Lead King Loop - Recent Working Group Activities
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Executive Summary

Every summer, residents of the Crystal River Valley are bombarded with more and more visitors flocking to their small quiet communities. Many of these visitors are motorized recreators seeking to ride off-highway vehicles (OHVs) on the Lead King Loop (LKL or "Loop"), a joint Forest Service and Gunnison County road located adjacent to the Town of Marble. Crystal City sits at the intersection of the LKL and Schofield Pass towards Crested Butte. County Road 3 is the only paved road accessing the Loop and Crystal and is the main thoroughfare through Marble. The town of Marble has informally taken on the role of "gateway to the Loop" and bears the brunt of OHV recreation impacts related to safety, environmental degradation, reduced quality of life for residents, and jeopardized user experience. Community members have sought to mitigate impacts with few resources and without the guidance of a management plan. As the main governing body, the Marble Board of Trustees was tasked by the Gunnison County Commissioners to form a working group consisting of representatives from the White River National Forest Service, Gunnison County, Western Colorado University, Marble, Crystal, and organizations local to the Crystal River Valley to begin laying the groundwork to develop a recreation management plan for the LKL. The Forest Service has many resources regarding the technical aspects of a recreation management plan, but lacks effective qualitative data gathering methods regarding user groups. Implementing a plan that will be effective and sustainable requires understanding the complex social dynamics of the community and users, including those who may oppose regulation. Therefore, this project aims to assist the Forest Service in implementing a data gathering system that clarifies the social dynamics of Loop users and surrounding communities to support effective long-term management.

The future of the LKL is deeply entangled with the surrounding communities. Changes on the Loop will inevitably impact the community and vice versa. The Forest Service, Gunnison County, and the Town of Marble assert that unmanaged tourism has put forest health, resident quality of life and user experience at significant risk. However, tensions around management decisions for the Loop exist. Authorities have limited capacity to implement and enforce regulations. Furthermore, many opinions regarding enforcement options are controversial and divisive, creating barriers to effective public outreach and management sustainability. Though the Loop is the focus of the project, understanding the culture, individual perspectives, and history of neighboring communities is integral to producing successful management strategies. This begins with identifying the needs, goals, conflicts, opportunities, and barriers that must be addressed during the development process to encourage successful outcomes. Preliminary methods entail ethnographic observation, literature reviews of case studies and sustainable OHV recreation management, online and field OHV user surveys, and community focus groups. The purpose of this convening report is to outline a project framework to inform the development and refinement of future research. The final Convening Report will consolidate the results of this data as well as recommendations for continued data gathering methods, monitoring and evaluation, public input processes and interim management strategies. It aims to contextualize the social dynamics of the study area, discuss study methods, recommendations, and summarize future research needs, and highlight interim management options and opportunities. This report is intended to be a living document that will assist the Forest Service, Gunnison County, and the Town of Marble in future decision making to accommodate for

changes as the project evolves to produce sustainable long-term management strategies that are appropriate for the unique context of the LKL and Crystal River Valley communities.

Stakeholders

Project stakeholders include residents of Marble, Crystal, Hermit's Hideaway, Serpentine & Prospector, as well as Crystal River Valley (CRV or "the Valley) business and property owners. These communities are in Gunnison County (GC). The LKL is part of the White River National Forest (WRNF). County Road (CR) 3 incorporates a section of the Loop known as Forest Service (FS) Road 314 that is managed jointly by the FS and GC. FS Road 315 is the section of the Loop bordering the Maroon Bells-Snowmass Wilderness between the intersection at the top of Daniel's Hill and Schofield Pass that is solely FS jurisdiction. Loop users encompass a wide range of motorized and non-motorized recreational types, experiences, and preferences. Every September, The Marble Charter School 5k Charity Race is hosted on the Loop. Local conservation groups and environmental organizations such as the Crystal Valley Environmental Protection Association (CVEPA) are interested in the sustained ecological health of the Valley and lend their partnership to this effort. OHV clubs such as the High Country 4 Wheelers often volunteer to perform road maintenance.

Background

The recreational value of the LKL has historic precedent. Ute Indians used the CRV as summering grounds for its plentiful hunting, fishing, and foraging opportunities. The Loop was a confluence of trade trails accessing the CRV (Vandenbusche & Myers, 1987). These ancient routes evolved with commercial growth as white settlers staked mining claims throughout the CRV and began reconstructing the roads to support mule trains and eventually steam engines to transport materials (Vandenbusche & Myers, 1987; McCollum, 2010). Not long after the mining industry took hold in the Valley, the Utes were expelled. Legend tells of a couple of young Ute men who were caught trying to set fire to buildings in the night and upon arrest were said to curse the Valley so that no white man's business would last (Vandenbusche & Myers, 1987). This tale is reflective of the inherent geologic instability of the area, which is prone to mudslides, avalanches and floods that routinely prevented attempts to build railroads to Aspen and Crested Butte, ultimately crippling the Valley's mining industry in the early 1900s (Vandenbusche & Myers, 1987; Rold & Wright, 1996; OATK, 2000; McCollum 2010). Marble was practically a ghost town but for a select few brave souls who still enjoyed its remote tranquility. The Loop remained in use by these residents, some of whom were World War veterans who drove military jeeps on the rough roads. Throughout the mid-twentieth century, the popularity of recreating on the Loop grew with the evolution of motorized recreation (Vandenbusche & Myers, 1987).

