

Extended Summary: Red Rock Canyon NCA Capacity Assessment

Final | March 2019

Overview

Red Rock Canyon (RRC) National Conservation Area (NCA), near Las Vegas, NV, is an increasingly popular destination for tourists and southern Nevada residents. More than one million people have visited the main Scenic Loop Drive portion of the NCA annually since 2012. Growing numbers of visitors highlights the importance of public lands like RRC for recreational and conservation purposes. However, increased visitation can also lead to capacity-related negative impacts, such as traffic congestion and resource damage, that may compromise the social and ecological values of RRC and the purposes for which it was designated as an NCA.

The *overall goal of the capacity assessment project* summarized here was to assist the Bureau of Land Management's (BLM) planning and decision-making process in the context of increased visitation at Red Rock Canyon National Conservation Area.

We accomplished this goal by synthesizing management directives and by providing scientific data and analysis of visitor use and visitation trends around the main Scenic Loop Drive portion of the NCA and perceptions of capacity-related issues among officials, visitors, and other stakeholders. We used these efforts to provide recommendations about visitor use management.

More specifically, after carefully reviewing a 2016 preliminary capacity assessment and engaging in conversations with the BLM, Southern Nevada Conservancy (SNC), and Friends of Red Rock Canyon officials, we developed *five objectives* for the capacity assessment project:

- 1) Review management directives and staff perceptions of capacity issues
- 2) Understand visitor and stakeholder perceptions of capacity issues at RRC
- 3) Characterize vehicle travel and parking issues throughout the Scenic Loop Drive
- 4) Provide public and agency benefits
- 5) Provide management and planning recommendations

We used a mixed-methods and multi-faceted approach that involved primary (i.e., we collected data ourselves) and secondary (i.e., we used existing data and document reviews) data sources to address these project objectives. Project development began in late 2016. Data collection began in April 2017 (after the most recent road and parking lot construction around the Scenic Loop Drive) and continued through January 2019.

In this extended summary, we provide an overview of the main findings associated with each objective. The complete report and appendices documents contain considerably more details and information. We strongly recommend carefully reviewing those documents as well.

Objective 1: Review Management Directives and Staff Perceptions of Capacity Issues

We addressed the first objective by conducting a document review and personnel interviews.

Management Document Review

We reviewed national and state BLM planning and strategy documents, RRC management plans, and previous RRC transportation studies to better understand the management context and direction for visitor use management at RRC. Here are the main findings from those efforts:

- BLM national and state guidance about recreation and visitor management is general in nature because it applies to a wide range of social and environmental situations and areas. There is an emphasis on balancing conservation, preservation, and access for a wide variety of uses and purposes on BLM lands across the state and U.S.
- Guidance for planning, implementing, and assessing outcome-based management is more specific and developed, though there is limited direction concerning capacity issues.
- Previous transportation studies at RRC have provided guidance for some decisions or changes, especially road and facility improvement, including a potential shuttle system.
- The 2005 RRC management plan lacks direction on visitor experiences, visitor management, visitor safety, and other capacity issues. It mostly focuses on locations for camping, climbing, target shooting, trails, OHVs, and commercial use. It discusses a return road from Sandstone Quarry and a new Calico III parking area development.

Interviews with BLM Staff and Other Personnel

We conducted 19 interviews with individuals representing a wide range of disciplines, backgrounds, and tenure at RRC. The purpose was to understand their perspectives of capacity-related issues, management directions, and solutions at RRC. Here are the main findings:

- Personnel are well aware of congestion issues at the Scenic Loop Drive entrance station, which are exacerbated by a lack of clear lane designation, slow internet, bottleneck-prone configuration, and proximity to NV 159. Re-configuration and expansion are needed. A shuttle system is likely needed to some extent and most are supportive of exploring that option. An in-depth study about shuttle services and options would be helpful.
- Communication issues commonly discussed include the need for public Wi-Fi and cell service, a more reliable radio tower, improved trail signage, more specific and clearly communicated plans are needed for rideshare visitors, and continuing to communicate with potential visitors about preparing for conditions and expectations for capacity issues.
- RRC personnel agree about the need for more staff (especially for law enforcement, rangers, and trail maintenance) and increased presence along the Scenic Loop Drive (at the Visitor Center, parking areas, trails). Staff turnover is a major challenge.
- Personnel perceive a lack of direction about visitation management. Clearer decisionmaking structure and updated management and communication plans are needed.
- Several participants discussed issues surrounding tension between RRC being an NCA and other designations like an NRA. There lacks a precedent among other NCAs and clear direction about managing heavy visitation and prioritizing conservation goals.
- There are sentiments among some officials that RRC does not receive the support and resources it needs to successfully manage visitation and capacity-related issues, which in turn makes achieving NCA goals challenging.

