Public Lands Transportation Scholar
Final Report

Integrating Shuttles at Chimney Rock National Monument

April 2014

Paul S. Sarbanes Transit In Parks Technical Assistance Center

UNDERSTANDING RESOURCES SOLUTIONS

This document was prepared for Federal Transit Administration by the Paul S. Sarbanes Transit in Parks Technical Assistance Center.

DISCLAIMER

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof. The United States Government does not endorse products of manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the objective of this report.

AUTHOR

This document was authored by Valerie Hermanson, Public Lands Transportation Scholar for the Paul S. Sarbanes Transit in Parks Technical Assistance Center (TRIPTAC) stationed at the Chimney Rock National Monument and the Canyons of the Ancients National Monement.

Abstract

Chimney Rock National Monument (CRNM) is located in the San Juan Mountains of southwest Colorado. It is managed by the United States Forest Service (USFS) Pagosa Ranger District with day-to-day tours and management by the non-profit, Chimney Rock Interpretive Association (CRIA). President Obama established Chimney Rock as a national monument on September 21, 2012, and with designation status increases in visitation is anticipated. However, with increased visitation, existing challenges such as visitor safety, cultural and natural resource protection and parking capacity could be further exacerbated. These concerns encouraged the USFS to explore alternative transportation modes at CRNM and in 2012, they were awarded a grant to purchase three 12-passenger vans to serve as shuttles. From June to October 2013, the Public Lands Transportation Scholar, Valerie Hermanson, addressed existing challenges at CRNM and identified strategies to integrate shuttles into daily operations at CRNM. She recommended several options to address challenges and the incorporation of shuttles.

Contents

Acronyms

Capital Improvement Plan	CIP
Cardiopulmonary resuscitation	CPR
Chimney Rock Interpretive Association	CRIA
Chimney Rock National Monument	CRNM
Chimney Rock National Monument Interdisciplinary Team	CRNM ID Team
Heat Island Effect	HIE
Low Impact Development	LID
Native American Cultural Gathering	NACG
San Juan Mountain Association	SJMA
San Juan National Forest	SJNF
United States Forest Service	USFS

List of Figures

List of Tables

Introduction

Location

Regional Map of the Chimney Rock National Monument Vicinity

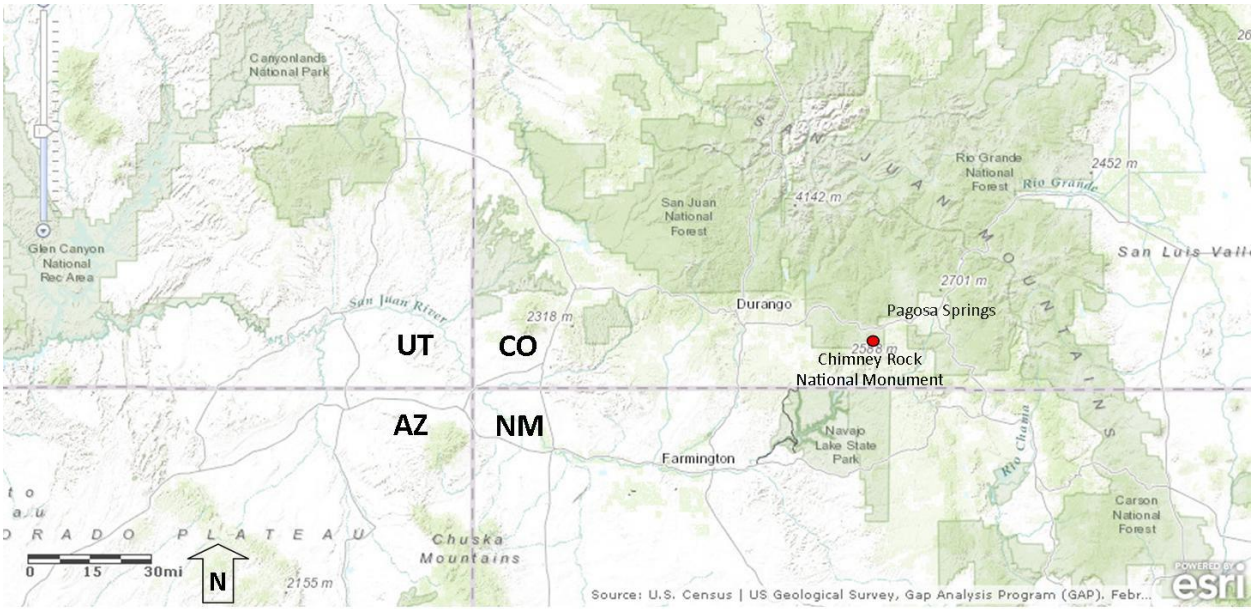


Figure 1: Regional Map of CRNM

Chimney Rock National Monument (CRNM) is located in Archuleta County in southwestern, Colorado. CRNM is about 18.5 miles west of Pagosa Springs, CO, and 41.6 about miles east of Durango, CO.

Chimney Rock National Monument Complex

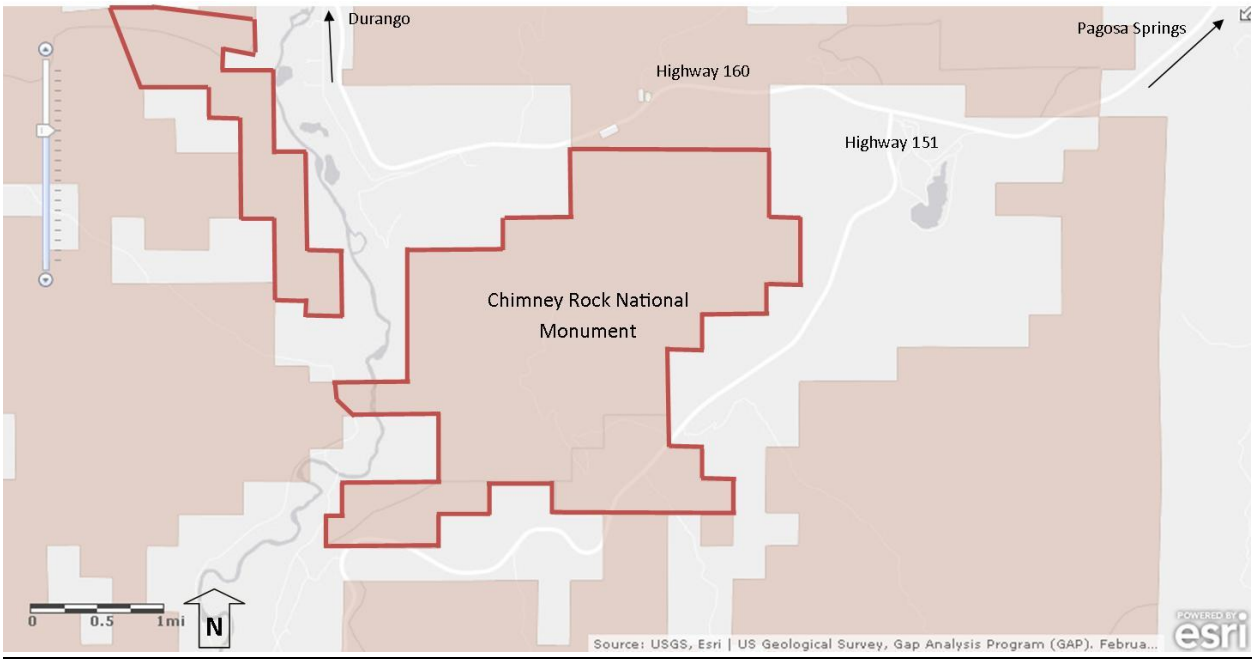


Figure 2: Chimney Rock National Monument Complex - The CRNM complex is 4,726 acres.

Chimney Rock National Monument

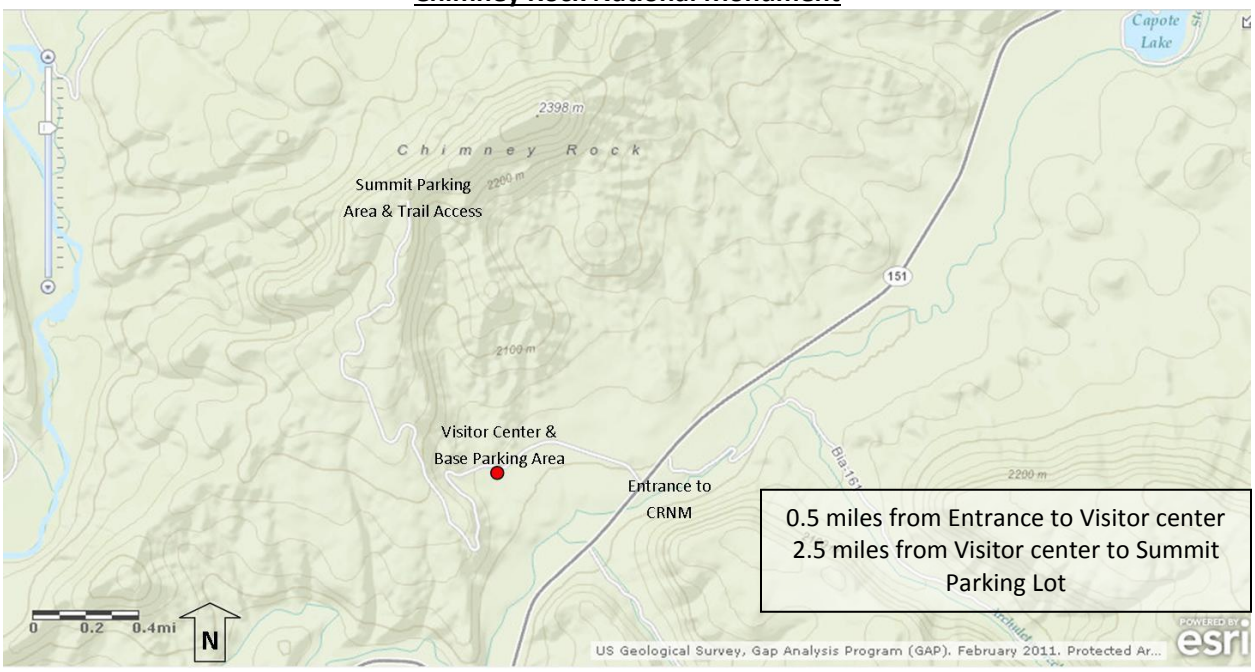


Figure 3: Chimney Rock National Monument Site: CRNM is comprised of base and summit areas. Prehistoric structures at the summit area sit hundreds of feet above the valley floor.

History and Background

The Ancient Puebloans occupied the Chimney Rock area between A.D. 900 and A.D. 1150.[1] This area is also known as the northern most outlier of Chaco Canyon, New Mexico, which is about 100 miles south of Chimney Rock.[2] The Chimney Rock site is home to over 100 structures settled in the valleys and high above the valley floor. It is believed that the two pinnacles, Chimney Rock and Companion Rock, were significant to the Ancient Puebloans and the Lunar Standstill can be seen in between the two pillars.[3] In addition to the Lunar Standstill, there are numerous other astronomical features. Prehistoric structures throughout the site align with different astronomical features such as summer solstice. The site is of spiritual significance to tribes today.

A number of excavations occurred at CRNM starting in the early 1920s, Jean Allard Jeancon and Frank Roberts excavated Chimney Rock.[4] In the 1970s Frank W. Eddy was the principal investigator at Chimney Rock and he was highly involved in Chimney Rock being identified as an Archaeological Area and being added to the National Register of Historic Places.[5] Even as recently as 2009, Stephen Lekson and Brenda Todd, conducted excavations at the Great House.[6]

In 1974, endangered Peregrine Falcons were discovered nesting at Chimney Rock and so the area was closed for the next 14 years with minimal tours given at the site.[7]

Before Chimney Rock was a National Monument, it was listed on the National Register of Historic Places in 1970 and was known as Chimney Rock Archaeological Area (CRAA). CRNM encompasses 4,726 acres of San Juan National Forest. While there are structures scattered throughout the 4,726 acres, only a portion of stabilized, excavated and unexcavated sites are open to the public.

[1] (United States Forest Service Pagosa Ranger District, 2013)
[2] (Forest, 2012)
[3] (BBC Research & Consulting, 2012)
[4] (Chimney Rock Interpretive Association, 2013)
[5] (Chimney Rock Interpretive Association, 2013)
[6] (Chimney Rock Interpretive Association, 2013)
[7] (Ramussen, 2012)

Site

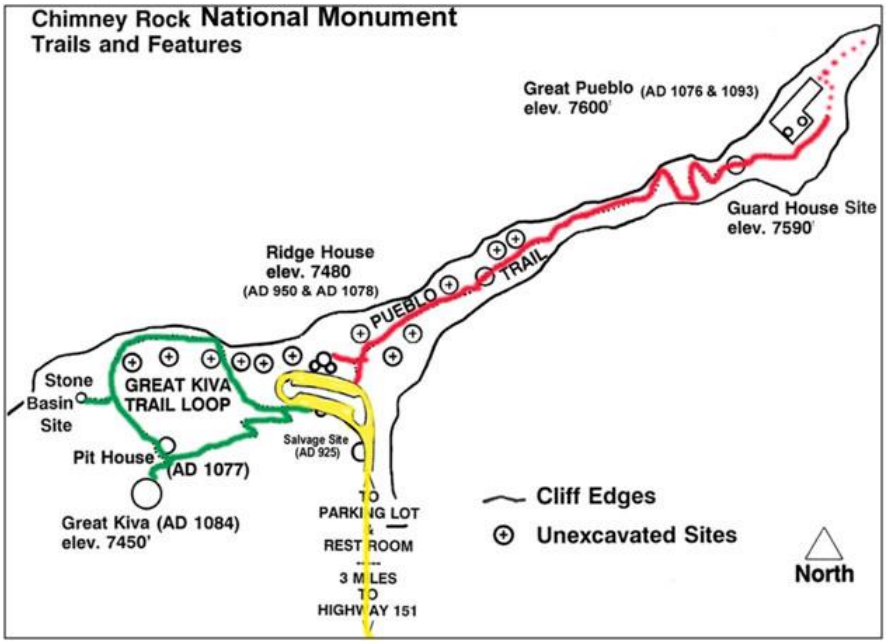


Figure 4: Chimney Rock National Monument Trails and Features. Map Source: http://www.chimneyrockco.org/index.htm

Chimney Rock National Monument has two main areas open to the public: the base and summit. The base area of CRNM has a small cabin visitor center, which Chimney Rock Interpretive Association (CRIA) uses to house its operations at the site. CRIA uses the cabin to have visitors check in and they sell CRNM related souvenirs and bottled water. The visitor center has 22 parking spaces with two (2) handicap parking spaces. Additionally, there is a small path leading from the base parking area to a sitting area with interpretive signage and vistas of the CRNM landscape. The base area also has an amphitheater with 19 benches. There are five (5) picnic tables where visitors can enjoy a snack or picnic before driving to the summit areas of CRNM. Food is not allowed at the summit of CRNM. In addition, there are two (2) handicap composting restroom facilities at the base parking area.

Figure 5: Base area of CRNM: Photo Source: ESRI Maps

The summit area of CRNM has two (2) handicap composting restroom facilities. There are 26 parking spaces with two (2) handicap parking spaces. There is a barrier free, ADA trail called the Great Kiva Trail, which one-third of a mile and has interpretive signage throughout.[8] The trail goes by views of pit houses and a kiva. The Pueblo Trail is an unimproved trail, which is two-thirds of a mile one-way and takes visitors to the Great House.[9] This trail increases 200 feet in elevation and at certain places along the trail faces sheet cliffs on each side.[10]

Figure 6: Summit area at CRNM: Photo Source: ESRI Maps

[8] (Chimney Rock Interpretive Association, 2013)
[9] (Chimney Rock Interpretive Association, 2013)
[10] (Chimney Rock Interpretive Association, 2013)

Chimney Rock Interpretive Association

The Chimney Rock Interpretive Association (CRIA) is a 501 (c) (3) non-profit volunteer association. CIRA was derived from the Pagosa Springs, CO, chapter of the San Juan Mountain Association (SJMA) around 2004.[11] SJMA started conducting interpretive tours at CRNM in the late 1980s.[12] Some volunteer currently with CRIA were also volunteers with SJMA, so a number of volunteers are intimately familiar with the Chimney Rock site. Through a special use permit with the USFS, CRIA offers a variety of programming and interpretive services at CRNM. Additionally, CRIA serve as stewards of the site to protect its cultural and natural resources. Volunteers to CRIA provide interpretive tours of the CRNM. Currently, there are about 150 CRIA volunteers.