Historic use of the CRV as summering grounds parallels the prevalence of contemporary summer homeowners, part time residents, and visitors of various recreational interests during the June to August peak season. The LKL borders the coveted Maroon Bells-Snowmass and Raggeds Wilderness where hunting, fishing, and hiking are still favorite pastimes for non-motorized and motorized users alike (Vandenbusche & Myers, 1987; FS MVUM, 2020). Many of these users endeavored to keep this pristine corner of the Colorado wilderness to themselves, so for almost a century, the CRV

was considered a hidden gem. Locals and many Loop users can trace their roots back to miners who first staked mining claims, built property or worked at the Yule Mine. Those who do not have a family history may still settle down in the Valley full time to seek solitude in nature and are drawn to the backcountry accessible from the Loop to experience "Colorado like it used to be'' (Marble Tourism Association, 2020). As a loop road with access to wilderness, the LKL is especially attractive ("Lessons Learned," 2005; "Pilot Program", 2012; Ouren et al., 2007; Cordell, et al., 2008; Burr et al., 2008). As families grow and become more geographically far flung, wealth and leisure time increases, and social media promotes outdoor recreation in pristine areas (Wood et al., 2020), the LKL - and subsequently the CRV - can anticipate exponentially increasing user numbers. To complicate matters, the remoteness of the area, though a major draw for both visitors and residents, means there is a lack of sanitary facilities such as public restrooms and waste receptacles. Ultimately, unmanaged increasing visitor volume results in environmentally degrading impacts related to human waste from both motorized and non-motorized user groups.

As an undesignated road, there are virtually no restrictions on vehicle or recreation types that may use the Loop, although signs do warn that the road is unmaintained and to go at one's own risk (FS MVUM, 2020). Even those wishing to engage in non-motorized activities may use OHVs to access their desired place. In this way, unmanaged motorized recreation is of high concern for project stakeholders. OHVs come in three general models: 4-wheel drive vehicles (including a wide variety of pick-up trucks, Jeeps, highway vehicles with off road capabilities), all-terrain vehicles (including 3-wheelers, 4-wheelers, ATVs, UTVs) and dirt bikes (off-road motorcycles or ORMs) (Ouren et al., 2007; Cordell et al., 2008). OHV recreation on public lands across the United States is rapidly increasing (Albritton & Stein, 2011; Denning et al., 2013) while relatively little research has been done on impact mitigation and management strategies, particularly on the social side ("Lessons Learned", 2005; Ouren et al., 2007; Albritton & Stein, 2011; Qin et al., 2019).

High user volume substantially increases pressure placed on natural resources, putting the landscape, resident quality of life and user experience at significant risk (Lessons Learned", 2005; Ouren et al., 2007; Cordell et al., 2008; Albritton & Stein, 2011; Denning et al 2013; Denning 2016; Fawcett et al., 2016). OHV impacts exacerbate those of typical outdoor recreation - such as crowds and litter - with heavy machinery and associated emissions, fluid leaks, and noise (Denning et al 2013; Denning & Jennison, 2016). High speeds pose safety concerns related to collisions, and impact human and environmental health from excess dust and erosion (Ouren et al., 2007; Denning et al., 2013). Inebriating substances are commonly used in outdoor activities and OHV recreation increases instances of driving under the influence and associated injuries ("Lessons Learned", 2005; Kil et al., 2012; Qin et al., 2017). OHVs are not street legal, and so are often transported with large trailers and utility vehicles. The combined volume of visitors and size of OHV trailers create concerns related to parking and traffic (Denning et al., 2016), often resulting in conflict. Community members in Marble and Crystal have expressed grievances caused by excess dust and noise, such as increased respiratory issues and decreased wildlife presence. The remoteness of the CRV compounds these issues as there is little opportunity for regular law enforcement and maintenance.

The FS has limited ability to support the development of a recreation management plan for the LKL, so the Town of Marble was tasked with organizing a working group consisting of representatives from the CRV community (private citizens, elected officials, and business owners), GC, the FS, and WCU. This working group aims to engage all stakeholders into the development process, establish partnerships among constituents, and design long term data gathering methods, public input processes, and interim strategies. More groups and agencies have potential to join as research identifies more needs. Collaboration is widely recognized as essential for management success ("Lessons Learned", 2005; "Pilot Program", 2012; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Hopkins, 2012; Davis et al., 2018), so a large portion of the preliminary stage was dedicated to learning how to work effectively as a team. This stage also demonstrated how members of the working group can utilize their expertise in project operations, e.g., a member that represented WCU's center for Public Lands utilized their position to facilitate meetings and coach the working group on effective collaboration ("Lessons Learned", 2005; Ouren et al., 2007; Fawcett et al., 2016). Research direction was also guided with input from members' various fields of expertise. Products of this process to date have been a working group charter, LKL history report, a guiding list of research questions, and a data gathering methodology.

Description
The history of the LKL reveals a deeply nuanced social and ecological landscape that presents barriers and opportunities for effective management. The groundwork for this project contextualizes the scope of the problem and identifies the needs and desires of stakeholders. During the beginning stages of working group proceedings, members shared their constituent concerns about damages to ecological health of the Loop and maintained the urgency to protect the culture of the area while implementing management strategies. Initial observation of the Loop and neighboring communities revealed broad concerns about social and ecological visitor impacts, especially from motorized users. Loop users and community members have a complex map regarding sense of place in terms of property ownership, time spent in the Valley, and family history. All this plays into what users desire to experience on the Loop. The scope of this phase of the project involves learning to work efficiently with partners as a group, beginning with investigation of the history, landscape, and current social climate in sectors affected by recreation on the LKL.