Objective 2: Understand Visitor and Stakeholder Perceptions of Capacity Issues at RRC

We conducted several different social science studies to understand public and other stakeholder perceptions of capacity issues and visitor experiences at RRC. Each effort is summarized here.

Visitor Satisfaction Surveys

We conducted two visitor satisfaction surveys at RRC with a total of 729 visitors. The first survey was in spring 2017 at the outer areas of the NCA (e.g., Ash Spring, First Creek). Volunteers and BLM and GBI staff randomly distributed 329 surveys to visitors across six different outer sites. Then, in fall 2017, GBI staff randomly distributed 400 surveys across six different sites around the Scenic Loop Drive area (e.g., Sandstone Quarry, Ice Box Canyon).

Overall, visitor satisfaction levels were very high. Indeed, 94% of visitors were satisfied overall with their experiences at the outer areas and 97% were satisfied around the Scenic Loop Drive. Respondents represented 24 states in the outer area survey and 40 states in the main Loop area.

Overall, satisfaction could be improved regarding:

- Cleanliness of restrooms and other physical facilities
- Providing stewardship information on protecting cultural and natural resources
- BLM interpretive and education program overall
- Providing a sufficient law enforcement presence to prevent crime
- Ensuring public awareness of rules and regulations
- Providing adequate signs on-site for direction and orientation

Approximately 70% of respondents in both survey efforts wrote comments on the survey. We reviewed those comments for general themes and other insights. Overall, most comments reflected these high levels of satisfaction with visitor experiences at RRC. The most common negative comments included the areas noted above and requesting Wi-Fi and cell service.

Open-ended Online Survey

We wanted to get a better understanding of perceptions of capacity issues and recreational experiences from local visitors and other stakeholders. Therefore, we designed an open-ended online survey with six general questions asking people to describe their own experiences at RRC over the years and their perspectives of different types of impacts they have noticed. We received responses from 451 people (~ 2,550 separate comments), many of whom were from Las Vegas. It is important to note that the findings from this survey are not statistically representative of any particular population because the sampling frame was quite broad and not strictly defined.

Visitors, especially long-time and/or frequent visitors and members of different activity or stakeholder groups, deeply value the NCA and the opportunity to recreate there. Their awareness of increased visitation and capacity issues is heightened compared to the average visitor. In particular, they commonly discussed congestion at the NCA's main entrance station and at some parking areas along the Scenic Loop Drive and the multi-lane and multi-use nature of the Scenic Loop Drive. A need for better signage along trails was also mentioned frequently. Many of them

felt that better communication, including more clear signage and lane demarcation, could address these issues to some degree. They also recognized the need for improved Wi-Fi and cell service at the entrance station, the Visitor Center, and perhaps along the Scenic Loop Drive.

Small Group Discussions and a Survey of Active Volunteers

Volunteers serve increasingly important roles and functions at the NCA. Indeed, in FY2018 nearly 800 volunteers provided more than 28,000 hours of service in many different ways at the NCA. Many of them are also regular visitors. To understand their perspectives, we engaged volunteers in two ways- small group discussions and an on-line survey. First, we held four separate focus groups with a total of 22 volunteers in December 2017. In these sessions, we discussed participants' insights about common issues with which they help visitors at RRC, the types of support they need to serve the BLM, their perceptions of capacity-related issues and impacts, and their suggestions for management strategies. Then, based on the discussions, we developed a survey to get a better understanding of these perspectives across the larger volunteer population. Volunteers who had logged at least five hours in FY2018 (n=416) were emailed an invitation to complete the online survey in August 2018. A total of 110 volunteers completed it.