CRIA's schedule of operations are May 15 – September 30 with hours from 9:00 am to 4:30 pm. Seven days a week they offer two (2) two and half hour guided interpretive tours starting at 9:30 am & 10:30 am and two (2) one and a half hour guided interpretive tours starting at 1:00 pm & 2:30 pm. There is a maximum of 25 people per tour. The morning tours explore the improved Great Kiva Trail and unimproved Pueblo Trail. The afternoon tours explore only the Pueblo Trail. If visitors are not interested in a guided interpretive tour, there are self-guided tours only of the Great Kiva Trail from 10:30 am – 2:30 pm.

Additionally, CRIA offers following programs: Night Sky Archaeoastronomy Programs, Full Moon (once a month during season), Moon viewing option (follows the Full Moon Program), Visions of Chimney Rock, Solstice/Equinox Programs, Life at Chimney Rock Festival, Puebloan Pottery Workshop and school tours.

CRIA charges an entrance fee to all visitors of CRNM whether they participate in the self-guided tour or interpretive tour. This donation entrance fees is used to further the preservation and maintenance of CRNM, interpretive programming and volunteer training.[13]

Current entrance and tour fees at CRNM as of September 30, 2013[14]	
Adults (17 and older)	$12
Children ages 5-16 years old	$5
Children under 5 years old	Free

Table 1: Current Entrance and Tour Fees at CRNM

Project Motivation

The Presidential Proclamation, which declared Chimney Rock a national monument, specified the requirement for the Secretary of Agriculture to prepare a management and transportation plan within

[11] (Ramussen, 2012)
[12] (Ramussen, 2012)
[13] (Chimney Rock Interpretive Association , 2013)
[14] (Chimney Rock Interpretive Association , 2013)

three years of September 21, 2012.[15] As of October 1, 2013, the United States Forest Service (USFS) Pagosa Ranger District Chimney Rock National Monument Interdisciplinary team (CRNM ID team) is developing those plans.

Additionally, in May 2012, the USFS contracted the U.S. Department of Transportation John A. Volpe National Transportation Systems Center to conduct research and analysis for the potential for alternative transportation at Chimney Rock. The report ultimately recommended Chimney Rock as a site appropriate for shuttles as alternative transportation mode. In addition, the USFS applied for and received a grant from the Paul S. Sarbanes Transit in the Parks to purchase three (3) shuttle vans to integrate alternative transportation at Chimney Rock. The USFS also applied for a grant in 2012, to bring a transportation scholar to Chimney Rock to research, analyze and create a transportation plan to integrate shuttles at Chimney Rock National Monument.

Designation status of Chimney Rock set in motion the need to create a sustainable management plan for the protection and preservation of objects identified in the Presidential Proclamation, which proclaimed Chimney Rock a national monument. With the USFS being awarded funds for shuttles and a transportation scholar, the current CRNM ID team planning aligned. Valerie Hermanson serves as the transportation scholar for CRNM.

Methodology

Goals, Objectives, Performance Measures

This section provides the goals, objectives and performance measures developed to address infrastructure and safety challenges identified by the transportation scholar, the USFS and CRIA. Additionally, the integration of a shuttle system at CRNM will help to meet much of the goals identified. Specific counts in objectives of this list were purposely omitted because it is recommended that the USFS decide those threshold numbers.

Table 2: Goal 1: Improve safety at Chimney Rock National Monument

GOAL: Improve safety at Chimney Rock National Monument	
1.1	OBJECTIVE: Decrease the number of parked vehicles on the side of the road at the summit by 2014 unless vehicles parked are buses for school field trips to CRNM
	PERFORMANCE MEASURE: Number of vehicles parked on the side of the road
	DATA SOURCE: Field counts
	DATA SOURCE: Traffic Counter Data
1.2	OBJECTIVE: Prohibit volunteers/visitors from sitting in shaded locations within the base and summit parking lots
	PERFORMANCE MEASURE: Number of volunteers/visitors sitting in the middle of parking lots
	DATA SOURCE: Field counts
1.3	OBJECTIVE: Provide lightning shelter for at least 160 people at the summit. Largest event capacity is 150 people + estimated 10 volunteers.
	PERFORMANCE MEASURE: Number of lightning shelters to support 160 people.

[15] (Obama, 2012)

	PERFORMANCE MEASURE: Number of additional lightning shelters to support any additional people
	DATA SOURCE: Field counts
1.4	OBJECTIVE: Provide a minimum of one shaded area at the summit for both volunteers and visitors by the 2014 CRNM season.
	PERFORMANCE MEASURE: Number of shaded areas.
	DATA SOURCE: Field Counts
	PERFORMANCE MEASURE: Number of volunteers/visitors utilizing created shaded areas
	DATA SOURCE: Field counts
1.5	OBJECTIVE: If visitation reaches X, then additional lightning/shade structures should be created.
	PERFORMANCE MEASURE: Number of additional lightning/shade structures for visitors, volunteers, staff
	DATA SOURCE: Field counts
1.6	OBJECTIVE: Improve condition of roads within CRNM. Road from entrance to visitor center & road from visitor center to summit. Decrease dusty conditions of road and washboarding
	PERFORMANCE MEASURE: Decrease dusty conditions on road and increase time between grading of the road
	DATA SOURCE: Field observations about dusty conditions and road conditions
1.7	OBJECTIVE: Improve ability of emergency vehicles to access summit of CRNM. Prohibit volunteers/visitors from parking on access road located behind the restrooms and from parking on both sides of the summit road
	PERFORMANCE MEASURE: Number of vehicles parked on access road behind restrooms & Number of vehicles parked on each side of the summit road
	DATA SOURCE: Field Counts

Table 3: Goal 2: Improve communications, signage and marketing both at and about Chimney Rock National Monument

GOAL: Improve communications, signage and marketing both at and about Chimney Rock National Monument	
2.1	OBJECTIVE: Create and install at least three interpretive signs (entrance, visitor center & summit)
	PERFORMANCE MEASURE: Installation of interpretive sign at CRNM entrance
	PERFORMANCE MEASURE: Installation of interpretive sign at CRNM visitor center
	PERFORMANCE MEASURE: Installation of interpretive sign at CRNM summit
	DATA SOURCES: Installed signed
2.1	OBJECTIVE: Ensure website, Facebook, chamber of commerce, hotels and other source publicizing Chimney Rock National Monument have accurate, consistent messaged materials about CRNM
	PERFORMANCE MEASURE: Web locations with accurate, consistent messaged materials about CRNM
	DATA SOURCE: Reviewing publicity/communications materials about CRNM to ensure consistency

Table 4: Goal 3: Preserve cultural, natural and historical resources of CRNM

GOAL: Preserve cultural, natural and historical resources of CRNM/Reduce cultural, natural and

historical damage due to vehicles parking in areas not designated for parking	
3.1	OBJECTIVE: Either the relocation or change to the Pueblo trail to the Great House
	PERFORMANCE MEASURE: Relocation or change to the trail (e.g., identifying alternatives, selecting the preferred alternative, approval for changes and implementing changes.
3.2	OBJECTIVE: Reduce vegetation damage due to off road parking by the summit of Chimney Rock National Monument
	PERFORMANCE MEASURE: Ratio of total parked vehicles to authorized (legal) parking spaces Number of illegally parked vehicles. Square feet of vegetative area with vehicle parked on it by some timeframe.
3.3	OBJECTIVE: Limit % of cultural and natural resources subject to visitor damage/degradation to x% of total by 20xx
	PERFORMANCE MEASURE: Percent of cultural resources that are accessible to the public without supervision
3.4	OBJECTIVE: Identify xx permanent overflow parking spaces at the base of CRNM for different types of vehicles (RVs, motorcycles, cars, trucks, etc.)
	PERFORMANCE MEASURE: Number of added RV/motorcycle/vehicle parking spaces

Table 5: Goal 4: Successfully collaborate with the Chimney Rock Interpretive Association and other identified stakeholders

GOAL: Successfully collaborate with the Chimney Rock Interpretive Association and other identified stakeholders	
4.1	OBJECTIVE: Achieve consensus and an agreement about operations of the shuttle system at CRNM
	PERFORMANCE MEASURE: Stakeholder opinions on the benefits of collaboration, challenges experienced while collaborating, satisfaction with the 2013 pilot implementation of the shuttle and support of future shuttle usage
	DATA SOURCE: Stakeholder survey

Table 6: Goal 5: Provide/develop a financially sustainable transit system

GOAL: Provide/develop a financially sustainable transit system	
5.1	OBJECTIVE: Services of greatest benefit to visitors are provided at the lowest possible cost
	PERORMANCE MEASURE: Total operational cost of a season of service
	DATA SOURCE: Detailed operation and maintenance costs
5.2	OBJECTIVE: Identify long-term funding mechanisms for shuttle operation
	PERFORMANCE MEASUREMENT: Long-term funding mechanisms will meet total operational costs of service
	DATA SOURCE: Detailed operation and maintenance costs, passenger counts, user surveys
5.3	OBJECTIVE: Identify strategy/partners for shuttle vans in the off-season
	PERFORMANCE MEASURE: Identifying a willing partner
	DATA SOURCE: Detailed plan to collaborate with a partnering organization

Field Observations

The transportation scholar visited Chimney Rock National Monument upon numerous occasions including daily tours, larger events both hosted and not hosted by CRIA. In addition, CRNM's archaeologist, Dr. Wendy Sutton, took the scholar on an in depth tour of CRNM. These visits to CRNM allowed the scholar to observe operations at the site. See appendix "Scholar Observations" for initial

thoughts and notes about Chimney Rock. These notes, in addition to USFS staff and CRIA, helped to guide the scholar in writing this report and making recommendations.

Traffic Counters

Engineers from the USFS Durango Supervisor's Office installed two (2) traffic counters at CRNM before the start of the visitor season in 2013. The lower traffic counter will track all vehicles that enter and leave CRNM's entrance. The upper traffic counter will track all vehicles that enter and leave the summit of CRNM. This data paired with visitor data will enable managers of CRNM to track visitor increases/decreases and additionally the number of vehicles that are at the site.

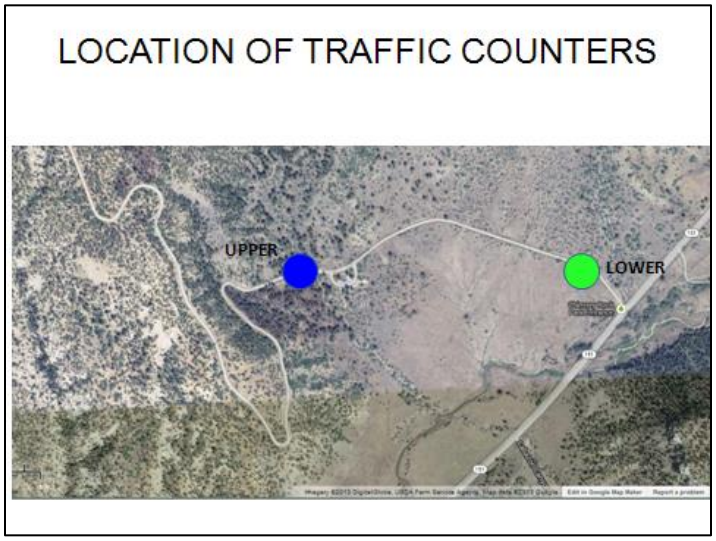


Figure 7: Location of traffic counters

This aerial view of the base area of CRNM shows where the traffic counters are located. The green traffic counter will track all vehicles that enter and leave CRNM entrance. The blue traffic counter will track all vehicles that enter and leave the summit road.

Meetings

The transportation scholar met with staff from the USFS Pagosa Ranger District and Durango Supervisor's Office. The scholar worked closest with USFS staff including Dr. Wendy Sutton, Archaeologist for the Pagosa Ranger District and of CRNM. Ms. Pauline Ellis, Travel Management/Partnerships Coordinator, Mr. Christopher Phelps, Engineer and Ms. Tonya Bierly, Fleet Manager. This core team is intimately involved with CRNM and helped to guide and steer the scholar.

Additionally, the scholar met with the Chimney Rock Interpretive Association's volunteers and board of directors to discuss CRNM, strengths, challenges, concerns and other related items.

Summary Report About the Pilot Shuttle Study

The USFS rented two 12 passenger vans to conduct a shuttle pilot at Chimney Rock National Monument. The Town of Pagosa donated funds to Chimney Rock Interpretive Association to rent one 12 passenger

van for the shuttle pilot study. And so there were three 12 passenger vans to conduct the shuttle pilot study.

The pilot was conducted at the Southwest Native Culture's Native American Cultural Gathering and at CRIA's July Full Moon Event. While there were challenges encountered during the shuttle pilot study, most if not all of the challenges can be mitigated. The pilot shuttle study also proved important to identifying challenges before permanently integrated the shuttles at CRNM.

The next section is the summary report and analysis if the pilot shuttle study.

Review of the shuttle vans at the Chimney Rock Native American Dances on July 20-21, 2013, & the Chimney Rock Interpretive Association Full Moon Program on July 22, 2013

Background:

In 2012, the United States Forest Service (USFS) applied for and received an Alternative Transportation grant from the Paul S. Sarbanes Transit in the Parks Technical Assistance Center (TRIPTAC). This grant would purchase three 12 passenger vans for use at the Chimney Rock National Monument (CRNM). Before purchasing the shuttle vans and in order to gain better perspective about the potential integration of a permanent shuttle system at CRNM, the USFS rented two 12 passenger vans to use at the 2013 Native American Cultural Gathering (NACG) event and the Chimney Rock Interpretive Association (CRIA) monthly Full Moon Program. These 12 passenger vans were intended to help facilitate shuttling visitors from the base to the summit and alleviate the number of private vehicles that drive and park at the summit. CRIA also rented one 12 passenger van for each event, for a total of three 12 passenger vans to shuttle visitors at each event. The three 12 passenger vans had a shuttling capacity of 33, which excludes the three drivers needed to drive the vans.

Native American Cultural Gathering

The 19th annual Native American Cultural Gathering (NACG) was held July 20-21, 2013, at CRNM. Southwest Native Cultures organized the event, while CRIA volunteers at the event. In years past, the event has drawn between 100-500 people. The 2013 NACG event had dances in the Great Kiva at 10:30 am and 3:30 pm on Saturday and Sunday. The event cost $10 per person and money for the event was collected at the CRNM entrance gate. There were no tours of the Great House, however, Native American dancers were allowed on the Pueblo Trail.

Figure 8: A scene from the Native American Cultural Gathering Photo Source: Valerie Hermanson

Due to large crowds at this event and limited parking capacity at CRNM's base and summit parking lots, a transportation plan exploring different options is needed. Additionally, it has been observed that visitors tend to arrive and leave around the same time creating congestion and safety issues. Shuttle and van transit options to move people from the base to the summit have been explored at prior events in 2011 and 2012. In 2011, a single 24-passenger shuttle was used, which helped to alleviate parking

congestion at the summit.[16] However, the 24-passenger shuttle required a commercial driver's license (CDL) and waiting time between shuttle pickups was up to an hour.[17] In 2011, it was estimated that the shuttle made more than 20 roundtrips at full capacity (24 people) for the two days of the event.[18] Private vehicles were allowed to park on one side of the road near the summit once the summit parking lot filled. It has been reported that there were no less than 50 vehicles parked down the road.

In 2012, two suburban style vehicles were used, which meant that drivers were not required to carry a CDL and helped to create a larger pool of potential drivers. Through use of walkie-talkies, the two vehicles were able to communicate and coordinate between the base and summit areas and stagger service.[19] While the 2012 event was smaller than the 2011 event and the two suburban style "shuttles" did not have a lot of people capacity, the system moved quickly with no more than a 10 minute wait for the next shuttle.[20] Additionally, not all visitors were required to use the suburban shuttles. Vehicles with four or more visitors, handicapped visitors or vehicles with small children/car seats were allowed to drive to the summit.[21] Again, private vehicles were allowed to park on one side of the road near the summit once the summit parking lot filled. Also, there were several vehicles parked on one side of the road to at least the first curve.

Full Moon Program

Figure 9: Taken from the Great House at the CRIA Full Moon Event Photo Source: Valerie Hermanson

CRIA hosts the Full Moon Program monthly during CRNM's open season, which is May 15 – September 30. The event has a maximum capacity of 150 people. There are three parts to the Full Moon Program. First, there are two tours of the Great Kiva Trail, which start at 5:15pm and lasts for about an hour and a half. The two Great Kiva Trail tours have a maximum capacity of 25 people each. Next is the Full Moon Program, which starts at 7:15pm. Visitors venture out on the Pueblo Trail to the Great House where Charles Martinez plays the flute while the sunsets and the moon rises. of the site and alignments with different astronomical features. The Full Moon Program lasts for about an hour. After the Full Moon program concludes, people walk back down the Pueblo Trail to the upper parking lot. Visitors that signed up for the Telescope Viewing stay at the summit parking lot to view the moon through telescopes set up in the parking lot. The Telescope Viewing can last up to two hours. The Telescope Viewing is the last program of the evening.