Previous projects involving the FS, GC, and WCU indicate the utility of recreation management to protect natural resources, recreational opportunities, and community integrity ("Pilot Program", 2012; Jerman, 2017). Unmanaged outdoor recreation is among the four major threats to forest health and implementing management strategies according to the needs of the community may ensure their long-term effectiveness ("Lessons Learned", 2005; Ouren, et al., 2007; Cordell et al., 2008; Denning et al., 2013 & 2013; Denning & Jennison, 2016; Kil et al., 2012; Fawcet et al., 2019). However, residents of Marble and neighboring CRV communities have expressed a general sentiment of distrust for the FS and GC ("Lessons Learned", 2005; Davis, 2018; Rasch & McCaffery, 2019), exacerbated by the remoteness of the Valley and lack of cellular service and Internet. Had the Loop remained a hidden gem and numbers remained low, a recreation management plan may not be needed. However, factors such as social media, increased population, wealth, and leisure

time have led to a rapid increase in the popularity of outdoor recreation nationally, especially motorized recreation ("Lessons Learned", 2005; "Pilot Project", 2005; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Albritton & Stein, 2011; Wood et al., 2020). Visitor numbers in the CRV are expected to follow these trends and continue rapidly increasing to the detriment of recreation and quality of life on and around the Loop. Implementing a management plan is in the interest of protecting the integrity and vitality of the landscape and requires long term data gathering, interim management strategies, and periodic check-ins with the community and stakeholders. Indicators for long term success will be a positive feedback loop of improved ecology and improved recreational experience. All management plans must take the needs and desires of recreationists into consideration while being compatible with the capacity of the community.

The CRV still lives up to its rugged and remote reputation, posing several challenges for this project. Management options are limited by a lack of cellular service and internet coupled with geologic instability, which hinders travel for emergency response, enforcement, and maintenance. Project operations are also limited by the travel distance and time commitment for governing bodies, agencies, partners, and volunteers to hold regular meetings in person and work effectively in a collaborative environment. Furthermore, stakeholders' sense of place - especially CRV residents and LKL users - are complicated by geography that places their daily operation primarily within Pitkin County rather than Gunnison County, which complicates public outreach, education, and input, highlighting the need for effective collaboration. This project must also meet novel challenges resulting from the global outbreak of COVID 19 that have burdened project partners and agencies (FS News Release, n.d.). It is important to note that the data collected for this report reflect changes in user demographics resulting from COVID 19 social distancing ordinances, including higher overall visitor volume especially of novice outdoor users.

Methods
Project methods were initially determined by outlining S.M.A.R.T. (specific, measurable, achievable, relevant, and time-oriented) objectives in the manner used by the Marble Volunteer Fire Department. One of the main objectives was to complete a preliminary ethnographic observation of the LKL and neighboring communities to learn the scope of the problem and pinpoint research needs. Ethnographic observation is a method used to identify the cultural and socio-economic factors that inform policy decisions (Ouren et al., 2007; Secor-Turner, 2010; Albritton & Stein, 2011; Pacheco-Vega, 2020). For this projects, it entailed informal interviews with key stakeholders (residents, users, partners, local organizations, agency reps, elected officials) as well as participating in town council meetings, community events, and recreation opportunities on the Loop to hear testimony from stakeholders and gain insight into the current policy outcomes ("Pilot Plan", 2005; "Lessons Learned", 2005; Burr, 2008), and also identify natural, historical, and commercial attractions that exist on or are accessed by the Loop. This information was used by the working group to generate a list of main impacts specific to LKL user activity, develop research questions, and determine the data needed for the project.

Collaboration is not only essential for working group partners but also for public input. The informal and objective nature of ethnographic observation makes it a useful platform to build

relationships among diverse stakeholders and encourage candid participation to prevent interests from being under- represented, as well as understanding relationship dynamics that present opportunities or barriers. For example, FS and GC policies on the LKL may be at odds with private property owners' perception of good management. For this reason, another main objective is to work off an agreed upon baseline science, which for our purposes includes the FS's legal obligation to community collaboration, and protect resources for multi-use purposes, including private and commercial land ownership, recreation, and wilderness. Dedicated educational efforts must be made to communicate that managing increasing volumes of visitors, especially motorized users is in all stakeholder interests to protect resources for commercial, property, and recreational value ("Lessons Learned", 2005; "Pilot Program", 2012; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Hopkins, 2012; Davis et al., 2018). Collaborating with stakeholders helped identify relevant case studies from within the WRNF, like Penny Hot Springs and Hanging Lake. A literature review of these case studies and pioneering research on OHV management illustrate methods of place-based capacity building and demonstrate the need for baseline data to begin characterizing LKL recreation opportunities, user demographics, and community dynamics ("Lessons learned", 2005; Ouren et al., 2007; Kil et al., 2012). Recommendations on relevant data needs and future research were referenced in designing research questions and surveys, fulfilling our final preliminary objective.

Data gathering began with a series of focus groups to check initial assumptions and gather community input in a standardized format (Khan et al., 1991; "Lessons Learned", 2005; ACECT Inc., 2011; Danielson et al., 2012). From July 8-11, 2020, four focus groups were held over four days for each main community in the CRV (Hermit's Hideaway, Serpentine & Prospector, Marble, and Crystal) to learn if residents felt a particular kinship to one area over another to gauge sense of place ("Lessons Learned", 2005; Burr et al., 2008; Cordell et al., 2008; ACECT Inc., 2011). Participants were invited to the focus groups via digital invitations on community Facebook pages, emails, and digital and printed flyers. Attendance averaged 3 participants per group. Preliminary research revealed four major themes that are shared among community members: Quality of Life, Community Culture, the LKL, and Visitor Impacts. During each session, participants were asked to write what each of those themes means to them on a slip of paper and discuss anonymous responses. A follow up focus group and public input session was hosted to check in on visitor perceptions during the August peak summer season, and participants were also asked to write anonymous responses to what the phrase "Save the Loop" means to them. All sessions were recorded, transcribed, then coded to gauge response frequencies.