Volunteers, especially those who interact with visitors at RRC, would like more information or educational materials to give to visitors about a wide range of topics (e.g., geology, botany, wildlife, and more specific information about the trails at the NCA). They appreciate training opportunities provided to them and would like more opportunities to engage directly with BLM and SNC officials to share their concerns and perspectives and learn more about the management issues and planning and decision-making process. Similarly, they would like to see a larger presence of BLM officials around the Scenic Loop Drive and interacting with visitors.

Volunteers felt that many visitors could be better prepared for the conditions and their experiences at RRC, especially those arriving via ride shares. Many volunteers are long-time visitors. They are keenly aware of increased visitation and some of the impacts, such as congestion and graffiti. Many of them also adjust their own visitation patterns to avoid times of high visitation at RRC. They are overall supportive of improving trail signage, designating lanes at the entrance station, improving the information available to visitors on official RRC websites, adding more trash cans at trail heads and parking areas, using electronic message boards to communicate capacity levels to potential visitors, installing a voluntary and free shuttle service during peak use times, and improving cell and Wi-Fi capability in some areas of the NCA.

Volunteer survey respondent agreement with statements about BLM support and personal RRC visits

	% Agree
Overall, I receive the support and resources I need from the BLM to be an effective volunteer	71
I would like more opportunities to communicate with BLM managers and staff	56
When I am volunteer around the Scenic Loop Drive, it is usually easy for me to quickly get in touch with a BLM ranger or other BLM staff member	32
The public has sufficient opportunities to interact with BLM staff, managers, law enforcement and other RRC officials	26
The BLM staff, managers, and law enforcement have sufficient presence around the Scenic Lo	op 15
I have noticed an increase in graffiti at the NCA over the past few years	73
I have noticed an increase in litter or trash around the NCA over the past few years	70
I personally visit the Scenic Loop Drive only on days or times when I think it will be less busy	78

Permittee Survey

Recreational permittees (e.g., outfitters) provide a range of opportunities to many RRC visitors. We administered a survey with fixed-choice and open-ended questions to approximately $1/3^{rd}$ of the current permittees in October 2018 to understand their perspective on capacity-related issues and management options at RRC. Although the number of respondents (n=6) was limited due to the small number of permittees (n=17), we still gained valuable insights from them.

Permittees who responded to the survey generally perceive increased visitation at RRC positively. They are most concerned about congestion and wait times at the entrance station and safety for their customers using smaller or human-powered vehicles along the Scenic Loop Drive due to a lack of lane designation and speeding enforcement. They also generally feel that the BLM provides the necessary support to them, although they would prefer more flexibility in the permitting process and longer permit periods, as well as more consistent and open communication with the BLM. They are supportive of adding or designating a separate lane at the entrance station for permittees only, having access to webcams to gauge wait times at the entrance station, installing Wi-Fi and cell service around the Scenic Loop Drive, and moving ahead with considering a return road from Sandstone Quarry to the Visitor Center.

Objective 3: Characterize Vehicle Travel and Parking Issues Throughout the Scenic Loop Drive

We collected different types of data to describe and quantify vehicle travel and parking characteristics along the Scenic Loop Drive. Findings will assist planning and monitoring efforts.

People Per Vehicle Estimate

The number of visitors who enter the Scenic Loop Drive area is estimated using a people per vehicle (PPV) multiplier for cars, vans, and other similar vehicles and a people per motorcycle (PPM) multiplier for motorcycles. The current PPV multiplier is 2.52 and the PPM is 1.25. We designed a protocol, data entry form, and sampling schedule and worked with fee booth attendees and volunteers to collect PPV/PPM counts as vehicles entered the NCA. We sampled a total of 5,328 vehicles during 85 different sampling sessions from Dec. 2017 to Dec. 2018.

The updated estimate, overall, is 2.547, which is similar to the previous estimate. The table below shows the average PPV overall and by season. The main report includes more information about how PPV varied according to weekdays/weekends and mornings/afternoons. Officials may choose to update and vary the estimates they use accordingly. Additionally, a total of 104 motorcycles were also sampled. The overall average for motorcycle occupancy is 1.405 PPM.