[16] (Forest, 2012)
[17] (Forest, 2012)
[18] (Ramussen, 2012)
[19] (Forest, 2012)
[20] (Forest, 2012)
[21] (Forest, 2012)

The Full Moon Program was held on July 22, 2013. Since the shuttle vans had never been tested at this event, the USFS and CRIA were able to rent the shuttle vans for one additional day in order to test them at the Full Moon Program.

The System

At each event, visitors were either directed to drive their private vehicle or to park in the overflow parking to use the shuttle. Visitors with three or more in their vehicle, handicap and vehicles with small children (child seats) were allowed to drive to the summit. Please see appendix for detailed information about parking and volunteer guidelines for the events.

Figure 10: Overflow Parking Area Photo Source: Google Maps

This is the aerial view of the base area of CRNM. The road from right to left is the main road that turns off from Highway 151 and leads to the Visitor center. The yellow arrow points at the entrance to the overflow parking lot. The yellow box is a rough area outline of where the overflow parking lot was placed. This location for overflow parking was chosen because it was a relatively flat area in which no trees would need to be cut. However, this may not be the permanent location of a potential overflow parking in the future.

Due to the location of the overflow parking, during peak times when visitors arrived to CRNM, one shuttle was dedicated to shuttling visitors from the overflow parking lot to the visitor center. Visitors would sign a liability waiver and then board the shuttle that goes to the visitor center. At the NACG, visitors would visit the vendors located at the visitor center and then board a shuttle to the summit. At the Full Moon event, visitors would visit and check in at the cabin. Once visitors checked in, at the cut out area of the base parking lot, visitors would queue for the shuttle. A parking volunteer would help to load and unload people in the shuttle van and ensure that everyone had signed the liability waiver to ride in the vans. Once the van reached capacity, visitors would be shuttled to the summit for programming.

Figure 11: Shuttle unloading area at summit Photo Source: Google Maps

This map shows the summit area of CRNM. At the summit for both events, visitors would be driven to the lower tier and unload where the yellow arrow points. This is also where the Great Kiva Loop trail begins and serves as an adequate area for loading and unloading passengers.

At the NACG and Full Moon events, once the shuttle van was full or mostly full, it would shuttle visitors to the base. At peak demand times when visitors wanted to go from the summit to the base, the shuttle would drop off visitors at the base and immediately return to the summit to reload.

Figure 12: Visitors at CRNM ride in one of the shuttles Photo Source: Valerie Hermanson

Shuttle drivers had walkie-talkies to communicate with other drivers and with parking volunteers located at both the base and the summit. Shuttle drivers would alert every one of their arrival and departure times. Additionally, overflow parking had a walkie-talkie and would alert the shuttles when there were enough visitors to shuttle from the overflow to the visitor center. Please see appendix for communications explanation.

Figure 13: Visitors at CRNM ride in one of the shuttles Photo Source: Valerie Hermanson

Shuttle Results

Overall, the shuttles were a success. Public reception of the shuttles for each event was well-received. Additionally, the shuttles were able to mitigate the number of vehicles parked at the summit road at the summit, which helped to create a safer environment for vehicles and pedestrians. The shuttles alleviated significant traffic on the road therefore decreasing the rate of aggregate deterioration.

SWOT Analysis

After both the NACG and Full Moon Program events, a number of strengths and weaknesses were identified. Testing the shuttles allowed for the USFS and CRIA to identify areas for improvement before permanent integration of a shuttle system at CRNM. A strengths, weakness, opportunities and threats (SWOT) Analysis was applied to each event in order to identify successes and areas for improvement. Information for the SWOT Analysis was provided by USFS, CRIA, event volunteers and the Transportation Scholar.

Table 7: Native American Cultural Gathering SWOT analysis

	STRENGTHS	WEAKNESSES
INTERNAL	• Public enjoyed more USFS presence • More efficient movement of vehicles • More sustainable transportation system • Shuttles enhanced the visitor experience • Less volume of vehicles and traffic at the summit • Dancers had easy access to their vehicles and gear • Fewer cars parked at the summit allowed for more vendor space • Allowing handicapped vehicles, with small children (booster seats) and with four or more people, allowed the shuttles to run more smoothly • Shuttle allows for more available parking for handicap & families with small children at the summit • Putting most vehicles in the overflow lot ensured there would be enough spaces at the upper lot and at the Visitor's Center for the disabled/handicapped. • The two-way radios were key to support communication among all parking volunteers, shuttle drivers and other helping facilitate the shuttles running • Volunteers were both incredible and much needed to coordinate the event • Minimal traffic • Public reception to shuttles was well-received • Visitors liked the information audio CD • Less cars parked at the summit made it safer for people to walk around • Shuttle from overflow parking to cabin	• Little publicity about the shuttle services at this event, which caused delay in transporting visitors to the summit • Little coordination among participating parties prior to event • The multi-point turn at the summit could be difficult for an inexperienced driver • Limited capacity in each shuttle • Unreported vehicle damage • Speeding on loose roadway • Poor communication with radio unit. (Transmittal base not strong enough) • Too much chatter on shuttle frequency when the same frequency was used for both the shuttle and ground support • Weather conditions and especially parking in the dirt lot proved difficult • Poor communication with shuttle drivers. (Drivers not reporting ETA, status, etc.) • Drivers not controlling loading and unloading of passengers • Vehicles not properly inspected daily • Seatbelts were not worn by all passengers • Uncontrolled pedestrian traffic at summit • The U-channel posts and pink flagging marking the border of the lot easily stretched out and fell down by the end of the day. If the parking lot were

	minimized pedestrian traffic along the roadway and worked well • Better crowd control at lower level • No overcrowded parking at the summit • More accurate visitor count and tracking	to fill to capacity, there would be nothing to discourage visitors from parking outside the border.
EXTERNAL	**OPPORTUNITIES**	**THREATS**
	• Possible increase to guided tours • Seamless flow of visitors from their private vehicles to the shuttle • Information technology systems to communicate with visitors wait times, shuttle times • More visitors and exposure to the Chimney Rock National Monument • Improve air quality • Improve natural environment • Better protection of natural and cultural resources • Decrease dust on roads • Decrease traffic congestion • Decrease noise due to traffic • Decrease wear and tear on roadway by 50-65% • Less erosion on roads and washboarding on roads • Decrease wear and tear on tourist POVs by 50-65% • Improve service and image of public transportation • Allow for more visitors to the site • Build partnerships with new and existing organizations • Grow greener and more sustainable tourism • Improve visitor safety	• Visitors arriving late to the site • Weather (lightning, mud, rain) • Future trends of people behavior • Transportation culture • Increase in number of cars • Reductions in fiscal support • Safety • Fuel costs may increase and reduce usage of cars and in turn reduce number of visitors • Inability to formulate collaborative strategies with partners

Table 8: Full Moon Event SWOT Analysis

INTERNAL	**STRENGTHS**	**WEAKNESSES**
	• Public enjoyed more USFS presence • More efficient movement of vehicles	• Since there were three different portions of the Full Moon

	• More sustainable transportation system • Shuttles enhanced the visitor experience • Less volume of vehicles and traffic at the summit creates safer pedestrian environment • Shuttle allows for more available parking for handicap & families with small children at the summit • Allowing handicapped vehicles, with small children (booster seats) and with four or more people, allowed the shuttles to run more smoothly • The two-way radios were key to support communication among all parking volunteers, shuttle drivers and other helping facilitate the shuttles running • Volunteers were both incredible and much needed to coordinate the event • Minimal traffic • Public reception to shuttles was well-received • Shuttle from overflow parking to cabin minimized pedestrian traffic along the roadway • Devoting one shuttle to running between the Overflow Lot and the Visitor's Center worked well. • Putting most vehicles in the overflow lot ensured there would be enough spaces at the upper lot and at the Visitor's Center for the disabled/handicapped. • Better crowd control at lower level • No overcrowded parking at the summit • More accurate visitor count and tracking	Programming, it was difficult to coordinate visitors in a timely manner from the base to the summit and the summit to the base. • Location of telescopes in parking lot proved difficult • Visitors did not spend as much money at the visitor center • Visitors did not stop through the visitor center after all the programming was complete • One rental did not have running boards, which caused a few people to slip • Extra time was needed to shuttle visitors from the summit to the base when programming was over • Little publicity about the shuttle services at this event, which caused delay in transporting visitors to the summit • Little to no lighting in the parking areas for loading and unloading visitors • Lightning/rain shelter safety • More volunteers were needed for longer hours • Multiple forms for visitors to sign • Limited capacity in each shuttle • Unreported vehicle damage • Speeding on loose roadway • Poor communication with radio unit. (Transmittal base not strong enough) • Poor communication with shuttle drivers. (Drivers not reporting ETA, status, etc.) • Too much chatter on shuttle frequency when the same frequency was used for both the shuttle and ground support • Weather conditions and especially parking in the dirt lot proved difficult • Drivers not controlling loading and unloading of passengers • A lot of miscommunication from the shuttle departure time to arrival time • Vehicles not properly inspected daily

		• Seatbelts were not work by all passengers • Uncontrolled pedestrian traffic at summit • The U-channel posts and pink flagging marking the border of the lot easily stretched out and fell down by the end of the day. If the parking lot were to fill to capacity, there would be nothing to discourage visitors from parking outside the border.
EXTERNAL	**OPPORTUNITIES**	**THREATS**
	• Planning/staggering schedule can improve seamless flow of visitors from private vehicles to shuttles before and after programming • Information technology systems to communicate with visitors wait times, shuttle times • Improve control over visitor safety • Build partnerships with new and existing organizations • Better protection of natural and cultural resources • More visitors and exposure to the Chimney Rock National Monument • Possible increase to guided tours • Allow for more visitors to the site • Improve air quality • Improve natural environment • Decrease dust on roads • Decrease traffic congestion • Decrease noise due to traffic • Improve service and image of public transportation • Grow greener and more sustainable tourism • Wear and tear on tourist POVs cut down by 50-65% • Wear & tear on roadway is cut down (50-65%) • Less erosion on roads and washboarding on roads	• Visitors arriving late to the site • Weather (lightning, mud, rain) • Future trends of people behavior • Transportation culture • Increase in number of cars • Reductions in fiscal support • Safety • Fuel costs may increase and reduce usage of cars and in turn reduce number of visitors • Inability to formulate collaborative strategies with partners

While each event faced a number of difficulties and challenges, the after action review team identified strategies to mitigate these challenges and concerns.

Traffic Count Results

Traffic counters were placed at Chimney Rock National Monument on May 14, to track the number of vehicles at two different locations. The first traffic counter is located near the entrance gate of CRNM (Lower) and the second traffic counter is located just past the road that leads to the summit (Upper). See figure 7. Data from the traffic counters was collected the week after the events to compare data before and after the shuttles.

Traffic data revealed that the shuttles did help to alleviate traffic and the number of vehicles at the summit.

Figure 14: A dancer at the Native American Cultural Gathering Photo Source: Valerie Hermanson

Native American Cultural Gathering Shuttle Data

Each shuttle driver was instructed to fill out a datasheet for each trip. The datasheets asked the trip number, if the shuttle was going from the base to the summit or the summit to the base, depart time, arrive time, number of adults and number of kids. Below is the average data from these datasheets with the three shuttle's data averaged. It should be noted that not every trip data was collected, so this data will not give all the information, but will still help paint a better picture of the events.

Table 9: Saturday Shuttle Data

Saturday Averages (all three shuttles averaged together)	
Total number of people transported 9AM-12pm	110
Total number of people transported12PM-5PM	131
Average trip time all shuttles (minutes)	11
Total number of trips	57

This chart shows the averages for Saturday, July 20, of the Native American Cultural Gathering.

Table 10: Sunday Shuttle Data

Sunday Averages (all three shuttles averaged together)	
Total number of people transported 9AM-12pm	73
Total number of people transported12PM-5PM	86
Average trip time all shuttles (minutes)	12
Total number of trips	40

This chart shows the averages for Sunday, July 21, of the Native American Cultural Gathering. On Sunday, July 21, it started to rain around 2:30 PM of the events, which delayed the afternoon dances. Very few visitors arrived to view the dances after the rain.

Table 11: Full Moon Program Shuttle Data

Monday Averages (all three shuttles averaged together)	
Total number of people transported	132
Average trip time all shuttles (minutes)	11
Total number of trips	23

This chart shows the three shuttles averaged for the Full Moon program on Monday, July 22. The final count on the number of people at the Full Moon event was 137.

According to the data, it took 75 minutes to transport all visitors that rode the shuttle from the summit to the base. It should be noted that while this is a long time, no visitors were recorded complaining about waiting to take the shuttle. Additionally, this event ran much later than most Full Moon events. A telescope event being held after the Full Moon Program enabled a staggered of shuttling visitors from the summit to the base.

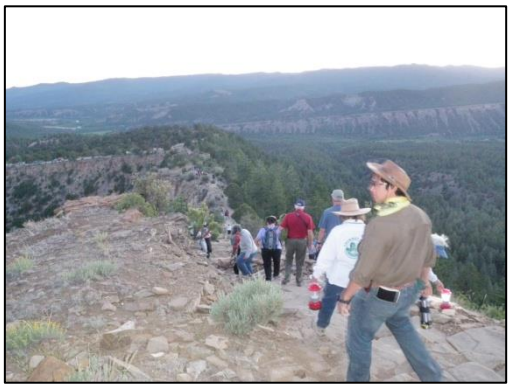


Figure 15: Visitors on the Pueblo Trail
Photo Source: Valerie Hermanson

Full Moon Field Counts

Three (3) shuttle vans were pilot tested at the July Chimney Rock Interpretive Association Full Moon event. Since the shuttles were pilot tested at this event, the transportation scholar attended the June, July, August and September Full Moon events to conduct field counts of the number of vehicles parked at the summit parking area, the number of vehicles parked on the side of the summit road, the type of vehicle (truck, van, car, SUV, other) and the license plate location. This data paired with the traffic counter data demonstrates the impact of the shuttles at the July event.

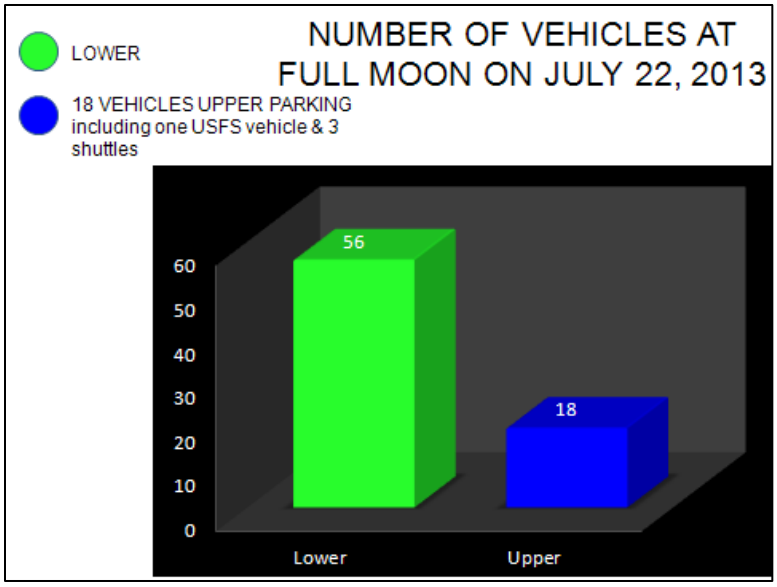


Figure 16: Traffic Count Data at July Full Moon Event

This chart shows traffic counter data that was pulled after the July Full Moon Event. The traffic counters showed that between 4pm-11pm, 56 vehicles entered CRNM and only 18 vehicles traveled to the summit of CRNM.