Surveys were conducted during the peak season of June through August 2020 to gather data on typical motorized users, both on the Loop and throughout the state of Colorado. Field surveys were conducted every other day from June to August from motorized users leaving the Loop. Respondents were asked to share their age, years of off-roading experience, primary destination on the Loop, and if they will or have stayed the night. 250 surveys were collected. Additionally, an online survey was distributed to OHV clubs to gather general perspectives on management and enforcement strategies. 121 responses were received for this survey. Survey responses were analyzed using basic statistical methods in Microsoft Excel and Qualtrics software.

Results
Ethnographic observation revealed the complex scope of impacts both in town and on the Loop that begs consideration for effects that overflow from the Loop into communities. One of the primary impacts articulated by stakeholders, especially residents, was described as "degraded quality of life," which includes overlapping environmental and social concerns related to increasing visitor numbers, the large majority of whom are perceived to be motorized users. Adverse environmental impacts from high motorized user volume include water quality degradation from over-burdened sewage systems in town, human waste pollution in wilderness areas, accelerated erosion from fugitive dust and soil compaction depleting vegetation coverage, as well as habitat destruction and fragmentation from creation of social trails, and injury and altered behaviors in wildlife from excessive noise (Ouren et al., 2007; Cordell et al., 2008; Mann & Leahy, 2009). These environmental impacts also pose concern for the social features of the study area such as human health and safety. Pollution from vehicle emission and human waste directly impacts the water quality of the Crystal River, which is the primary drinking water source for CRV residents. Excessive dust poses a respiratory hazard. Accelerated erosion in an area prone to mudslides, rockslides, flooding, and avalanches threatens access to the LKL and surrounding communities by emergency and other essential services (Rold & Wright, 1997; OATK, 2000). Additionally, space for commuting non-motorized recreators and haul-vehicles for OHVs is limited. Many vehicles in a small area results in illegal parking on driveways and workplaces interrupting daily life and services. Traffic on the Loop spills out into town, increasing concerns of trespassing and property damage from parking scarcity and vandalism ("Lessons Learned", 2005). All these impacts create dynamics of conflict, tension and distrust between residents and visitors, between various motorized and non-motorized user groups on the LKL, and between residents and Loop users and management and enforcement agencies. Literature reviews of case studies reveal potential barriers and opportunities for management through understanding relationships between user groups in multi-use areas, particularly with the presence of motorized recreation.

Conflict is typical of recreating in multi-use areas among various user groups with differing expectations and desires for their recreation experiences (Albritton & Stein, 2005; "Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Mann & Leahy, 2009; Kil et al., 2012; Nesteruk, et al., 2013; Davis et al., 2018; Qin et al., 2019). According to the Theory of Goal Interference, conflict will arise when one activity undermines the desired outcomes of another activity ("Lessons Learned", 2005; Albritton & Stein, 2011). For example, elk and deer herds impacted by excessive noise from OHVs may alter their behaviors, jeopardizing hunting and wildlife viewing opportunities for both non-motorized and motorized users (Mann & Leahy, 2009; Qin et al., 2017). Motorized users are more likely to experience conflict as a result of low tolerance for technology dependence by non-motorized users (Ouren, 2007; Mann & Leahy 2009; Albritton & Stein, 2011). Motorized activities are considered more technology dependent because trail riding enjoyment focuses on having fun with machine capabilities especially while overcoming natural obstacles (Ouren et al., 2007; Kil et al., 2012). Motorized activities are also more likely to be group activities with families and friends engaging with each other, their machines, and the landscape. Because of this, motorized users may be more reactive to rules and regulations that limit their ability to use their vehicles or group sizes while non-motorized, who may be more likely to prefer

experiences of quiet solitude or in small groups, are more willing to adopt regulations that protects environmental preservation (Kil et al., 2012). Conflicts can also arise between non-motorized recreators and the utility of OHVs for infrastructure and economic needs in rural communities (Mann & Leahy, 2009, Denning et al., 2013 & 2013; Denning & Jennison; 2016; Fawcett et al., 2016) and between rural communities and federal land management agencies.

Despite the adverse impacts of motorized recreation, OHVers tend to exhibit a pro-environmental attitude in their desired experiences, settings, and ancillary activities (Burr et al., 2008). To varying degrees, OHVers often engage in non-motorized recreational activities or may use OHVs purely for utility or as a side-trip to their main activity ("Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Kil et al., 2012) and thus hold mutual values and desires to protect and promote through management (Mann & Leahy, 2009; Kil et al., 2012; Nesteruk et al., 2013). Frameworks like Outcomes-Focused Management and the Recreation Opportunity Spectrum (Kil et al., 2012) theorize that understanding the preferences of user groups helps facilitate satisfying recreation experiences to increase compliance and minimize conflict. All user groups have similar goals and reasons for participating in outdoor recreation such as social bonding, stress relief, nostalgia, learning experiences, and enjoying pristine settings and natural features with reduced rules and regulations (Ouren et al., 2007; Mann & Leahy, 2009; Kil et al., 2012). Outdoor recreators of all kinds are more likely to comply with rules and regulations when information about regulations and the reasons for them is easily available and management and education strategies are made to protect the recreation are *for* rather than *from* the public ("Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Cordell et al., 2008; Mann & Leahy, 2009; Kil et al., 2012; Nesteruk et al., 2013). Trails that meet user desires prevent noncompliance, maintain the integrity of the landscape, and reduce conflict among user groups.