Season	Months	Total number of vehicles sampled	Number of sampling days	Average PPV
Winter	Dec, Jan., Feb.	1,037	14	2.735
Spring	Mar., Apr., May	2,169	27	2.593
Summer	Jun, Jul., Aug.	925	22	2.299
Fall	Sept., Oct., Nov.	1,197	22	2.488
	Overall	5,328	85	2.547

People per vehicle counts at RRC by season

Magnetic and Pneumatic Vehicle Counters

We placed 14 vehicle counters across the Scenic Loop Drive at main parking areas, near the Visitor Center, and at the beginning and end of the Scenic Loop Drive. An additional counter was installed on Calico Basin Road. Most of them are magnetic counters and two of them are pneumatic tube counters. Data periods vary due to mechanical errors and installation issues that delayed installation, though we generally have data for most counters from Oct. 2017 – Jan. 2019. Below are some example figures from the main report highlighting key findings. Note, the Visitor Center was closed during the week of 12/24/2018 due to the government shutdown.



Total number of vehicles counted weekly

We examined vehicle counts for holidays, fee free days, Scenic Loop Drive closure days, and days during the government shutdown (12/22/2018 - 1/22/2018); data was collected a few days before the shutdown ended). These figures indicate an increase in traffic at Calico Basin Rd during peak use days at the Scenic Loop Drive.



Hourly number of vehicles on select days and overall



Vehicle and Visitor Observations

The magnetic and pneumatic vehicle counters provide a lot of information about the number of vehicles entering and leaving different areas of the NCA. However, to capture additional insights about vehicle travel characteristics and patterns across the Scenic Loop Drive beyond the information provided by the mechanical vehicle counters, we conducted two additional and separate tasks that consisted of different vehicle, traffic, and visitor observations and counts.

We conducted a total of 1,135 observation sessions or counts on 97 different days between August 2017 and July 2018 of different attributes related to visitation and capacity at many of the Scenic Loop Drive parking areas. On average, the Calico II, Lower White Rock, and Ice Box Canyon parking areas were near or above 100% capacity. At times, these sites were recorded at approximately 300% capacity. These were also the areas around the Scenic Loop Drive where cars were more likely to park on the road or in other undesignated areas. Parking areas were, on average, nearer to full capacity on fee free days, holidays, and days when the Scenic Loop Drive closed due to capacity compared to overall averages across the entire sampling period.

	Overall	Fall	Winter	Spring	Summer
Visitor Center	39	42	39	39	n/a
Calico I	41	43	43	44	9
Calico II	151	168	156	159	29
Sandstone Quarry	72	67	75	77	11
High Point Overlook	52	70	48	52	31
Lower White Rock	92	90	94	93	75
Upper White Rock	70	97	59	77	35
Willow Spring	59	64	56	64	20
Lost Creek	63	69	56	68	28
Ice Box Canyon	107	132	87	124	36
Pine Creek	42	45	39	46	5
Oak Creek	50	38	50	56	15

The average percent capacity for Scenic Loop Drive parking areas by season

Fall = *Sept, Oct, Nov; Winter* = *Dec, Jan., Feb; Spring* = *Mar., Apr, May; Summer* = *June, July, Aug. Bolded numbers indicate peak percent capacity for that site across seasons.*

Bus and RV parking was most prevalent at Pine Creek, Calico I, the Visitor Center, and Sandstone Quarry. There was also a lot of RV parking noted at Calico II. The Visitor Center, Calico I, and High Point Overlook appear to be the most popular sites for motorcycles and bicycles to park or visit. Seventy-two percent of all sessions recorded no litter in the vicinity of the parking areas. Upper White Rock and Willow Spring were most likely to have litter recorded.

The entrance station, Calico II, Lower White Rock, and Icebox Canyon areas have notable congestion and capacity issues, due in part to design and available parking spaces, the popularity of these sites, and longer-term use at some of these sites (e.g., climbing and longer hikes).

Observations along the Scenic Loop Drive and at the entrance station. The other task involved driving the Scenic Loop Drive and recording different information about vehicle and traffic flow (e.g., time taken to drive different segments of the Loop, the number of cars parked along the Loop road, and an estimated congestion level of vehicles in front and behind the

surveyor vehicle) at different segments along the Scenic Loop Drive and the amount of time taken to drive the entire Scenic Loop Drive. A total of 55 of these observations were conducted.