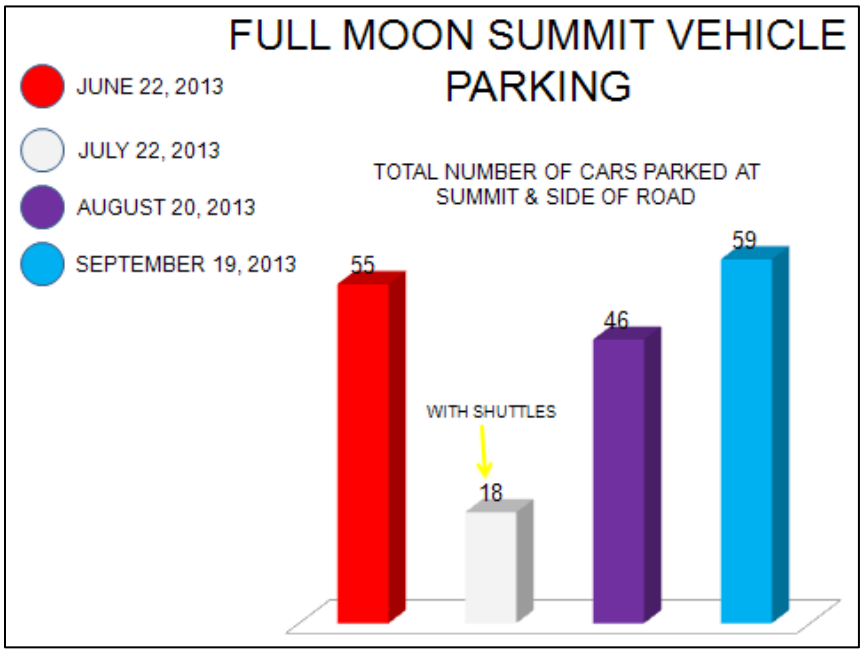


Figure 17: Full Moon Summit Vehicle Parking Data

This bar graph compares the total number of vehicles parked at the summit of CRNM for the Full Moon Event. It is noticeable that the use of shuttles prevented a number of private vehicles from driving and parking at the summit. It should be noted that of the 18 vehicles parked at the summit, one was a USFS vehicles and three were the shuttles that parked at the summit during the program.

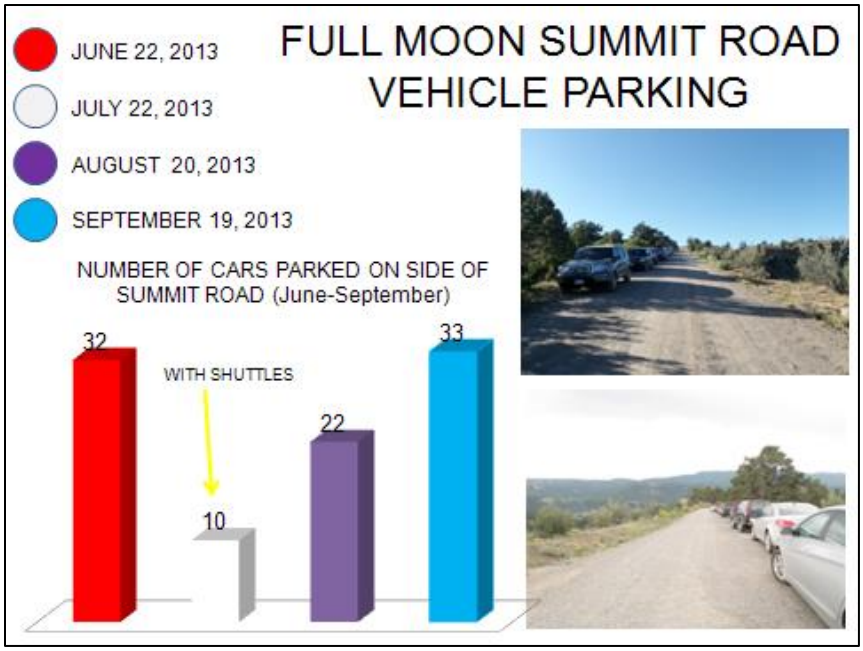


Figure 18: Summit Parking Full Moon Data

This bar graph further breaks down the total number of vehicles parked at the summit. This chart only shows the number of cars parked on the side of the summit road. This chart shows that through the use of shuttles, a significant number of private vehicles did not have to drive to the summit area. The use of shuttles also decreases the wear and tear on the road and decreases dusty conditions.

As the data shows, the shuttles were able to mitigate the number of vehicles that travel to the summit. This meant that fewer cars were parked on the side of the summit road and unknowingly parking on top of unexcavated archeologist sites and destroying vegetation. Additionally, passengers that did have to walk up the summit road to the summit after parking on the side of the road had a safer pedestrian environment. In addition, fewer cars meant less dust and less wear and tear on the roads.

Conclusions

While there were a lot of existing challenges and weaknesses, most of them can be mitigated through planning, collaboration and communication. The pilot test of the shuttles revealed large and small details that need to be considered when integrating the shuttles system into CRNM on a more permanent level.

Regardless of how and when the shuttle system is integrated, current conditions at Chimney Rock National Monument cannot continue with business as usual without stipulations. A need exists to improve visitor safety, while also improving protection over natural and cultural resources.

In addition, there is confidence that through improved planning, collaboration and communication, a seamless flow of visitors from their private vehicles to the shuttles can be created through different shuttle options depending on demand needs.

Additionally, the data shows that the shuttles were able to prevent a significant number of vehicles from driving to the summit. This in turn helped to decrease damage to natural and cultural resources, improve visitor safety, and decrease wear and tear on visitor vehicles and the road by 50-65%.

Recommendations

Native American Cultural Gathering

For future Native American Cultural Gathering events, the Transportation Scholar, Valerie Hermanson, has the following recommendations:

- Improved communication among participating organizations/parties working or volunteering at the event. A meeting among the USFS, CRIA, Southwest Native Cultures and other volunteers to discuss expectations prior to the event would have been very helpful. A second meeting to do a walkthrough of how the event will unfold would help create expectations of those participating at the event.
- Have volunteers arrive at the site in advance of the start of the programming/volunteer shift. Have an internal volunteer meeting for morning and afternoon volunteers to review how events will unfold and expectations.
- If shuttles are used for this event in the future, it would be helpful to publicize the use of shuttles in all advertising and advise visitors to arrive earlier to enable the shuttles more time to move visitors to the summit.
- If shuttles are used again for this event, obtain additional vehicles to transport visitors.
- Vendors should not be allowed to set up at the base of CRNM. Vendors should only be located at the summit.
- Overflow parking closer to the Visitor center or the creation of a trail from the overflow parking to the Visitor center
- Plan of action in place for inclement weather and ensure that all volunteers understand necessary steps.

Full Moon Event

- If shuttles are used at this event, it would be helpful to obtain additional vehicles to transport visitors quickly before and after programming
- Overflow parking closer to the Visitor center or the creation of a trail from the overflow parking lot to the Visitor center
- A more staggered schedule of the two Great Kiva tours prior to the Full Moon Tour
- A different location of the Telescope event following the Full Moon Tour
- Advertising of the use of shuttles – encourage visitors to arrive earlier to ensure a more seamless flow of visitors from the base to the summit
- Volunteer orientation to review the events and schedule prior to the event
- Have volunteers arrive well before programming begins to review details and schedule for the event and answer questions

APPENDIX

Parking/Driver Guidelines

The Transportation Scholar did preliminary research about the event and previous events and wrote a report with estimated costs, logistics and guidelines for the event (see "Chimney Rock Native American Cultural Gathering Van Costs"). Based on research, site observations, previous event observations, the Transportation Scholar developed "Parking and Driver Guidelines" with approval from Wendy Sutton. These guidelines were given to each driver and parking volunteer.

Parking Instructions

- No parking on either side of the road from the entry gate to the lower parking lot
- No RVs will be allowed to drive into the lower parking lot. Please direct RVs to park in the overflow parking area delineated with pink ribbon
- Vehicles with 3 or more people will be allowed to drive and park at the summit
- Handicap persons can drive and park at the summit
- Vehicles with small children/car seats can drive and park at the summit
- Only the van shuttles and handicap vehicles are allowed to drive through the upper parking lot area
- Carpooling vehicles and vehicles with small children that are allowed to drive and park at the summit will need to conduct a multi-point turn BEFORE the upper parking lot. Please direct these vehicles to park on the right side of the road after turning around.
- For handicap vehicles that are allowed to drive and park at the summit, please allow them to advance through the upper parking lot to locate a handicap parking spot.

Driver Instructions

- Please see "Job Hazard Analysis"
- Open and close all doors to the vehicle – passengers should not open or close the doors
- Walk around the vehicle before driving to ensure nothing is blocking behind or in front of the vehicle
- Vocally alert passengers to buckle their safety belts before departing
- Please fill out the Driver Data Sheet keeping track of your departure and arrival times and the number of adults and children for each trip
- For trips to the summit of Chimney Rock, please restart the audio CD for passengers to listen to on their way to the top

Parking Signage and Barriers Plan

CRNM Native American Cultural Gathering Event – Signage Plan

- Overflow Parking

NO RVS PAST THIS POINT

PARKING

← ←

    - Parking Signs with arrow to overflow parking
    - In/Out Sign Overflow Parking Area
    - Ribbon outline of overflow parking
- Carsonite “No Parking” signs from the entrance to the visitor center along the right side of the road

- 2 signs (one for each post) at “emergency” road behind the base bathroom

NO PARKING BEYOND THIS POINT
SHUTTLE RIDERS PLEASE FIND PARKING

- “Shuttle Only” sign to prevent people from accessing road behind the base bathroom
- Sign to prevent people from accessing the summit road

NO PARKING BEYOND THIS POINT
SHUTTLE RIDERS PLEASE FIND PARKING

- Sign at summit to prevent private vehicles from circling around parking lot/access to shuttles & handicap only

PUBLIC TURNAROND HERE
HANDICAP & SHUTTLE ACCESS ONLY GOING FORWARD

- Sign about where to queue for the shuttles at the base and the summit

SHUTTLE QUEUE HERE

- Carsonite “No Parking” on this side signs on road to summit approach

- Parking signs along summit road on right hand side of the road
    - Similar or the same as the one on the road leading from the highway to the visitor center

- Block out 4 administrative parking spaces at the summit

RESERVED

- Block out 2-4 more handicap parking spaces at the summit

HANDICAP

- Cones or some other sign to prevent people from parking at the summit on top of the pit house near the turnaround zone
    - Jesse made structure

Shuttle Data Sheets

Below is a sample of the data sheets located in each of the three shuttle vans. The drivers of each van were instructed to complete this datasheet for each trip taken in the van.

Table 12: Chimney Rock National Monument – Native American Cultural Gathering Data Sheet
Shuttle Name: Bear July 21, 2013

Trip Number	Base to Summit	Summit to Base	Time Depart	Time Arrive	# of adults	# of kids
Sample 1	X		12:15 pm	12:27 pm	9	2
Sample 2		X	12:30 pm	12:42 pm	10	1

Communications

The parking volunteer at the overflow parking lot, base van shuttle loading zone, visitor center, summit parking volunteer and summit parking volunteer to help with loading and unloading was given a walky-talky to help facilitate communication among the shuttles and between the summit and the base. Channel 20 was for general communication usually among CRIA volunteers. Channel 21 was for transportation. Through the use of the walky-talkies, drivers and parking volunteers were able to stagger service and inform visitors of when the next shuttle would arrive.

Each shuttle van was given a name to help coordinate among the shuttles. Shuttle names were Bear, Falcon and Rabbit.

Volunteer Roles

Overflow parking – Due to the number of people that attended the event, it was necessary to ensure that at least one or two parking volunteers were placed at the overflow parking area. Overflow parking volunteers served as the second point of contact after visitors entered into CRNM. These volunteers were instructed to help filter the cars that were entering the site. The following rules were used at the event:

- No parking on either side of the road from the entry gate to the lower parking lot
- No RVs will be allowed to drive into the lower parking lot. Please direct RVs to park in the overflow parking area delineated with pink ribbon
- Vehicles with 3 or more people will be allowed to drive and park at the summit
- Handicap persons can drive and park at the summit
- Vehicles with small children/car seats can drive and park at the summit
- Only the van shuttles and handicap vehicles are allowed to drive through the upper parking lot area
- Carpooling vehicles and vehicles with small children that are allowed to drive and park at the summit will need to conduct a multi-point turn BEFORE the upper parking lot. Please direct these vehicles to park on the right side of the road after turning around.
- For handicap vehicles that are allowed to drive and park at the summit, please allow them to advance through the upper parking lot to locate a handicap parking spot.

These rules helped to mitigate the number of cars that were at the summit parking lot and parking along the side of the road to the summit. At 11:25 am on July 20, 2013, eight vehicles were observed at the top of the summit parked on the side of the road. There was no more than ten vehicles parked alongside the summit road.

On Saturday, July 20, 2013, a third CRIA shuttle was added at 10am to the two existing shuttles. At peak times, this shuttle was used to shuttle visitors from the overflow parking lot to the Visitor center

Visitor center – Multiple volunteers were located at the visitor center. The cut out in the parking lot at the visitor center is where loading and unloading for the shuttles occurred. The shuttle vans were allowed to access to the road that runs behind the bathrooms.

Van driver – USFS volunteers drove the USFS rented vehicles and a CRIA volunteer drove the CRIA rented shuttle van.

Parking at summit – A parking attendant was located at the top of the summit. This person directed private vehicles to do a multipoint turn before entering the parking lot and instructing them to park on the right side of the road.

Works Cited

BBC Research & Consulting. (2012). *Economic Impacts of National Monument Designation, Chimney Rock, Colorado.* Denver: BBC Research and Consulting.

Chimney Rock Interpretive Association . (2013). *Welcome to Chimney Rock!* Retrieved September 18, 2013, from http://www.chimneyrockco.org/

Chimney Rock Interpretive Association. (2013). *Excavation and Research*. Retrieved from http://www.chimneyrockco.org/excavationresearch.php

Chimney Rock Interpretive Association. (2013, September 23). *Walking Tour Description*. Retrieved from http://www.chimneyrockco.org/walktourdescrip.php

Forest, U. S. (2012, September). Chimney Rock Alternative Transportation Grant Application. Pagosa Springs, Colorado: USFS.

Hanel, J. (2013, August 29). *West Fork Fire forced firefighters to hang back*. Retrieved from The Durango Herald: http://www.denverpost.com/news/ci_23973334/west-fork-fire-forced-firefighters-hang-back

Inciweb the Incident Information System. (2013, July 19). *West Fork Complex*. Retrieved from http://www.inciweb.org/incident/3436/

Obama, B. P. (2012, September 21). *Presidential Proclamation -- Establishment of the Chimney Rock National Monument.* Retrieved from http://www.whitehouse.gov/the-press-office/2012/09/21/presidential-proclamation-establishment-chimney-rock-national-monument

Ramussen, B. (2012, May). The Potential for Alternative Transportation at Chimney Rock, San Juan National Forest. U.S. Department of Transportation, John A. Volpe National Transportation Systems Center.

San Juan National Forest Pagosa Ranger District. (1992). *Design Narrative Capital Investment Project Chimney Rock Archaeological Area.* Pagosa Springs: San Juan National Forest.

United States Forest Service Pagosa Ranger District. (2013). *Chimney Rock National Monument*. Retrieved from http://www.fs.usda.gov/detail/sanjuan/specialplaces/?cid=stelprdb5390324

Constituencies

The groups most affected by the challenges being addressed at CRNM include:

- Chimney Rock National Monument Visitors
- Chimney Rock Interpretive Association (CRIA)
- USFS
- Tribal Communities
- Pagosa Springs, CO

Visitors to CRNM would benefit from improved infrastructure, safety plan implementation and shuttle implementation because ideally all of these things would enhance the visitor experience. Any shuttle system at CRNM will need strong support of CRIA because they serve as the day-to-day managers and interpretive guides at CRNM. The USFS will rely heavily on CRIA to staff and operate the system and pay the operations and management costs associated with the three shuttle vans. The USFS will pay a monthly FOR fleet cost for each shuttle van and will likely have a larger presence at CRNM.

Tribal communities today still find spiritual and other significance at Chimney Rock. The USFS consults with about 26 different tribes about CRNM. The annual Native American Cultural Gathering attracts a number of different tribes to CRNM to dance in the Great Kiva. Improvements in infrastructure, safety and shuttles would benefit this program and visitors to this event.

The economy of Pagosa Springs, CO, is heavily based in tourism with a variety of activities that draw visitors throughout the year. Potential visitors to CRNM will have an impact on the business community of Pagosa Springs. Additionally, the business community will be important to ensuring consistent messaging and publicity about the shuttle system and CRNM. Also, residents and the local government of Pagosa Springs will provide ideas at future charrettes hosted by the USFS CRNM ID team as they develop the CRNM management plan in the coming years.

Capital Improvement Plan

The transportation scholar was tasked with reviewing and assessing infrastructure at CRNM and how it would potentially relate to the integration of a shuttle system.

CRNM was home to ancestors of modern Pueblo Indians and has over 100 sites scattered throughout its 4,726 acre boundary – some excavated, stabilized sites and numerous unexcavated sites. CRNM is comprised of two main areas: the base and summit. The base area has a small cabin managed by the Chimney Rock Interpretive Association. This cabin also serves as the visitor center and first point of contact for visitors. Additionally, there are 22 parking stalls with two (2) handicap stalls at the base area. It is 2.5 miles from the visitor center to the summit parking area where there are 26 parking stalls with two (2) handicap stalls.