Results of the focus groups offer insight to the attitudes, perceptions and relationship dynamics between the community, LKL users and management. Residents experience user impacts both on the Loop and in daily life. When asked about what a good quality of life in the area meant to them, environmental health featured heavily in participant responses, particularly maintaining environmental health to preserve natural pristine beauty such clean water, clean air, abundant wildlife, and recreation opportunities for quiet enjoyment to connect with family and friends. When asked about community culture, participant responses painted a picture of family, art, history, recreation, and pristine nature entailing values related to small town charm, environmental quality, family, freedom, and safety. Participants referred to pleasant memories to describe their views of the Valley and pined for "the way things used to be" in town, although that ideal *when* may change depending on the individual. Residents also reported a particular appreciation for the history of the area and the spectrum of opportunities and cultural pieces of art and history that they did not perceive to be shared by visitors to the Loop.

When asked about threats to quality of life and community culture, respondents felt most impacted by motorized recreators but noted that crowding in general is a problem, and even non-motorized users in need of parking personal vehicles may cause property or ecological damage. Still, the direct and indirect impacts have led some participants to describe visitors as disrespectful to the

community in their recreation efforts. Disrespect can take the form of social impacts such as personal property damage or interpersonal conflict, or as environmental impacts like damage to water and air quality which can also harm human health. This is especially noted when damage is felt wrought by visitors who leave without feeling the consequences for themselves. Safety concerns also arise when the relaxed attitude of visitors described by participants as being on vacation clashes with residents who are engaging in regular life at home, work, or school. Visitors who come to the Loop to enjoy a relaxing trail ride may be in a party mindset and less mindful of safety, increasing incidents of speeding and drunk driving and a still further likelihood of causing adverse impacts (Denning et al., 2013; Denning & Jennison, 2016; Fawcett et al., 2016). Participants described a "Hatfield & McCoy'' dynamic within Marble and neighboring communities that has spurred disagreement about potential management directions on the LKL. One side of the perspective spectrum wishes to ban all motorized use of the LKL while another wishes management to continue as-is, namely minimal to no regulation. Related to the reported cultural trait of freedom, self-regulation was noted as an important piece of Marble and neighbors' community dynamic. However, police enforcement was preferred for visitors, although opinions differed on whether management should focus more on building enforcement capacity or educational efforts. One widely shared perspective was the desire to find balance between these two opposing perspectives and plan for projected tourist, commercial, and residential growth to control adverse impacts to ecological and cultural values that act as a draw for such users, perhaps remaining on the conservative side to preserve the area as a snapshot of intact Colorado history. The worst-case outcomes for participants was for the LKL and neighboring communities to become "Disneyland," with uncontrolled numbers of recreationists disturbing the pristine backcountry nature of the LKL into over-developed parks and transforming neighboring communities into resort towns.

Lack of regulation within the CRV and especially on the LKL has traditionally been a part of the area's charm (Vandenbusche & Myers, 1987; McCollum, 2010). Focus group participants fondly recalled when they could go days on a trail without encountering another person. Well into the 90's residents and recreators were attracted to the remote location and could recreate with little interference (OATK, 2000). Traditionally unmanaged areas lack safety culture (Denning et al., 2013, Denning and Jennison, 2016, Fawcett et al., 2016) because users are more likely to participate in illicit activities in areas known to be unenforced or in fact choose to go to places specifically because they are not enforced (Ouren et al., 2007). Unfortunately, such areas have seen rapid growth in recreation user numbers that contribute to impacts similar to the CRV often become resort communities that capitalize on natural beauty, and small-town character ("Lessons Learned", 2005) or succumb to adverse ecological impacts that make the area unusable over time (Jerman, 2017). Dynamics of fragmented land ownership on the LKL and in town makes regulations, access, and closures confusing for users, even when they endeavor to research and follow rules and regulations. History shows Marble residents feel that they are low priority for authorities due to their remote location and rural character (Vandenbusche & Myers, 1987; Rold & Wright, 1997; OATK, 2000; McCollum, 2010), and worry this low priority will persist despite implementing a management plan.