The average time to drive the Scenic Loop Drive road was 30 minutes. It took ~ seven minutes longer on busy days. The average time at the entrance station was ~ five minutes and it was up to six times longer on busy days. Six out of 53 observation sessions recorded vehicles backed up on NV 159. The report shows much more information about these findings. The figure below shows overall findings for each segment (avg. minutes and cars parked on the Scenic Loop Drive, and most frequent congestion level recorded where 'none' = 0 cars w/in 150 feet and 'low' = 1-5 cars). Congestion levels were much higher on busy or peak-use days (e.g., weekends, holidays).



We estimate that typical visitors spend an average of approximately two hours visiting the Scenic Loop Drive. In addition to a much higher number of vehicles entering the Scenic Loop Drive on peak visitation days compared to overall averages, it also appears that visitors tend to stay for slightly longer durations of time on peak visitation days compared to overall averages. We expect this trend is due in part to favorable weather conditions and having more time to spend there on peak visitation days, which tend to occur on weekends, holidays, and fee free days.

We also analyzed overall visitation trends and trends on specific days or circumstances, such as fee free days, holidays, and other peak visitation days, to help managers identify indications of when capacity issues may occur. For instance, if the total number of vehicles entering the Scenic Loop Drive reaches at least 300 vehicles by 9:00am, 450 vehicles by 10:00am, or 750 vehicles by 11am, or 1,000 vehicles by noon, then it is likely that visitation that day will be quite a bit higher than average days and lead to conditions that managers deem necessary to close the Loop road temporarily or permanently for that day. Similarly, managers should infer an indication of potential capacity-issues when at least 200 hundred vehicles enter the Scenic Loop Drive between 9:00-10:00am, or at least 300 vehicles per hour between either 10:00-11:00am, 11:00am–noon, noon–1:00pm, or 1:00-2:00pm.

The number or portion of vehicles driving the Loop compared to the number of vehicles parked at any given time is difficult to accurately estimate with our data and without more sophisticated technology that can provide real-time estimates at multiple points along the Scenic Loop Drive simultaneously. That type of real-time data would improve the ability to precisely measure and predict use levels and congestion issues at specific areas along the Loop and at the entrance area.

A related and important inference is that visitation levels on peak visitation days recorded by traffic counters are noticeably higher compared to days when the Scenic Loop Drive was closed for capacity considerations (when comparing each hour before the Loop was actually closed on closure days). It is unclear why officials decided not to close the Loop on these peak visitation days compared to days with less visitation when it was closed. The conditions that existed on the closure days (e.g., congestion, lack of parking, and vehicles backed up on NV 159) may have existed to a similar extent on peak visitation days when no closure occurred.

There is a generally agreed upon protocol and method for deciding to close the Loop that involves coordination between BLM, SNC, and law enforcement officials. Many factors are considered in this decision-making process, including visitor safety, traffic backups on NV 159, parking lot capacity and overflow along the Scenic Loop Drive road, and amenity fee collections. Moving ahead, it will be imperative for officials to better and more carefully document the precise time and reason for Loop closures (including locations along the Loop or at the entrance that caused concern) in order to better prescribe feasible solutions and identify proper indicators of when the Loop *should* be closed for capacity issues. They should develop a formal closure protocol that clearly defines the decision-making process. Communication with potential visitors and other stakeholders about these types of decisions, and the situations in which the Scenic Loop Drive closures are likely to occur, is important. Enhanced understanding of these issues will help visitors plan and better appreciate the nature of the challenges RRC officials face.

Objective 4: Provide Public and Agency Benefits

We aimed to provide a range of benefits to the public and the BLM throughout this project. In addition to surveying and interviewing different visitors, stakeholders, and officials about their perspectives on capacity issues at RRC, we also provided several educational, outreach, and training opportunities to engage the public in our efforts and increase their understanding of different aspects that are considered in the planning and decision-making process at RRC. More specifically, we engaged a diverse set of stakeholders to both understand their perspective on capacity issues at RRC and describe different surveying and monitoring processes to them by offering training sessions to interested volunteers to help with future surveying and other capacity-related data collection efforts.