CRIA Interpretive Tours

The Chimney Rock Interpretive Association serves as stewards of the site and offer different programs. Chimney Rock National Monument visitor season are May 15 –September 30, 9:00 am to 4:30 pm. Currently there are four interpretive tours per day offered by CRIA. There are two morning tours at 9:30 am and 10:30 am that are two and half hours. Also, there are two afternoon tours at 1:00 pm and 2:30 pm that are one and half hours. Additionally, if visitors arrive to CRNM and do not want an interpretive tour, visitors are allowed to walk the Great Kiva trail alone, however only visitors on an interpretive tour may walk on the Pueblo Trail. CRIA also offers other programs such as the Full Moon Event (once a month), Night Sky Viewing with Telescopes (varies), Life at Chimney Rock (once a year) and summer solstice and autumn equinox viewings among other programs.

With designation status of CRNM, the USFS CRNM ID team is conducting an extensive management planning phase, which creates the need to conduct an evaluation about the site. This document is meant to review existing infrastructure at CRNM as well as explore different infrastructure alternatives that could be useful to the CRNM ID team.

I. Existing Infrastructure Inventory

Roads

There are three miles of aggregate road surface with an average of 16 feet road width at Chimney Rock National Monument. The traffic speed is 20 miles per hour; however there is no signage to indicate this speed limit. The roads are graded before the season starts on May 15 and usually after the season ends on September 30. When vehicles drive on the road, dusty conditions increase, which decreases visibility and decrease air quality. Additionally, washboarding patterns occur throughout the roads within CRNM. Also, vehicles have been observed speeding above 20 miles per hour along the aggregate roads. The road from the visitor center base parking lot area to the summit parking area bisects and cuts through archeological sites, therefore at certain locations along the road artifacts and sites can be found. This fact makes rerouting the road a difficult option.

Road Evaluation: Overall, the roads are a problem that needs to be addressed and especially with anticipated increased tourism. It can be anticipated that the roads will degrade faster with more visitors and traffic.

Parking

There are two paved parking areas at CRNM. A base parking lot with 22 stalls (two handicap) and a two tier parking area with a total of 26 stalls (two handicap). The parking stalls at the base and summit are striped for regular to small sized vehicles. The summit parking area has islands of archaeological sites in between the upper and lower tier parking areas. Additionally, there are archaeological sites surrounding the summit paved parking area. A rock wall mimicking archaeological structures surrounds the summit parking lot, but due to tight and limited existing space in the parking lot, larger vehicles have destroyed areas of the wall. Areas of the wall that have been destroyed have not been repaired because of assumed repetitive damage by future larger vehicles driving in the summit parking lot.

Parking Evaluation: Parking is currently a problem at CRNM and will continue to be a problem with anticipated increased visitation. Parking capacity does not meet visitor demand both at the base and summit parking areas within existing paved parking lots. Additionally, at high volume events, the parking problem is further exacerbated and creates unsafe environments for pedestrian traffic.

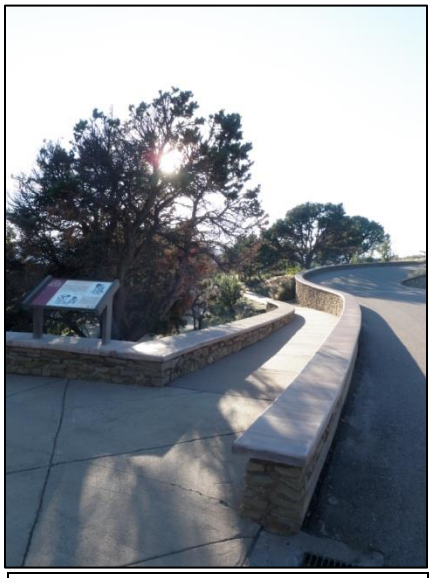


Figure 19: Entrance to the Great Kiva Trail Photo Source: Valerie Hermanson

Trails

There are two trails at the summit of CRNM. The Great Kiva Trail (Figure 19) is about one third of a mile, paved and is wheel chair accessible with limited elevation changes. The Great Kiva Trail views an excavated kiva and a partially reconstructed pit house.

The Pueblo Trail is about two thirds of a mile on an unimproved, rough and steep path that leads to the Great House. The trail has a 200 foot elevation gain and goes through archaeological sites at certain locations, overlooks cliff edges and becomes steep and rocky toward the end of the trail.

Trail Evaluation: The Great Kiva Trail is sufficient, but could be improved with more wayfinding signage. The Pueblo Trail has steep and difficult portions, which could be improved depending on decisions in the final CRNM management plan. Additional trail options for visitors could be considered.

Figure 20: CRIA visitor cabin Photo Source: Valerie Hermanson

Buildings

The visitor center for CRIA is located at the base parking area of CRNM (Figure 20). Inside there is a counter, cash register and computer. Additionally, there are CRNM souvenirs, water, sunscreen and insect repellent for sale. There is a small porch in front of the cabin with an uncovered veranda the goes around the entire cabin.

Visitor center Evaluation: The existing visitor center will suffice until a larger visitor center can be constructed. The existing facility is small and not many visitors can fit inside the cabin at one time. Given past patterns of increased tourism each year at CRNM and anticipated visitor increase from designation status, a larger visitor center will be needed to better facilitate guests. The visitor center can also serve as a staging area to improve facilitation of shuttle operations.

Facilities

Figure 21: Amphitheater seating
Photo Source: Valerie Hermanson

Figure 21 - Outdoor Amphitheatre - At the base area near the CRIA cabin, there is amphitheater style seating. There are 19 benches for visitors and kid groups that visit the site.

Figure 22 - Picnic Seating - There are five (5) picnic benches near the cabin for visitors to have a picnic or wait until programming starts.

Figure 22: Picnic Benches
Photo Source: Valerie Hermanson

Figure 23: Base interpretive area
Photo Source: Valerie Hermanson

Figure 23 – Base Interpretive Area - There is an interpretive area with a paved path near the visitor center cabin. At this area, there are three (3) interpretive signs and places to sit to see the surrounding area.

There are interpretive signs throughout the Great Kiva trail. There are also two interpretive signs at the summit parking area, which lead to the beginning of the Great Kiva Trail.

Restrooms/Storage - At the base parking lot there are two ADA composting toilets. There is also a storage closet attached to the restroom facility. Additionally, there are two ADA composting toilets at the summit. The summit restroom facility also has a storage closet attached.

Figure 24 - Sandbox – At the base area next to the visitor center cabin, there is a sandbox for kids to play in.

Figure 24: Base sandbox
Photo Source: Valerie Hermanson

<u>Archaeological Sites</u>

There are numerous stabilized structures throughout the summit of CRNM. Additionally, there are numerous unexcavated archaeological sites both on and off trails.

Archaeological Sites Evaluation: Due to the number of existing unexcavated sites at CRNM, current protection measures need to be increased to decrease further degradation of cultural and natural resources.

II. Infrastructure Alternatives

a. Short-term Parking

Due to existing parking constraints both at the base and summit parking areas, additional parking areas need to be identified. With monument designation status, there is an anticipated increase in tourism with no existing parking capacity to support a drastic increase of visitors. In addition, there is no official parking to support recreational vehicles (RVs) and motorcycles. With any type of implementation or addition of shuttle vans at CRNM, additional parking capacity needs to be identified. Since parking capacity at the summit cannot be expanded due to archaeological sites, parking at the base area needs to be identified.

Table 13: Short Term Parking Options

Option	Strengths	Weaknesses
1. No change with business	• No immediate decision	• This option does not

as usual	would need to be made	address increased visitor demand, RVs , motorcycles, buses, larger vehicles • Shuttles will not be able to operate efficiently and effectively
2. Overflow parking area identified for Native American Cultural Gathering 2013 could be utilized for overflow vehicles that do not fit in the base parking area	• This area is flat and relatively treeless making it easy for vehicles to park here. • It is a large enough space for larger vehicles and RVs	• It is not close to the Visitor center thereby compromising visitor safety when visitors walk up the road to the Visitor center. • During wet events, the area turns into mud, increasing chances of visitors becoming stuck • Further use of this area as a temporary parking area could destroy and make it more difficult to return the area to its original state
3. Utilize existing gravel parking area west of the Visitor center cabin with additional vehicles allowed to park on the side of the entry road to the visitor center. Road behind base restrooms will be kept clear. Restripe/change markings at the summit parking lot. Upper tier parking should be compact vehicles only. Lower tier should be larger vehicles. Vehicles may continue to park on the side of the summit road until lower, long-term parking capacity is identified, lightning shelter for all summit visitors and shuttles are fully operational.	• The gravel parking area is already disturbed and accessible to the visitor cabin • This area could temporarily provide a location for RVs and overflow parking at high volume events • Adding markings at the summit parking lot for the upper/lower tier would be an easy, affordable and quick fix • Minimal changes • Keeping access road behind base restrooms will allow for emergency vehicle access	• Temporary fix to this problem • Gravel area is not a huge capacity area for vehicles to park • Volunteers/staff will need to ensure that vehicles that park on the side of the entry road are instructed to park in a way to not obstruct emergency vehicle access

Preferred Option: 3

For short-term parking purposes, utilizing the existing gravel area west of the visitor center cabin and not disturbing additional areas would be the preferred scenario. This gravel area can hold extra vehicles or it can be used for RV, larger vehicles and/or overflow parking if the base parking lot is full. Additionally, restriping or verbally informing visitors that the upper tier of the summit parking area is for compact vehicles and the lower tier is for larger vehicles will help to improve safety. Not allowing volunteers, visitors or staff to park on the access road behind the base restroom area will be critical for emergency access. Ensuring the area to access that road is kept clear will be important.

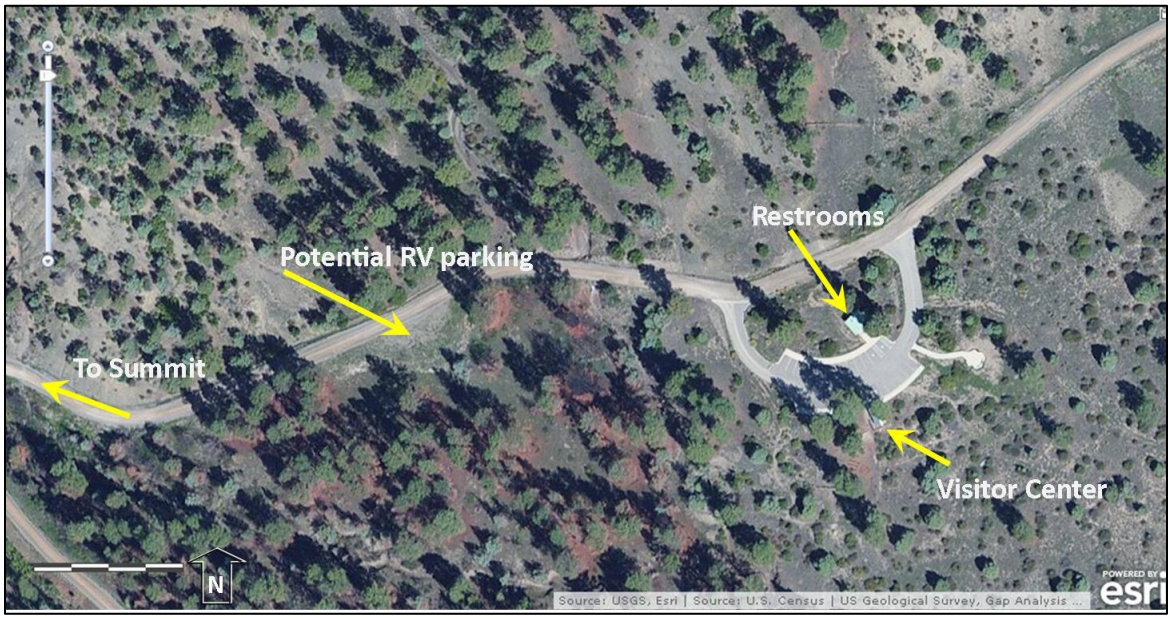


Figure 25: Base area at CRNM

Due to parking lot constraints at the summit parking area, a quick and low cost solution to improving safety and parking space would be to designate the upper tier for compact vehicles and the lower tier for larger vehicles. If shuttles are utilized at CRNM, this will allow for more space for the vehicles to drive through the upper tier parking area to the lower tier parking area to drop off visitors.

Figure 26: Summit area at CRNM

b. Long-term Parking

Table 14: Long Term Parking Options

Option	Strengths	Weaknesses
1. No change with business as usual.	• No changes mean this option would be cheaper	• This option does not address parking for increased visitor demand, RVs , motorcycles, buses, larger vehicles • No additional parking capacity could compromise visitor safety because additional vehicles will be parked on the side of the road where pedestrians are moving from their vehicles to the visitor center • If there is poor management of visitor vehicles, poor word of mouth about operations at CRNM could deter possible future visitors

		from visiting CRNM • Does not allow for full operation of the shuttles
2. Once a location for a future visitor center is established, a more permanent and larger parking area should be identified at the base of CRNM. This area should have parking for all vehicles sizes and designated areas for RVs and motorcycles. Additionally, the parking area should be designed with a loading and unloading area for future shuttle usage. It is recommended to be designed in a way that visitors must pass through the visitor center when they enter and exit CRNM.	• Allows for better planning for the future of CRNM in anticipation of future needs • Ensures that visitors will visit the visitor center upon entry and exit • Allows for possible expansion of shuttling operation as visitor demand increases • All types of visitors in different vehicles sizes will be accommodated	• It will take time, planning and money • Not an immediate solution

Preferred Option 2: Planning a future parking lot facility with the shuttles and visitor center in mind will be the best case scenario. The site will allow for an efficient and smooth flow of visitors from their private vehicles to the visitor center and from the visitor center to the summit area.

Case Study Example: Gettysburg National Military Park (GNMP), Gettysburg, PA. For visitors that do not drive their private vehicles to tour GNMP, they must park their vehicle at the Visitor center. The parking lot is designed in a way that visitors must enter the Visitor center when arriving and departing GNMP. The yellow arrow is point at the parking area at GNMP.

Figure 27: Gettysburg National Park Map Source: http://www.nps.gov/gett/index.htm

Parking Lot Best Management Practices to be Considered

Regardless of where the parking lot is created, it should not be the first place that visitors encounter when they arrive at CRNM. Parking should be located behind the visitor center or in a place where the parking lot is the entrance. Additionally, consideration should be given to designing the parking lot with green infrastructure and low impact development (LID) principles to manage stormwater onsite and to fit with the context of native aesthetics. Parking should be graded to drain stormwater into planted areas. Additionally, there should be native shade trees that fit within the context of the CRNM environment, which help to ensure that the parking lot does not take away from the ambiance of CRNM. The planted areas and trees will help to reduce the heat island effect (HIE), be greener, improve air quality, filter water and enable the parking lot to distract from the visual aesthetics of the CRNM environment. Additionally, while integrating green infrastructure principles in parking lot design, the parking lot should not only cater to vehicles. Pedestrian paths and interpretive areas can also be created within this environment to provide safe walking paths for pedestrians and provide interesting information to encounter.

Benefits of Green Parking Lots:

- Low impact development strategies to manage stormwater onsite
- Reduce heat island effect
- Reduce air pollution
- Reduce water pollution
- Reduce erosion and sedimentation of developed areas

Green Parking Lot Techniques:

- Swales
- Vegetated Filter Strips/Riparian Buffers
- Bio retention Areas (Rain Gardens)
- Dry Detention Basins
- Wet Retention Basins
- Infiltration Systems (basins/trenches)
- Constructed Wetlands

Types of Parking Lot Materials

Permeable and semi-permeable pavers should be used for the parking lot. Examples include gravel, cobble, concrete, wood mulch, brick, open jointed pavers filled with turf or aggregate, turf blocks, natural stone and pervious concrete.