Results from surveys show that typical motorized users on the Loop follow national trends of being upper middle-aged male and aging ("Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Denning et al., 2013; Nesteruk et al., 2013; Denning & Jennissen, 2016; Fawcett et al., 2016), who also get themselves in the most trouble on the trail in terms of injuries, incidents, and breaking regulations (Ouren et al., 2007; Denning & Jennissen, 2016). However, use by women, couples and families appear to be increasing along with the general population ("Lessons Learned" 2005; Burr et al., 2008; Cordell et al., 2008). Surveys showed most users on the Loop were in groups of 4 or more. OHVs tend to have big groups, which tend to be a little more disrespectful and require confrontation, likely due to perceptions of an ingroup versus an outgroup (Burr et al., 2008, Cordell et al., 2008). Users on the LKL had an average of 20 years' experience (Burr et al., 2008) and considered off-roading to be one of their primary forms of recreation, or a primary way of accessing favorite non-motorized activities. In the field, more than half of visitors surveyed were from towns local to the area but outside the scope of impacts, such as Redstone, Carbondale, Glenwood Springs, Basalt, El Jebel, and Aspen, and also reported old family connections to the Valley, indicating that visitors to the Loop perceive themselves to be from the Valley or a member of the community through their family history.[1] Over half (55%) of all respondents had visited the Loop before and were more than likely to return multiple times in one summer. Most respondents reported engaging in multiple recreation activities in one visit and reported an excellent experience (5 on a 5 point scale where 1 is 'awful' and 5 is 'excellent') indicating Loop users are less noticeably affected by impacts, although crowds were often reported as a detriment to an otherwise good outdoor recreation experience. Resident numbers on the Loop are low: out of 159 respondents with a 81623 zip code, only 13 were residents of Marble, Serpentine, Hermit's Hideaway or Crystal, reflecting community members' reports of being unable to engage in activities on or accessed by the Loop. Most respondents were 4WD users, indicating the majority of LKL users and visitors to Marble and Crystal are casual motorized recreators, families, and/or new users (Burr, et al., 2008; Cordell et al., 2008). Typical behavior for OHV riders to avoid obstacles by taking the path of least resistance around obstacles and outside the trail's path ("Pilot Program", 2012). Online surveys asking about Colorado OHV club members' management preferences indicated that motorized users tend to prefer self-regulation, education and other forms of indirect management strategies that allow them to be social within their groups and with other riders. However, most field survey respondents were not part of OHV clubs. Most important to note for this study is the Crystal Mill is the main draw to the Loop and Marble, attracting over two thirds of visitors and also featured prominently in online surveys, hinting at the geographic spread of potential Loop users.

Recommendations
The LKL is highly attractive due to its difficulty, loop road network, and access to remote wilderness for motorized and non-motorized users. Recent trends have indicated that more beginner hikers, bikers, and other motorized and non-motorized recreators are using public lands than have been in previous years, and hint that LKL management must prepare for cumulative impacts from higher numbers of inadequately informed users as well as mitigating for noncompliant behaviors based on

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[1] Field survey trial runs revealed the need to change question verbiage from "Loop visitor" to "Loop user" as many respondents said that they were not visitors but from the area as they had spent much of their lives recreating in the CRV.

attitudes toward regulation (Denning et al., 2013; Nesteruk et al., 2013; Fawcett et al., 2016). Holistic management approaches incorporating trail maintenance, education of user etiquette and environmental protection measures, and enforcement personnel presence and activity have been shown to be the most effective ("Lessons Learned", 2005; "Pilot Program", 2012; Nesteruk et al., 2013), especially when stakeholders work in partnership to create a consistent message to aid recreators mitigate impacts and address perception gaps in education and enforcement that create tension ("Lessons Learned", 2005; Ouren et al., 2007; Albritton & Stein, 2011; Hopkins, 2012; Danielson et al., 2012). Continuing empirical and qualitative data collection on all recreation types in the area to know what to prepare for as the situation evolves, including user attitudes toward compliance depending on intention, knowledge and perception (Mann & Leahy, 2009; Lawhon et al., 2017), geospatial data to track sites with highest concentration of users, impact, and incidents, specialized engineering and geologic data to assess long-term effects of the LKL's unrestricted vehicle designation, historical photographic to track visual changes over time, and social data on efficacy of public input and a more in depth assessment of the spectrum of community perspectives regarding management strategies.

Enforcement
Lack of enforcement is one of the main reasons why impacts are so heavily felt in addition to presenting barriers to effective management on The LKL (Marble County Commissioners Meeting, Oct. 10, 2019). This lack of enforcement has simultaneously encouraged freedom to enjoy public lands unhindered, endeavoring to be as open as possible to US taxpayers while risking unmitigated damage. In many instances, the majority of users stay within the limits of acceptable behavior while recreating in natural settings (Burr, et al., 2008; "Pilot Program, 2012" Jerman, 2017), and impacts may primarily result from misguided attempts to follow directions or cultural patterns of behavior e.g., following undesignated social trails. For such users, illegal actions are best managed by anticipating issues to provide attractive trails or alternative places for a desired activity to make directions easy to follow (Albritton & Stein, 2005; "Lessons Learned", 2005). Such indirect management strategies may be more appropriate in settings that have limited enforcement personnel. Specific areas that require a more heavy-handed approach can be pinpointed to allocate resources efficiently and build capacity, even if enforcement is minimal ("Pilot Program", 2005). Permitting and fees are acceptable to the majority of public land users if other enforcement options are not available ("Lessons Learned", 2005; Nesteruk et al., 2013). If fees are to be in place, it is recommended that the public is able to see direct benefits of their fees ("Pilot Program", 2005). However, fees must apply to all users, including those who own property on the Loop and use the area for commuting rather than recreation, so this strategy may be less acceptable. Moreover, the lack of enforcement personnel creates an opportunity for users to ignore rules and regulations unhindered. Management case studies have shown that prohibitions and constraints do not sustain inspiration, solidarity, and long-term commitment ("Lessons Learned", 2005; Mann & Leahy, 2009) and OHVers already perceive too many rules and regulations. Indirect forms of regulation, such as natural barriers to close trails and the ability to self-regulate within their parties and among peers is preferable and (Kil et al., 2012; Nesteruk et al., 2013). Online survey responses and case studies indicate that typical OHV riders' self-police internal and external groups, report a desire to volunteer, and are open to education ("Lessons Learned", 2005; Ouren et al., 2007;) especially when

encountering law enforcement patrolling trails on OHVs who strive for friendly interactions ("Pilot Program", 2012).