Activity	Notes	Date(s)	Hours
BLM, SNC, law enforcement interviews	n=19; 1 hour each	Continuous	19
Spring 2017 satisfaction survey volunteers	n=11 volunteers	Spring 2017	84
Spring 2017 visitor satisfaction survey	n=329; 10 mins each	Spring 2017	55
Fall 2017 visitor satisfaction survey	n=400; 10 mins each	Fall 2017	67
Small group discussions with volunteers	n=24; 3 hours each	Winter 2017	72
Survey of volunteers	n=110; 20 mins each	Summer 2018	37
Open-ended survey with stakeholders	n=451; 15 mins each	Winter/Sp. 2018	113
Survey of permittees	n=6, 20 mins each	Fall 2018	2
Capacity monitoring volunteer training	n=11; 4 hours each	April 10, 2018	44
Capacity monitoring event May 19	n=5; 4 hours each	May 19, 2018	20
Capacity monitoring event May 28	n=5; 4 hours each	May 28, 2018	20
Capacity monitoring pilot tests	n=6; hours vary	Spring 2018	94
People per vehicle counts	n=2, hours vary	Spring 2018	13
Total number of volunteer and in-kind hours			

Volunteer and in-kind participant hours for the capacity assessment project

Additionally, we shared updates about the capacity project and capacity-related issues at RRC with several different groups:

- Two presentations with recreation planning classes at Oregon State University
- Three articles in *The Rock* magazine (Fall 2017, Winter 2018, Spring 2018, Winter 2019, and expecting Spring 2019)
- Summary and updates sent to volunteer participants (e.g., volunteers who helped distribute satisfaction surveys and who helped collect pilot data for capacity monitoring)

To assist with future capacity monitoring at RRC, consistent with the approaches we used in our capacity assessment, we also developed **several manuals and guides** that can be used by staff or volunteers to continue consistently monitoring capacity-related issues:

- A user-friendly manual for setting up, installing, monitoring, and analyzing magnetic and pneumatic traffic counters
- A manual for volunteers to use to collect vehicle and visitor monitoring data developed and refined with volunteer training sessions and pilot data collection efforts
- Two manuals for volunteers to distribute visitor satisfaction surveys at areas around the Scenic Loop Drive and at outer RRC areas

Objective 5: Provide Management and Planning Recommendations

Based on the findings from the various data collection efforts, we are pleased to offer a set of recommendations for consideration in addressing capacity-related management and planning issues. The following is a brief overview of each main recommendation.

A. Develop and implement a visitor use management and monitoring plan.

• We encourage officials to use the Interagency Visitor Use Management (VUM) framework and guidebooks to develop a VUM plan that addresses increased visitation by defining management goals, desired future conditions, and applying and adapting appropriate management and monitoring strategies. Our data serves as a reference point for many issues. An initial step should be to identify an interdisciplinary team to begin the VUM planning process.

B. Consider improvements to accommodate more visitors and enhance communication.

- Expanding, moving, and/or reconfiguring the entrance station and demarcating lanes
- Implementing a reservation system during peak use days or seasons at certain parking areas (e.g., Calico II and Icebox Canyon)
- Conducting a formal feasibility analysis of a shuttle system, a return road from Sandstone Quarry, a Calico III parking area, extending the NV 159 deceleration lane, entrance station changes, and a potential reservation system
- Improving Wi-Fi and cell phone service at the entrance station and Visitor Center
- Enhancing the capability of automated, real-time vehicle capacity data collection and communication regarding congestion levels around the Loop and at the entrance
- Improving signage along most Scenic Loop Drive trails in and along the Loop road

C. Increase the presence of official personnel around the Scenic Loop Drive.

• The number of field staff is currently insufficient to adequately monitor conditions across the NCA and communicate with visitors effectively. Increased presence could improve visitor experiences and may mitigate safety and behavioral issues (e.g., theft, graffiti) to some degree.

D. Enhance the support and capabilities of the volunteer program.

• Enhance communication opportunities between volunteers and officials. Continue providing training opportunities. Engage them in capacity-monitoring efforts.

Conclusion

We designed our study and the various protocols with the intent that the BLM continue regular and consistent monitoring exercises to inform their management strategies as conditions and visitation change. Our capacity assessment is one of many resources that BLM officials and partner organizations will use to inform their priorities and decisions. Collaboratively addressing the inherent challenges of balancing NCA designation, conservation goals, and visitationto create and implement a visitor use management plan is an imperative next step for RRC officials.

Authors and Contact Information

Chad Kooistra@thegreatbasininstitute.org), Jerry Keir, and Will Rempel