Figure 28: Pervious Concrete (left)
Photo Source: http://www.creativeconcrete4you.com/Pages/PerviousConcrete.aspx

Figure 29: Open jointed pavers filled with turf or aggregate (right)
Photo Source: http://www.pavingexpert.com/permabl1.html

Table 15: Parking Lot Options

	Parking Lot Options	
		
Photo Source	http://www.nbwest.com/porous.html	http://www.tececo.com/technical.permecocrete.php
Explanation	Porous Asphalt	Porous Concrete
Definition	Porous, bituminous pavement that is appropriate for pedestrian-only areas and for very low-volume, low-speed areas such as overflow parking areas, residential driveways, alleys, and parking stalls.	Large pea gravel and a lower water-to-cement ratio are combined to achieve a pebbled, open surface that is then roller compacted.
Definition Source	http://www.sustainablecitynetwork.com/topic_channels/transportation/article_eab162d2-18f2-11e0-ab54-0017a4a78c22.html	http://www.sustainablecitynetwork.com/topic_channels/transportation/article_eab162d2-18f2-11e0-ab54-0017a4a78c22.html
Measurements	22 feet wide, 4 inches depth, 3 miles long (5,280ft)	22 feet wide, 6 inches depth, 3 miles long (5,280ft)
Total Sq. ft.	348,480 sq. ft. x 4 inches deep	348,480 sq. ft. X 6 inches deep

High Estimated Cost	$348,480 (Source: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=135&minmeasure=5)		$2,439,360 (Source: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=137)	
Low Estimated Cost	$174,240 (Source: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=135&minmeasure=5)		$696,960 (Source: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=137)	
Lifecycle	15 to 20 years		20 to 30 years	
Weighing Options	Strengths	Weakness	Strengths	Weakness
	Effective management of stormwater runoff, which may reduce the need for curbs	Periodic maintenance to remove fine sediments from paver surface will optimize permeability	Effective management of stormwater runoff, which may reduce the need for curbs	Limited use in heavy vehicle traffic areas
	Reduction in noise levels	Do not use sand for snow or ice treatment	Reduced contamination in waterways around CRNM	Specialized construction practices
	Improved safety measures for drivers and pedestrians due to reduced spray during rain,		Recharge water supplies	Extended curing time
	Reduced potential for black ice or ice due to improper drainage		Reduce heat island effect	Sensitivity to water content and control in fresh concrete
	Improved water quality		Reduced noise emissions caused by tire–pavement interaction.	Lack of standardized test methods.
				Special attention and care in design of some soil types such as expansive soils and frost-susceptible ones
				Special attention possibly required with high groundwater

c. Relocation of Pueblo Trail that goes over cultural resources

Table 16: Pueblo Trail Options

Options	Strengths	Weaknesses
1. No change with business as usual	• No money would need to be spent	• Visitors will still be walking through archaeological

		sites • Anticipated increased visitation could degrade the archaeological sites • Could be considered disrespectful for people to walk through ancient Puebloan sites
2. Create alternate trail route	• Visitors would no longer be walking through the archaeological site further disturbing it • More respectful to Ancestral Puebloans	• Difficulty and limitations in designing alternate trail route due to cliff edges • Cost • Volunteers/staff needed to ensure visitors stay off old trail
3. Create elevated structure for visitors to walk over the archaeological sites	• Visitors would no longer be walking through the archaeological site further disturbing it • Designers could get creative with the structure design to engage visitors further • More respectful to Ancestral Puebloans • Increase visitor safety since visitors will no longer be walking on rough, rocky terrain	• Difficulty and limitations in designing an elevated structure to go over archaeological sites • Cost
4. Combination of moving the trail and creating elevated structure for visitors to walk over the archaeological sites	• Allows for flexibility depending on site analysis of trail evolves • Designers could get creative with the structure design to engage visitors further • More respectful to Ancestral Puebloans • Utilizing moving the trail and a structure could be cheaper than only creating a structure	• Difficulty and limitations in designing an elevated structure and moving existing trail • Cost

Preferred Options: 2-4

The San Juan National Forest Pagosa Ranger District Capital Investment Project plan (1992) identified the objective to relocate about 100 feet of the Pueblo Trail that crossed through unexcavated sites.[22] Depending on site analysis, scenarios 2, 3 or 4 may be the best scenarios. Due to site constraints with cliff edges near the trail, it would be difficult to move the trail entirely. However, creating a structure over the trail could allow for creativity and increase visitor enjoyment and engagement with the site. Below are examples of paths and trails.

Figure30: This is an example of an elevated platform that could be created above the unexcavated archaeological sites. Photo Source: http://www.123rf.com/photo_19014693_wooden-boardwalk-in-forest-with-walkway-sign-khao-yai-national-park-thailand.html

Figure 31: Here is another example of an elevated platform that could be created above the unexcavated archaeological sites.
Photo Source:
http://popupcity.net/green/tetsuo-kondos-elevated-forest-path/

Figure 32 (left): This elevated glass walkway is another example of the type of structure that could be created above the archaeological sites. The glass would allow visitors to see the ground beneath them.

Photo Source:
http://www.smartplanet.com/blog/design-architecture/all-glass-walkway-circles-chinas-tianmen-mountain/2241

[22] (San Juan National Forest Pagosa Ranger District, 1992)

d. Recreational ideas

Trail from base to summit – both ways or one-way

Table 17: Trail from base to summit options

Options	Strengths	Weaknesses
1. No change with business as usual	• No cost option	• No added diversity of recreational benefits at CRNM
2. One-way pedestrian trail from summit to base	• Provide visitors with an additional activity during their visit at CRNM	• Difficulty in monitoring activity on trail • Difficulty designing trail around existing archaeological sites
3. Two-way pedestrian/bike trail from base to summit/summit to base	• Provide visitors with additional recreational activities during their visit at CRNM	• Difficulty in monitoring activity on trail • Difficulty designing trail around existing archaeological sites

Figure 33: Acoma Pueblo
Photo Source: Creative Commons

At Acoma Sky City Pueblo in New Mexico, visitors are required to the shuttle to the top of the mesa. At the end of the tour, visitors have an option to either take the shuttle back to the visitor center or walk down a trail to the visitor center. CRNM could utilize this model to create a one-way trail for visitors to walk from the summit to the base area. In addition, the Capital Investment Project plan identified the objective to "Construct a trail for foot and bicycle use between the entry complex and the upper parking lot for alternative access. This trail will use native materials and surface, with hardening only where needed for safety or resource protection," (San Juan National Forest Pagosa Ranger District, 1992).

CRNM could utilize this objective from the plan to create a two-way trail between the base and summit areas of CRNM.

e. The Road

Additional Trail Options at the base of CRNM

The Capital Investment Project plan identified the desire to create an additional trail network throughout CRNM.[23] Foot traffic trails were proposed to connect Pyramid Mountain, the Piedra Bluff Sites, the Great Kiva Trail and the upper parking lot loop system.[24] CRNM could eventually expand its trail system to offer additional recreational opportunities for visitors. Another option is to create a base trail system with interpretive trail loops that all start and end at the Visitor center.

Road Options

Different road surfacing types were investigated. The charts below explore those different road surfacing options. The first chart explores options related to no change in the road, additional grading of existing road and adding aggregate to the existing road.

Table 18: Road surfacing options 1-3

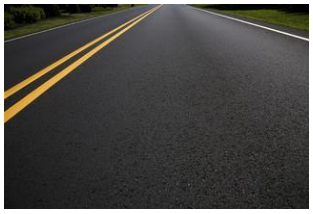
	Option 1	Option 2	Option 3
		No picture	
Photo Source	Valerie Hermanson	NA	http://www.euromin.co.uk/type1.htm
Explanation	No change	Additional grading per season	Aggregate
Definition	No change in the existing roads at CRNM	Instead of only grading the road before the season begins and after the season ends, add additional grading throughout the CRNM season	A collective term for sand, gravel and crushed stone mineral materials in their natural or processed state (NSSGA 1991).
Definition Source	NA	NA	http://www.aestone.com/calculators/aggregate.shtml
Measurements	NA	24 feet wide, 3 miles	24 feet wide, 6inches depth, 3 miles long (5,280ft)
Total Square Feet	NA	NA	380, 160 sq. ft. X 6 inches deep

[23] (San Juan National Forest Pagosa Ranger District, 1992)
[24] (San Juan National Forest Pagosa Ranger District, 1992)

High Estimated Cost	NA		X per road grading		$1,581,465 (Source: http://www.homewyse.com/costs/cost_of_aggregate_concrete_driveways.html) Should be noted this cost estimate may not be accurate	
Low Estimated Cost	NA		X per road grading		$ 1,022,630 (Source: http://www.homewyse.com/costs/cost_of_aggregate_concrete_driveways.html) Should be noted this cost estimate may not be accurate	
Lifecycle	NA		Varies depending on traffic.		Varies depending on traffic. Grading will be needed.	
Weighing Options	Strengths	Weakness	Strengths	Weakness	Strengths	Weakness
	Little to no extra money spent	With more visitors, roads deteriorate more quickly	A cheaper option to adding aggregate, asphalt or concrete	Road conditions could still deteriorate if visitors do not follow signage and the same or similar issues would still exist	Improve visitor experience through improved roads	Roads will still need to be graded throughout CRNM season for maintenance
		Does not address existing safety issues	Could be an appropriate option until either asphalt or pavement funding identified	If tourism increases significantly, roads will need to be graded more often	Stormwater can still seep into the ground through aggregate	Dust could still be a problem
		Dusty road conditions	Stormwater can still seep into the ground through existing surface		Lower cost option than paving the roads	Difficulty in getting water to the site
		Washboarding will still occur			Dust abatement will decrease the need to blade the road as often	Depending on type of dust abatement, could compromise carbon dating for adjacent archaeological sites

This chart explores options related to paved surfaces such as asphalt and concrete.

Table 19: Road surfacing options 4-5

	Option 4		Option 5	
				
Photo Source	http://www.merchantcircle.com/business/Damons.Asphalt.Maintenance.Leslie.MI.1.517-589-9640/picture/gallery		http://pavingatlanta.com/blog-0/?Tag=concrete%20paving	
Explanation	Asphalt		Concrete	
Definition	A mixture of dark bituminous pitch with sand or gravel, used for surfacing roads, flooring, roofing, etc.		An artificial, stonelike material used for various structuralpurposes, made by mixing cement and various aggregates, assand, pebbles, gravel, or shale, with water and allowing themixture to harden.	
Definition Source	http://oxforddictionaries.com/us/definition/american_english/asphalt		http://www.concretenetwork.com/concrete/howmuch/calculator.htm	
Measurements	22 feet wide, 4 inches depth, 3 miles long (5,280ft)		22 feet wide, 6 inches depth, 3 miles long (5,280ft)	
Total Square Feet	348,480 sq. ft. X 4 inches deep (8518.4 tons of hot asphalt mix needed)		348,480 sq. X 6 inches deep	
High Estimated Cost	$1,290,666.67 (source: http://www.thermoasphaltrepair.com/TARCalculator.aspx)		$3,505,708.80 (source: http://www.homewyse.com/costs/cost_of_concrete_slabs.html)	
Low Estimated Cost	$1,393,920 (source: http://www.greatdayimprovements.com/asphalt-vs-concrete-driveways.aspx)		$2,090,880 (source: http://www.homewyse.com/costs/cost_of_concrete_slabs.html)	
Lifecycle	20 years + (source: http://www.greatdayimprovements.com/asphalt-vs-concrete-driveways.aspx)		40 years + (source: http://www.greatdayimprovements.com/asphalt-vs-concrete-driveways.aspx)	
Weighing Options	Strengths	Weakness	Strengths	Weakness
	Improve visitor experience through improved roads	Improved road conditions could increase speeding and decrease safety	Improve visitor experience through improved roads	Improved road conditions could increase speeding and decrease safety
	Able to resurface easily	Heat island effect	Has a longer life than asphalt	Heat island effect is worse in concrete than asphalt
	Easier to repair than concrete	Increased stormwater runoff	More durable than asphalt	Increased stormwater runoff
	100% recyclable	Shorter life than concrete		

		Could impair adjacent archaeological sites (?)		Could impair adjacent archaeological sites (?)
		Softens in high heat		Cracks in freezing temperatures
		Less durable than concrete		Not able to resurface
				More difficult to repair than asphalt

Regardless of road type decided upon, roads should be created to filter stormwater run-off into planted areas. The Capital Investment Project plan stated the objective to create a paved, interpretive overlook area between the base and summit.[25] However, due to the expanse of archaeological sites throughout CRNM, it could be difficult to locate an appropriate location. The Capital Investment Project also stated the objective of creating an overflow parking lot trailhead area ½ a mile from the summit parking area for buses, RVs and other vehicles.[26] In addition to the constraint of archaeological sites, with the integration of shuttles at CRNM, it is not recommended that this objective be further pursued at this time. With the current proposal for the integration of shuttles at CRNM, this overflow parking area would not enable a seamless flow of visitors. Additionally, currently visitors are required to check in at the visitor's Cabin and the creation of such an area could deter visitors from stopping.

Table 20: Lightning/shade/rain shelter

Options	Strengths	Weaknesses
1. No change with business as usual	• No cost	• Liability for visitors if/when storm approaches CRNM • Limited to no shade at CRNM for visitors
2. Make summit restrooms lightning proof	• In case of storm emergency, visitors, volunteers and staff at the summit will have a safe location • Quick strategy to increasing lightning shelter safety at the summit	• Cost • Restrooms do not serve as a good shade location
3. Install lightning proof shelter at summit	• Shelter could be used as lightning, rain and shade shelter • Allows for more safe locations for visitors, volunteers and staff at	• Cost • Depending no design, structure could inhibit vistas from the summit

[25] (San Juan National Forest Pagosa Ranger District, 1992)
[26] (San Juan National Forest Pagosa Ranger District, 1992)

	the summit in case of storm	

Preferred Option: 2 & 3

Making the restrooms at the summit lightning proof will be detrimental to the implementation of the shuttles. Ensuring that every visitor, volunteer and staff person at the summit has access to a safe location in case of a lightning activity is important since with shuttle use, fewer vehicles to serve as lightning shelters would be available. A possible location for a lightning, rain and shade shelter is pictured in figure 34. This location at the summit of CRNM has already been disturbed and a shelter here would not obstruct many vistas.

Another potential consideration related to shade is solar. Solar panel installation within the base or summit parking areas could serve as both shade structures and a generator of electricity for use at CRNM.

Figure 34: Possible location for shade/lightning structure at summit of CRNM. Photo Source: Valerie Hermanson

Figure 35: Existing summit restroom that could potentially be adapted into lightning shelter. Photo Source: Valerie Hermanson

Lightning Proof/Lightning Shelters

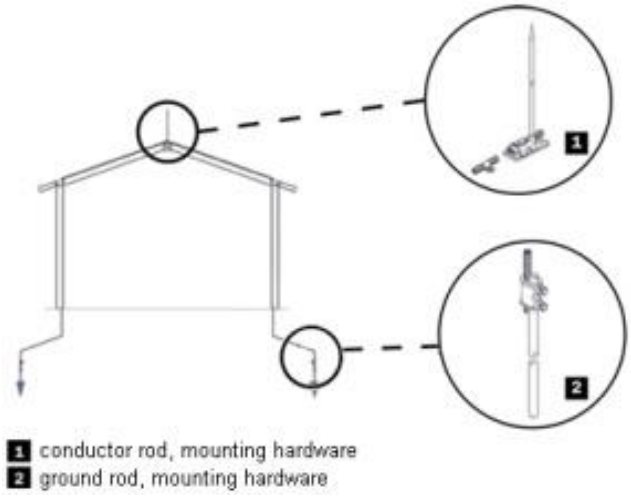


Figure 36: Lightning Kit
Picture Source:
http://www.poligon.com/lightning.htm

The diagram shows a lightning kit that can be installed on buildings to make them lightning proof. This could be a viable option to be investigated to make the summit restroom facility a lightning safe

Figure 37: Lightning Structure
Picture Source:
http://www.broward.org/parks/plantationheritagepark/pages/phshelter4.aspx

This is an example of a lightning shelter at a park. This or an adapted version to fit the context of CRNM could be useful at the summit. Additionally a structure like this could serve as rain and shade shelter for visitors.