Although warnings and presence are effective, there are just not enough law enforcement personnel available. Therefore, it is recommended that LKL management initially focuses on indirect management strategies, centered around identifying and learning how to effectively engage stakeholders to promote sustainable long-term management, capitalizing on common desires between residents and Loop users, and making consistent messaging and signage throughout the study area. Enforcement should begin with education, making information about why rules and regulations are in place as well as how to report violations easily accessible. GC Sheriff's Office personnel have stated that in order to act on violations, reports need to be timely and provide details such as the time, day, place where the incident occured, and if there are any patterns associated with the place, equipment, or person (i.e., if same incident happened before at the same time/day) (Marble County Commissioners Meeting, Oct. 10, 2019). Even if violators are not caught or prosecuted, incident data can assist management planners in providing enforcement in most needed areas and tracking changes. Much of the literature recommends that the FS focus on education, while affected counties (in this case, Pitkin and Gunnison Counties) bolster enforcement capability through cooperative law enforcement agreements ("Lessons Learned", 2005), such as in Taylor Reservoir where FS pays Sheriff deputies to patrol and provided education. Users should primarily be empowered to self-regulate through these efforts.

Education
The products of indirect management strategies should be a combination of dispersal and education (Albritton & Stein, 2011). Much of the literature calls for legislation requiring formal OHV driver's education classes to receive a riding permit as part of hunter education classes or regular driver's education, and for OHV manufacturers to include point of purchase information and on-product warning labels to encourage an industry standard of safety culture, especially targeting young riders and their parents ("Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Nesteruk et al., 2013; Denning et al., 2013; Denning & Jennissen, 2016; Fawcett et al., 2016; Topping 2019). Unfortunately, increasing knowledge does not necessarily equate to a change in an individual's behavior (Fawcett et al., 2016; Lawhon et al., 2017), so onsite efforts such as trail maintenance, signage, and documentation indicating all activities allowed and alternative locations were viewed as the highest priorities needed to improve rider compliance (Ouren et al., 2007; "Pilot Program", 2012). Trailhead facilities should also reflect the fact that most OHV owners recreate in groups and want to teach or lead others in the activity and have an appropriate reading level for young riders (Nesteruk et al., 2013). According to the Theory of Planned Behavior (TPB), individuals make behavioral decisions based on beliefs (Lawhon et al, 2017), which is often complicated by distrust in authorities, negative views toward Leave No Trace and Tread Lightly principles that seem inconsistent or take years of experience and skills to learn, and traditional and cultural practices that are incongruent with changing management needs. Therefore, it is recommended to learn the beliefs and knowledge of users to understand barriers to management and provide appropriate onsite messaging.

Educational efforts should target the many OHV users that participate in other forms of outdoor recreation that depend on a healthy ecosystem, communicated in ways that describe reasons for management decisions so they do not appear arbitrary, such as hunting and fishing activities that may be at stake (Ouren et al., 2007). More effort should be focused on providing information about rules, hazards, and conditions in a consistent and standardized format across agencies and partners ("Lessons Learned", 2005; Ouren et al., 2007; Burr et al., 2008; Albritton & Stein, 2011, Lawhon et al., 2017) and to improve knowledge about existing laws among agency personnel (Qin et al., 2019). Engagement strategies should be matched to partnership interests, issues, and capacities that are familiar and appropriate to on-the-ground management and enforcement agencies and the users they supervise. Education materials are recommended to be developed according to the zone of proximal development (Simmons et al., 2017), which builds new information upon what users already know. For many visitors to the Loop, this may incorporate acknowledging the desired recreation opportunities visitors came to seek and connect them to shared perspectives of residents, such as respect for personal property (Burr et al., 2008) or protecting the area where Loop users' feel they belong.

Branding and messaging
A final focus group for the 2020 summer asked participants to respond to what the term "save the Loop" means to them. Responses varied from protecting the environmental integrity and cultural values of Marble to requiring all OHVs be banned as they were seen as incompatible with resident needs and desires. Unfortunately, such a ban would also apply to residents of the CRV. To attempt a balance between outdoor enjoyment and environmental protection, it is recommended that future public input methods should focus on designing a community-wide message and LKL brand. Such a message and brand should promote education about the cultural values of the CRV and the LKL, such as native, mining, and recreational history and environmental protection. It is also recommended that messaging uses a positive approach to reframe problems to show benefit potential ("Lessons Learned", 2005; Mann & Leahy, 2009; Fawcet et al., 2016). For example, the general sentiment of Loop users being local to the Valley can be leveraged to build upon the power of place and promote a sense of shared ownership and responsibility for clean water and air, abundant wildlife, healthy ecosystems, and small-town character ("Lessons Learned", 2005), as well as incorporate etiquette education for the growing numbers of new users (Nesteruk et al., 2013). General safety advisories such as old mining holes on private property can serve dual purposes of educating about history and providing reasons for rules and regulations. Because so many Loop users are experienced OHVers and feel an investment in the ecological integrity of recreation areas, peer pressure among OHV groups that look out for the longevity of the Loop can also be leveraged, particularly with OHV clubs like High cOuntry 4 Wheelers (Fawcett et al., 2016). Also, economic benefit from user fees and sales can be branded as investing in relationships and partnerships to build consistent messaging and publicity, especially to develop economic instruments that "reward protection rather than destruction of natural capital" (Ouren et al., 2007; Mann & Leahy, 2009; Hodza, 2012; Davis et al., 2018). Potential brands and messages should be developed by communities most directly impacted by incomers from outside the study area and supported by counties and towns who house many of the users as well as other stakeholders and partners like agencies and businesses. Key educational messages concern environmental impact, state laws,

safety and skills, and ways of limiting user conflicts balancing fun with responsible resource use ("Lessons Learned", 2005). The town of Marble must be responsible for publicity. Most users reported that they do basic google searches or various trail apps that do not seem to reflect the dangers the LKL poses to normal passenger vehicles. It is recommended that as many internet sources receive input from CRV community messaging.

