resources at the trails, lakeshore, and parking lot of String/Leigh Lakes? (PROBE, did you think that the natural resources were in good condition, or did you experience impacts?)

28. Please describe your experience with parking at String/Leigh Lakes today?
   PROBE, where did you park? (PROBE, were you able to park in a marked space, or did you have to find road-side parking, or parking on the grass? PROBE if not in a legitimate parking space – Did you feel like your parking space was safe for you and your personal group? Why or why not?)

29. Please describe how the number of people in the String/Leigh Lakes area affected your experience today. (PROBE, were there too many people, just the right amount, or not enough?)

30. Please describe if you noticed any visitors behaving in a manner that disturbed park resources while at String/Leigh Lakes today. If YES, what activity did you notice, and where did this occur?

31. Please describe if you noticed any visitors behaving in a manner that disturbed your experience while at String/Leigh Lakes today? If YES, what behavior did you notice, and where did this occur?

Demographics Finally, we’d like to know a little bit more about you and your group.

32. Are you a permanent resident of the United States?
   a. If YES, what is your primary zip code?
   b. If NO, what country are you from?
   c. In what year were you born?
   d. In what year were you born?
   e. In what year were you born?

33. In what year were you born?

34. How many adults and children were in your personal group today during your visit to String/Leigh Lakes, including you?
   a. Number Adults?
   b. Number Children?

35. How would you best describe the group you are with today? (For example, are you with your friends, kids, grandparents, commercial tour group etc.?)

36. Finally, what language do you and your personal group primarily use to communicate with each other?
Before we end, is there anything else that you or your group would like to share with us? Or any other comments you would like to add regarding what we chatted about today? Thank you very much for your time!