Figure 38: Glass lightning structure

Picture Source:
http://www.rollacover.com/docs/productsgolf.html

Here is another example of a lightning shelter that offers more views. Once again, an adapted version of this lightning shelter that fits into the context of CRNM would create a safe shelter for visitors in case of a lightning storm. While this shelter could provide rain shelter as well, it would not serve as a good source of shade.

f. Signage – gateway

Table 21: Signage Options

Options	Strengths	Weaknesses
1. No change with business as usual	• No cost	• With designation status, visitor expectation may be let down with no signage • No wayfinding or signage to improve and enhance the visitor experience • No signage to direct visitors and provide them with information
2. Signage at the entrance to CRNM	• Serve as obvious entrance to CRNM from road for visitors • Enhance visitor experience by providing information and knowledge about the site • Produce more visitor contacts • Can be relatively inexpensive when cost is compared against visitor contact • Convey a consistent message to many people at one time and can be viewed at a visitor's convenience. • Are in place at all times and available to visitors 24 hours each day.	• Could draw attention to fragile resource and as a result could be damaged or destroyed • One way communication and information could become outdated • Vulnerable to damage by weather, decay, wildlife and vandalism.
3. Signage at the entrance & visitor center	• Serve as obvious entrance to CRNM from road for visitors • Enhance visitor experience by providing information and knowledge about the site • Produce more visitor contacts • Can be relatively inexpensive when cost is	• Could draw attention to fragile resource and as a result could be damaged or destroyed • One way communication and information could become outdated • Vulnerable to damage by weather, decay, wildlife and vandalism.

	compared against visitor contact • Convey a consistent message to many people at one time and can be viewed at a visitor's convenience. • Are in place at all times and available to visitors 24 hours • each day.	
4. Signage at the entrance, visitor center and at the summit of CRNM	• Serve as obvious entrance to CRNM from road for visitors • Enhance visitor experience by providing information and knowledge about the site • Produce more visitor contacts • Can be relatively inexpensive when cost is compared against visitor contact • Convey a consistent message to many people at one time and can be viewed at a visitor's convenience. • Are in place at all times and available to visitors 24 hours • each day.	• Could draw attention to fragile resource and as a result could be damaged or destroyed • One way communication and information could become outdated • Vulnerable to damage by weather, decay, wildlife and vandalism.
5. Signage at entrance, visitor center, summit and wayfinding signage throughout (shuttle pick up & drop off location)	• Serve as obvious entrance to CRNM from road for visitors • Enhance visitor experience by providing information and knowledge about the site • Produce more visitor contacts • Can be relatively inexpensive when cost is compared against visitor contact • Convey a consistent	• Could draw attention to fragile resource and as a result could be damaged or destroyed • One way communication and information could become outdated • Vulnerable to damage by weather, decay, wildlife and vandalism. • Until more permanent base parking area exists, will be difficult to place signage for shuttle

	message to many people at one time and can be viewed at a visitor's convenience. • Are in place at all times an available to visitors 24 hours each day. • Communicate with visitors about shuttle pick up and drop off locations	pickup/drop off

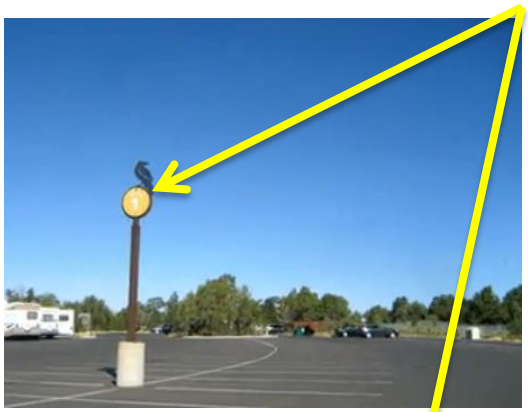
Preferred option: 5

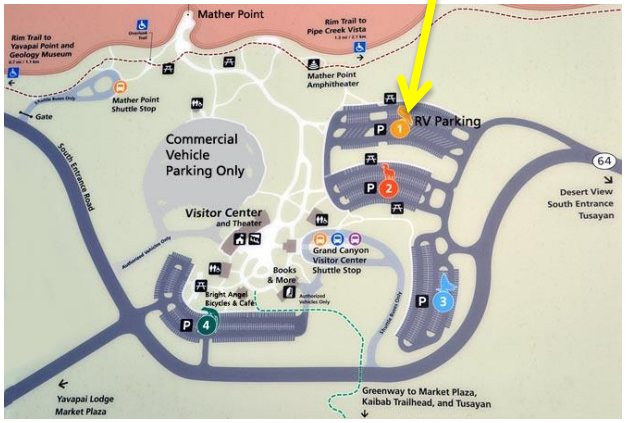
Figure 39: Potential Gateway as identified from the Capital Investment Project Plan. Photo Source: Valerie Hermanson

Signage at the entrance, visitor center and summit would be the most ideal option. Additionally, the Capital Investment Project plan identified the objective to create at Chimney Rock gateway at Highways 160 & 151.[27] This could be an additional option for signage to alert and draw more visitors from Highway 160. Also, creating wayfinding signage and shuttle signage will communicate clearly to visitors and will help to enhance the visitor experience. Wayfinding signage is not only fun, but it is a way for CRNM to brand itself.

[27] (San Juan National Forest Pagosa Ranger District, 1992)

CRNM Wayfinding Symbols





This example is from Grand Canyon National Park. The Grand Canyon visitor center and parking map uses symbols to identify key areas of interest to visitors such as RV parking, parking, shuttle pickup locations and visitor center location. The symbols used in the map can also be found on the ground enabling visual cues for visitors to find their way. Similar usage of wayfinding symbols is recommended for CRNM and especially if trail options and additional recreational opportunities are expanded at CRNM.

Top: Figure 40: Wayfinding symbol at Grand Canyon National Park. Bottom: Figure 41: Wayfinding symbol on map.

Photos Source: http://www.nps.gov/grca/planyourvisit/parking_sr.htm

g. Table 22: Outdoor lighting

Options	Strengths	Weaknesses
1. No change with business as usual	• No additional cost	• With shuttle implementation, it creates unsafe circumstances for loading and unloading passengers • Visitor safety at dark events
2. Full cutoff lighting at shuttle loading/unloading zones at base and summit areas	• Improve visitor safety with loading/unloading at dark events at CRNM	• Cost • Could take away from natural setting of site
3. Full cutoff lighting at shuttle loading/unloading zones at base and summit areas & in designated overflow parking area	• Improve visitor safety with loading/unloading at dark events at CRNM • Improve visitor safety in parking areas	• Cost • Could take away from natural setting of site

Preferred Option: 3

While lighting could possibly take away from the aesthetic of the site, it will enhance visitor safety. Lighting can be created to fit within the CRNM context, so as to not detract.

h. Table 23: Potable water

Options	Strengths	Weaknesses
1. No change with business as usual	• No additional cost	• Visitors anticipate a potable water source • On sunny, hot days visitors may need additional water
2. Identifying potential for well at CRNM	• Improve visitor experience • Improve visitor safety on high heat days • More environmentally friendly than selling bottled water	• Cost • CRIA could lose money on bottled water they sell

Operations

Operations Scenarios

The following scenarios were created using the current Chimney Rock Interpretive Association's Tour Schedule for the 2013 season. If the schedule for the 2014 season changes, then of course, the below shuttle schedules would also change.

Table 24: 2013 CRIA Tour Schedule

Tour One	9:30am -12:00pm
Tour Two	10:30am-1:00pm
Tour Three	1:00pm-2:30pm
Tour Four	2:30pm-4:00pm

Some scenarios mean that the tour guide would drive the shuttle, while other scenarios have its own dedicated driver. The scenarios are meant to demonstrate that shuttles are possible from a variety of different scenarios both with/without dedicated drivers. The fourth scenario is preferred because it incorporates three shuttles and would move visitors efficiently. However, it should be noted that since there are a variety of scenarios, the USFS and CRIA should work together to create a shuttle schedule that would work smoothly and effectively.

Scenario 1

This scenario assumes there is only ONE shuttle for all the tours. The driver would NOT be a CRIA tour guide and would be a separate driver to shuttle visitors between the base and summit. The shuttle holds 11 passengers, so depending on group size, a number of private vehicles will need to be driven to the summit.

TOUR ONE	TOUR TWO	TOUR THREE	TOUR FOUR

Table 25: Scenario 1

Time	One Shuttle
CRIA Volunteer Driver/Other Dedicated Driver - Non Tour Guide Driver	
	TOUR ONE
9:00AM-9:15AM	Visitors arrive to (CRNM) in their private vehicles
	Visitors park vehicles in the base parking lot or other identified parking area
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)
	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
	CRIA tour guide could drive their private vehicle to the summit or ride in the shuttle depending on how full the shuttle is.
9:15AM	Shuttle leaves base for the summit
9:30AM	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
9:35AM	CRIA tour guide begins tour
9:35AM-12:05PM	TOUR ONE
9:30AM	Shuttle leaves summit for base
9:45AM	Shuttle arrives at the base

9:45AM-10:15AM	Visitors arrive to (CRNM) in their private vehicles
	Visitors park vehicles in the base parking lot or other identified parking area
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)
	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
	CRIA tour guide could drive their private vehicle to the summit or ride in the shuttle depending on how full the shuttle is.
10:15AM	Shuttle leaves base for the summit
10:30AM	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
10:35AM	CRIA tour guide begins tour
10:35AM-1:05PM	TOUR TWO
10:35AM-12:05PM	Shuttle to stay at summit for TOUR ONE to conclude
12:05PM	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
12:05PM	Shuttle leave summit for base
12:20PM	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles
12:30PM-12:45PM	Visitors arrive to (CRNM) in their private vehicles
	Visitors park vehicles in the base parking lot or other identified parking area

	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)
	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
	CRIA tour guide could drive their private vehicle to the summit or ride in the shuttle depending on how full the shuttle is.
12:45PM	Shuttle leaves base for the summit
1:00PM	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
1:05PM	CRIA tour guide begins tour
1:05PM-2:35PM	TOUR THREE
1:05PM	Visitors on TOUR TWO that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
1:20PM	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles
1:15PM-1:45PM	Visitors arrive to (CRNM) in their private vehicles
	Visitors park vehicles in the base parking lot or other identified parking area
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)

	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
	CRIA tour guide could drive their private vehicle to the summit or ride in the shuttle depending on how full the shuttle is.
1:45PM	Shuttle leaves base for the summit
2:00 PM	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
2:05PM	CRIA tour guide begins tour
2:05PM-3:35PM	TOUR FOUR
2:05PM-2:35PM	Shuttle to wait at summit for TOUR THREE to conclude
2:35PM	Visitors on TOUR THREE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
2:50PM	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles
2:55PM	Shuttle leaves base for the summit
3:10PM	Shuttle arrives at the summit
3:10-3:35PM	Shuttle to wait at summit for TOUR FOUR to conclude
3:35PM	Visitors on TOUR FOUR that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
3:50PM	Shuttle arrives at base
4:30PM	CRNM Closes

Scenario 2

This scenario assumes there are two shuttle vans and the CRIA tour guide would be the drive. Each shuttle holds 11 passengers, so depending on group size, a certain number of vehicles will need to drive to the summit. Shuttle one will shuttle visitors in TOUR ONE and TOUR THREE. Shuttle two will shuttle visitors in TOUR TWO and TOUR FOUR.			
TOUR ONE	TOUR TWO	TOUR THREE	TOUR FOUR

Table 26: Scenario 2

Time	One Shuttle	Shuttle Two
	CRIA Tour Guide Driver	CRIA Tour Guide Driver
9:00AM-9:15AM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.	
9:15AM	Shuttle leaves base for the summit	
9:30AM	Shuttle arrives at the summit	
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
9:35AM	CRIA tour guide begins tour	
9:35AM-12:05PM	TOUR ONE	
	Shuttle stays at summit for entire TOUR ONE	
9:45AM-10:15AM		Visitors arrive to (CRNM) in their private vehicles
		Visitors park vehicles in the base parking lot or other identified parking area

		Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)
		If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
10:15AM		Shuttle leaves base for the summit
10:30AM		Shuttle arrives at the summit Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
10:35AM		CRIA tour guide begins tour
10:35AM-1:05PM		TOUR TWO
10:35AM-12:05PM		Shuttle stays at summit for entire TOUR TWO
12:05PM	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base	
12:05PM	Shuttle leave summit for base	
12:20PM	Shuttle arrives at base	
	Visitors unload, visit the visitor center or leave in their private vehicles	
12:30PM-12:45PM	Visitors arrive to (CRNM) in their private vehicles Visitors park vehicles in the base parking lot or other identified parking area Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	

	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.	
12:45PM	Shuttle leaves base for the summit	
1:00PM	Shuttle arrives at the summit	
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
1:05PM	CRIA tour guide begins tour	
1:05PM-2:35PM	TOUR THREE	
	Shuttle stays at summit for entire TOUR THREE	
1:05PM		Visitors on TOUR TWO that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
1:20PM		Shuttle arrives at base
		Visitors unload, visit the visitor center or leave in their private vehicles
1:15PM-1:45PM		Visitors arrive to (CRNM) in their private vehicles
		Visitors park vehicles in the base parking lot or other identified parking area
		Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)
		If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.
1:45PM		Shuttle leaves base for the summit
2:00 PM		Shuttle arrives at the summit

		Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.
2:05PM		CRIA tour guide begins tour
2:05PM-3:35PM		TOUR FOUR
		Shuttle waits at summit for entire TOUR FOUR
2:35PM	Visitors on TOUR THREE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base	
2:50PM	Shuttle arrives at base	
	Visitors unload, visit the visitor center or leave in their private vehicles	
3:35PM		Visitors on TOUR FOUR that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base
3:50PM		Shuttle arrives at base
		Visitors unload, visit the visitor center or leave in their private vehicles
4:30PM	CRNM Closes	

Scenario 3

This scenario means there are two shuttles that are NOT driven by the CRIA tour guides. The drivers will be separate. Each tour will have two shuttles to shuttle visitors between the base and summit. Each shuttle holds 11 people, so private vehicles will be needed if a tour has 25 people. Depending on the fullness of the tour, the CRIA guide could either drive to the summit in their private vehicle or ride in one of the shuttles.

TOUR ONE	TOUR TWO	TOUR THREE	TOUR FOUR

Table 27: Scenario 3

Time	One Shuttle	Shuttle Two

	Non Tour Guide Dedicated Driver	Non Tour Guide Dedicated Driver
9:00AM-9:15AM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
	Tour guide could ride in van or drive up	
9:15AM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
9:30AM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
9:35AM	CRIA tour guide begins tour	
9:35AM-12:05PM	TOUR ONE	
9:30 AM	Shuttle leaves summit for base	Shuttle leaves summit for base
9:45 AM	Shuttle arrives at the base	Shuttle arrives at the base
9:45AM-10:15AM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	

	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
	Tour guide could ride in van or drive up	
10:15AM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
10:30AM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
10:35AM	CRIA tour guide begins tour	
10:35AM-1:05PM	TOUR TWO	
10:35AM-12:05PM	Shuttle to stay at summit for TOUR ONE to conclude	Shuttle to stay at summit for TOUR ONE to conclude
12:05PM	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.
12:05PM	Shuttle leave summit for base	Shuttle leave summit for base
12:20PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	Visitors unload, visit the visitor center or leave in their private vehicles
12:30PM-12:45PM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
	Tour guide could ride in van or drive up	
12:45PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
1:00PM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
1:05PM	CRIA tour guide begins tour	
1:05PM-2:35PM	TOUR THREE	

1:05PM	Visitors on TOUR TWO that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
	Shuttle leave summit for base	Shuttle leaves summit for base
1:20PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	Visitors unload, visit the visitor center or leave in their private vehicles
1:15PM-1:45PM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
1:45PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
2:00 PM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
2:05PM	CRIA tour guide begins tour	
2:05PM-3:35PM	TOUR FOUR	
2:05PM-2:35PM	Shuttle one waits for TOUR THREE	Shuttle two waits for TOUR THREE
2:35PM	Visitors on TOUR THREE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
2:35PM	Shuttle leave summit for base	Shuttle leaves summit for base
2:50PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	
2:55PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
3:10PM	Shuttle arrives at the summit	Shuttle arrives at the summit
3:35PM	Visitors on TOUR FOUR that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
3:35PM	Shuttle leaves summit for base	Shuttle leaves summit for base

3:50PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	
4:30PM	CRNM Closes	

Scenario 4 – Preferred Scenario

This scenario means there are two shuttles that are NOT driven by the CRIA tour guides. The drivers will be separate. Each tour will have two shuttles to shuttle visitors between the base and summit. Each shuttle holds 11 people, so private vehicles will be needed if a tour has 25 people. Depending on the fullness of the tour, the CRIA guide could either drive to the summit in their private vehicle or ride in one of the shuttles.