Signage
Signage is perceived to be the most readily available management resource along with an education and interpretation strategies to connect recreation to history and place (Lawhon et al., 2017; Khan et al., 1991) but there are challenges related to maintenance and theft or vandalism prevention. Inconsistent management policies across different land management agencies cause confusion and conflict, and even in town, different businesses will have different postings and information. It is highly recommended that community branding and messaging incorporates consistent signing and information dissemination to avoid mixed messages and confusion ("Lessons Learned", 2005; Ouren et al., 2007; "Pilot Program", 2012). Uniform signage informs riders on OHV trail routes, route navigation, degree of trail difficulty, responsible use practices, trail use and access allowances, alternatives and route closures should account for education and branding considerations ("Pilot Program", 2012). Most incident reports identified trail maintenance and signage needs as the principal trail/road problems ("Pilot Program", 2012). However, residents and agencies seem to agree that users often take warnings as challenges. Positive approaches to messaging can mitigate this, but further monitoring needs to be done to test effectiveness. One obvious fix is updating the sign at the junction of at the top of Daniel's Hill to clearly indicate which direction Crystal Mill is on the Loop to avoid confusion, bottlenecking, and conflict.

Next Steps
More data will be needed over several years to determine efficacy of management strategies, track changes in LKL user demographics and community needs and desires and monitor effects across habitats and watersheds (Ouren et al., 2007). Future field data will be collected in the peak season from July to September. Areas to safely conduct field surveys have been identified at the LKL trailhead and the Gold Pan parking area. Several community members and users have suggested designating the Loop as one-way or alternating days for motorized and non-motorized use to slow the crowds. Data on trail difficulty is needed to determine if a one-way designation is appropriate for the Loop. If so, the Loop could be closed to riders under a certain ability or to normal passenger vehicles. However, enforcement personnel would be needed to ensure such directives are followed. A more robust engineering study would be needed to determine if the LKL should be redesignated as open only to ATVs and ORMs. Emergency incident and legal citation data gathered from GC Sheriff's Department, Carbondale Fire Department, Gunnison National Forest, and White River National Forest can be used to determine points where enforcement is most needed or where areas should be marked for extreme caution. Traffic counts of travelers on CR 3 and the Loop are also being gathered in addition to guest counts of overnight services. Data in the form of historical photography from old user and resident pictures can be used to assess threats over time and is also an opportunity for public input (Evans, n.d., "Lessons Learned", 2005). Inventory data of trail width, observed uses, hazards, and various types of sites and activities (such as campsites, fire pits,

parking lots, dump sites, etc.) marked with GPS coordinates must also be taken (Lessons Learned", 2005) along with GIS (positively framed as appreciative GIS (Hodza, 2012)) data to visualize visitor preferences, uses, and values toward resource attributes, and identify areas to exclude from development for OHV use or as alternatives (Ouren et al., 2007; Albritton & Stein, 2011). Additionally, social media is a useful data source to fill information gaps on spatial and temporal extent of recreation activities because the amount of recreational use is positively correlated with social media activity (Wood et al., 2020). Social media is also where many first-time users learn about the LKL and spread awareness about the area. Mann & Leahy suggest a "[q]uantitative study of rider populations to capture distinctions in meanings" through relative importance ranking while interpretive research is further needed to understand meanings and experiences of Loop users to find more appropriate management strategies. One example of interpretive data collection is The Q Method (Brown, 1993; Van Exel et al., 2005; Ward, 2009; Danielson et al., 2012), which has been recognized as an effective means of measuring subjectivity, ensuring a full spectrum of perspectives are identified rather than the vocal minority. The Q Method presents various statements that showcase a range of perspectives about a given topic to participants who are asked to sort the statements in order of how much they agree or disagree. The range of disagreements can be statistically analyzed to solidify and categorize perspectives of stakeholders. A Q sort would be useful to identify both the range of resident perspectives regarding tourism and management preferences among visitors and enforcement agencies. These perspectives can be compared to find knowledge gaps and opportunities for improved communication or evaluate how management is going and look for areas that need adjustment. Therefore, the use of the Q method in the next data gathering phase is recommended.

Challenges
Behind all this remains a bigger question of managed tourism growth in Marble and neighboring communities that involves determining where to draw lines for resident rights and needs of tourism-based businesses in the Valley. Clashing and seemingly incompatible needs and desires from community members will continue to drive divisive perspectives that pose a challenge for creating a universal brand and message from the town and a brand for the Loop, as well as challenge policy makers and enforcement officers. Funding must also be considered. Currently, the state of Colorado funds trail maintenance through OHV registrations and trail use permits in the Responsible Recreation Foundation (RRF) ("Pilot Program", 2012). Funding for the OHV management has not kept pace with growth ("Lessons Learned", 2005; "Pilot Program", 2012). A daily use fee would be lesser of the two evils if local funding sources are inadequate and outside funding is unavailable and users see or participate in the direct result of their user fees (Burr et al., 2008). When presented with a list of priorities for uses of public funds, OHV users selected purchasing rights-of-way for OHV access, new OHV trail construction, erosion control, and OHV trail system planning and maintenance (Ouren et al., 2007). Leadership and follow through from working group members, governing agencies, community members, and local recreation and environmental organizations must be maintained over years of data gathering in the face of urgency.

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