TOUR ONE	TOUR TWO	TOUR THREE	TOUR FOUR

Table 28: Scenario 4

Time	One Shuttle	Shuttle Two	Shuttle Three
	Non Tour Guide Dedicated Driver	Non Tour Guide Dedicated Driver	CRIA or other driver
9:00AM-9:15AM	Visitors arrive to (CRNM) in their private vehicles		
	Visitors park vehicles in the base parking lot or other identified parking area		
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)		
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers	
	Tour guide could ride in van or drive up		
9:15AM	Shuttle leaves base for the summit	Shuttle leaves base for the summit	
9:30AM	Shuttle arrives at the summit	Shuttle arrives at the summit	
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.		
9:35AM	CRIA tour guide begins tour		
9:35AM-12:05PM	TOUR ONE		
9:30 AM	Shuttle leaves summit for base	Shuttle leaves summit for base	

9:45 AM	Shuttle arrives at the base	Shuttle arrives at the base	
9:45AM-10:15AM	Visitors arrive to (CRNM) in their private vehicles		
	Visitors park vehicles in the base parking lot or other identified parking area		
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)		
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers	
	Tour guide could ride in van or drive up		
10:15AM	Shuttle leaves base for the summit	Shuttle leaves base for the summit	
10:30AM	Shuttle arrives at the summit	Shuttle arrives at the summit	10:30 AM - 2:30 PM Self-Guided
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.		
10:35AM	CRIA tour guide begins tour		
10:35AM-1:05PM	TOUR TWO		
10:35AM-12:05PM	Shuttle to stay at summit for TOUR ONE to conclude	Shuttle to stay at summit for TOUR ONE to conclude	
12:05PM	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
12:05PM	Shuttle leave summit for base	Shuttle leave summit for base	
12:20PM	Shuttle arrives at base	Shuttle arrives at base	
	Visitors unload, visit the visitor center or leave in their private vehicles	Visitors unload, visit the visitor center or leave in their private vehicles	
12:30PM-12:45PM	Visitors arrive to (CRNM) in their private vehicles		
	Visitors park vehicles in the base parking lot or other identified parking area		
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)		

	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
	Tour guide could ride in van or drive up	
12:45PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
1:00PM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
1:05PM	CRIA tour guide begins tour	
1:05PM-2:35PM	TOUR THREE	
1:05PM	Visitors on TOUR TWO that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
	Shuttle leave summit for base	Shuttle leaves summit for base
1:20PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	Visitors unload, visit the visitor center or leave in their private vehicles
1:15PM-1:45PM	Visitors arrive to (CRNM) in their private vehicles	
	Visitors park vehicles in the base parking lot or other identified parking area	
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
	Shuttle One holds 11 passengers	Shuttle Two holds 11 passengers
1:45PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
2:00 PM	Shuttle arrives at the summit	Shuttle arrives at the summit
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
2:05PM	CRIA tour guide begins tour	
2:05PM-3:35PM	TOUR FOUR	
2:05PM-2:35PM	Shuttle one waits for TOUR THREE	Shuttle two waits for TOUR THREE

2:35PM	Visitors on TOUR THREE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
2:35PM	Shuttle leave summit for base	Shuttle leaves summit for base
2:50PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	
2:55PM	Shuttle leaves base for the summit	Shuttle leaves base for the summit
3:10PM	Shuttle arrives at the summit	Shuttle arrives at the summit
3:35PM	Visitors on TOUR FOUR that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center.	
3:35PM	Shuttle leaves summit for base	Shuttle leaves summit for base
3:50PM	Shuttle arrives at base	Shuttle arrives at base
	Visitors unload, visit the visitor center or leave in their private vehicles	
4:30PM	CRNM Closes	

Scenario 5

This scenario assumes there are three shuttles. Shuttle one will shuttle visitors in TOUR ONE and TOUR THREE. Shuttle two will shuttle visitors in TOUR TWO and TOUR FOUR. Shuttle three would be designated to shuttling visitors between 10:30am-2:30pm that do not take the private tour.			
TOUR ONE	TOUR TWO	TOUR THREE	TOUR FOUR

Table 29: Scenario 5

Time	One Shuttle	Shuttle Two	Shuttle Three
	CRIA Tour Guide Driver	CRIA Tour Guide Driver	CRIA or other driver
9:00AM-9:15AM	Visitors arrive to (CRNM) in their private vehicles		
	Visitors park vehicles in the base parking lot or other identified parking area		
	Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the		

	shuttle(s)		
	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.		
9:15AM	Shuttle leaves base for the summit		
9:30AM	Shuttle arrives at the summit		
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.		
9:35AM	CRIA tour guide begins tour		
9:35AM-12:05PM	TOUR ONE		
	Shuttle stays at summit for entire TOUR ONE		
9:45AM-10:15AM		Visitors arrive to (CRNM) in their private vehicles	
		Visitors park vehicles in the base parking lot or other identified parking area	
		Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
		If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.	

10:15AM		Shuttle leaves base for the summit	
10:30AM		Shuttle arrives at the summit Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	10:30AM-2:30PM Self-Guided Tours
10:35AM		CRIA tour guide begins tour	
10:35AM-1:05PM		TOUR TWO	
10:35AM-12:05PM		Shuttle stays at summit for entire TOUR TWO	
12:05PM	Visitors on TOUR ONE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base		
12:05PM	Shuttle leave summit for base		
12:20PM	Shuttle arrives at base		
	Visitors unload, visit the visitor center or leave in their private vehicles		
12:30PM-12:45PM	Visitors arrive to (CRNM) in their private vehicles Visitors park vehicles in the base parking lot or other identified parking area Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)		

	If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.		
12:45PM	Shuttle leaves base for the summit		
1:00PM	Shuttle arrives at the summit		
	Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.		
1:05PM	CRIA tour guide begins tour		
1:05PM-2:35PM	TOUR THREE		
	Shuttle stays at summit for entire TOUR THREE		
1:05PM		Visitors on TOUR TWO that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base	
1:20PM		Shuttle arrives at base	
		Visitors unload, visit the visitor center or leave in their private vehicles	
		Visitors arrive to (CRNM) in their private vehicles	
1:15PM-1:45PM		Visitors park vehicles in the base parking lot or other identified parking area	

		Visitors check-in at visitor center, sign waiver, shop, walk around the lower base area or wait in line at a clearly marked place where the shuttle van will pick up passengers. Determine how many people will ride in the shuttle(s)	
		If there are 25 visitors, then 11 could fit the shuttle and the remaining visitors would drive to the summit.	
1:45PM		Shuttle leaves base for the summit	
2:00 PM		Shuttle arrives at the summit	
		Visitors arrive to the summit. Visitors unload from the shuttle. Visitors that drove their private vehicles will park at the summit and unload.	
2:05PM		CRIA tour guide begins tour	
2:05PM-3:35PM		TOUR FOUR	
		Shuttle waits at summit for entire TOUR FOUR	
2:35PM	Visitors on TOUR THREE that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base		
2:50PM	Shuttle arrives at base		
	Visitors unload, visit the visitor center or leave in their private vehicles		

3:35PM		Visitors on TOUR FOUR that rode the shuttle to the summit would load on the shuttle. Vehicles that drove to the summit in their private vehicles would drive down the summit to the visitor center. Shuttle leaves summit for base	
3:50PM		Shuttle arrives at base	
		Visitors unload, visit the visitor center or leave in their private vehicles	
4:30PM		CRNM Closes	

Visitation

BBC Research and Consulting researched and wrote a report about potential economic impacts if Chimney Rock was designated a national monument. BBC Research and Consulting published the report on June 15, 2012, which was before Chimney Rock was designated a national monument. Visitation projections are calculated based on data from other recently designated national monuments.

Table 30: Current and Project CRNM Visitation

Pre- and Post- Designation Years	Projected Visitation	Percentage Change
Current	12,000	-
Year 1	14,400	20%
Year 3	19,200	60%
Year 5	24,000	100%

Chart Source: BBC Research and Consulting[28]

In the 2011 Chimney Rock season, there were 12,000 visitors. CRIA reported 8,800 visitors that participated in their programming with an estimated 3,200 coming to Chimney Rock for programming outside of CRIA. BBC Research and Consulting estimated that year one of designation status would result in 14,400 visitors to CRNM. Based on CRIA visitation data, there were 9,024 visitors to CRNM in 2012. CRIA visitation data as of September 23, 2013, (date of writing this report) was 8,167. Based on the same date (September 23, 2012) in the previous year, visitation was at 8,206. Assuming year 2013 receives the same number of visitors as 2012, which was 818 from September 23-September 30, 2012, then visitation for year 2013, would be 8,985.

Table 31: CRIA's visitation numbers

[28] (BBC Research & Consulting, 2012)

Chimney Rock Interpretive Association Visitation Numbers	
Year	Number of Visitors
2011	8,800
2012	9,024
2013 estimated	8,985

While this estimated visitation number is lower than year 2012, it should be noted that the West Fork Complex Fire, which started on June 5, 2013, was 80% contained on July 19, 2013.[29] This fire burned an area of 170 square miles and became the second largest fire in Colorado's history.[30] Additionally, the fire forced the closure of highway 160 over Wolf Creek pass at the beginning and through much of the summer tourist season. Also, the areas surrounding the fire, including Pagosa Springs, experienced heavy smoke and ash in the air, which discouraged outdoor activity. It can be assumed that the West Fork Complex Fire deterred visitation to this region of Colorado and potentially to Chimney Rock National Monument. The 2014 CRNM season, may serve as a better year to base visitation on and determine whether monument designation has had an increase on visitation.

Shuttle Management Estimates

The Transportation Scholar worked with Ms. Tonya Bierly, Fleet Manager of the San Juan National Forest, to estimate the total operations and management costs for the shuttles. Ms. Bierly estimated that the life of the vehicle would be 10-12 years. Additionally, it was assumed that each vehicle would travel about 7,000 miles a year. The use rate per mile was estimated at $ .45 per mile.

$ .45 per mile * 7,000 miles/year = $ 3,150 per vehicle/year
$ 3,150 * 3 shuttle vans = $ 9,450 O&M for three shuttle vans

CRIA agreed to pay the operations and management cost associated with the shuttles, which is estimated at $9,450 a year for three shuttles. This was agreed upon with the CRIA board in 2012 when the USFS applied for the grant to receive money for the purchase of shuttles.[31] As of September 16, 2013, Ms. Tonya Bierly was revisiting cost estimates to ensure that this number is accurate.

Chimney Rock National Monument Safety Considerations

While it is important to protect cultural and natural resources within CRNM, the health, safety and protection of visitors, volunteers and staff within CRNM are a high priority to the USFS. Of course limitations exist to entirely eliminate all hazards, however the USFS, contractors, concessionaires and those at CRNM shall seek to provide a safe environment for all visitors, volunteers and employees.

The primary emphasis of the safety program is accident prevention through CRNM staff training and visitor education and awareness. Pre-visit information about potential hazards and their mitigation shall be provided through CRNM publications (handouts, brochures, etc.) and electronic media (website, Facebook, twitter, etc.) from both the USFS and Chimney Rock Interpretive Association (CRIA).

[29] (Inciweb the Incident Information System, 2013)
[30] (Hanel, 2013)
[31] (United States Forest Service San Juan National Forest, 2012)

Additionally, information about hazards and risk mitigation shall be provided verbally to each visitor to CRNM. Additional CRIA volunteers roving the Pueblo Trail shall provide safety oversight at special events like the Full Moon Event or other types of programming at CRNM. Safety comment and suggestion cards shall be actively sought from visitors to document hazards and safety suggestions, and reviewed monthly by the USFS and CRIA.

Visitors participating in the full CRIA tour, which takes visitors on the Great Kiva Trail and the Pueblo Trail shall receive five (5) personal safety briefings and screenings.

1. Visitor arrival at Visitor Cabin (verbally and through signed liability waiver)
2. CRIA volunteer guide briefing before visitors before drive to summit
3. CRIA volunteer guide briefing before starting the Great Kiva Trail
4. CRIA volunteer guide briefing before ascending the Pueblo Trail
5. CRIA volunteer guide briefing before descending the Pueblo Trail

Visitors participating in the shorter CRIA tour, which takes visitors on the Pueblo Trail shall receive four (4)*personal safety briefings and screenings.

1. Visitor arrival at Visitor Cabin (verbally and through signed liability waiver)
2. CRIA volunteer guide briefing before visitors before drive to the summit
3. CRIA volunteer guide briefing before visitors ascend the Pueblo Trail
4. CRIA volunteer guide briefing before visitors descend the Pueblo Trail

*Some visitors do the Great Kiva Trail without a CRIA tour guide and then join one of the two afternoon Pueblo Trail tours. Those visitors shall receive all the above safety screenings except number two.

Visitors participating in the CRIA Full Moon Event, which takes visitors on the Pueblo Trail shall receive four (4) safety briefings and screenings.

1. Visitor arrival at Visitor Cabin (verbally and through signed liability waiver)
2. CRIA volunteer guide briefing before visitors before drive to the summit
3. CRIA volunteer guide briefing before visitors ascend the Pueblo Trail
4. CRIA volunteer guide briefing before visitors descend the Pueblo Trail

Visitors participating in the CRIA Telescope Viewing, which takes places after the Full Moon Program shall receive in addition to the four (4) safety briefings and screenings one (1) final reminder before visitors leave the event.

Conflicts between pedestrians and motor vehicles in and around the Chimney Rock base and summit parking lots are potential hazards for visitors as they ascend and descend the access road. Tour sizes and frequencies proposed by the USFS shall be followed in order to provide the safest experience for visitors through their time at CRNM. Currently, the Full Moon Event has a capacity of 150. It is highly discouraged that this capacity be increased. Additionally, regular tours have a capacity of 25 people and it is also highly discouraged that this capacity be increased.

Each visitor, volunteer and employee ascending and descending the Pueblo Trail is exposed to risks, including steep elevation gain, uneven ground surfaces, rocky and rough terrain, and cliff edges. The annual CRNM opening and closing dates are selected to avoid trail-use during high-risk periods, e.g. icy trails and times when snow presents a risk over the trail. Any increase in trail use, even during lower risk periods, proportionally increases the ratio of risk exposure, while any reduction in trail use similarly reduces risk. This concept is commonly acknowledged in operational risk management, where reducing the number of operational “cycles” reduces team risk exposure.

Lightning Safety

The USFS shall explore lightning safety options for the summit of CRNM. Either “lightning proofing” an existing structure such as the restroom facility or designing and building a new structure to provide both rain, shade and lightning shelter would be ideal. Lightning shelter shall be created for an estimated maximum number of visitors, volunteers and/or employees that could be at the summit at one given time. CRIA shall continue to monitor weather conditions for events and cancel as appropriate due to lightning safety concerns.

All CRNM staff shall receive training annually in at least basic first aid and cardiopulmonary resuscitation (CPR). First aid supplies are also stored throughout CRNM site at the base and summit areas.

In order to allow for better preparedness for visitor, volunteer and employee safety at CRNM, the following accident scenarios have been developed with recommendations.

To minimize risk of vehicular accidents on the access road to the summit, it is recommended that either CRIA and/or the USFS shall

- Refer to safety guidelines of CRNM staff in which staff explain to visitors safety rules
- Work together to identify potential hazards or concerns and solutions prior to larger events at CRNM
- Add signage at base and summit parking lots alerting drivers of potential pedestrian activity
- Add signage about speed limit within CRNM
- Add signage about washboarding, cliff edges and the hairpin turn
- Continue to only allow parking on one side of summit road
- Continue to limit the number of visitors at specific CRNM events
- Continue to utilize parking volunteers at appropriate places to guide visitors

To minimize risk of vehicular accidents in the base and summit parking areas at CRNM, it is recommended that either CRIA and/or the USFS shall

- Refer to safety guidelines of CRNM staff in which staff explain to visitors safety rules
- Work together to identify safe parking strategies prior to larger events at CRNM
- Not allow vehicles to parking behind the access road behind the base restroom facilities. This road must be kept clear
- Continue to limit the number of visitors to specific events
- Continue to utilize parking volunteers at appropriate places to guide visitors
- Only allow compact vehicles to park at the upper tier of the summit parking lot with larger vehicles parking on the lower tier

To minimize risk of large vehicle accidents in the base parking area at CRNM, it is recommended that either CRIA and/or the USFS shall

Since redesign of a base parking lot will take time to complete, the following guidelines are recommendations for procedures to minimize the risk of large vehicle accidents in the lower parking area.

- Redesign the base parking lot to create parking areas for recreational vehicles and motorcycles
- Warn RV and motorcycle users via USFS and CRIA printed materials and electronic media that the site is constrained for these types of vehicles
- Have recreation vehicles (RVs) park at that graveled informal parking area near the base Visitor center
- Continue to not allow RVs to drive up the summit road
- Continue to allow motorcycles to drive the summit road on a case by case basis

To enable emergency vehicles access to the summit to respond to emergencies, it is recommended that

- The access road behind the base restrooms shall be kept clear
- Continue to limit parking to one side of the summit road for larger events
- Continue to limit number of people at events
- The entrance/exit area around the upper parking lot where vehicles at the Full Moon Event conduct a U-turn will be kept clear to allow for emergency vehicle access
- Only allow compact vehicles to park at the upper tier of the summit parking lot with larger vehicles parking on the lower tier to enable more space for potential emergency vehicles

To ensure public safety in the event of a wildfire, including evacuation in a single ingress/egress road situation the USFS shall

- Investigate the potential creation of an emergency only road/trail to provide an alternative route to leave the summit
- Investigate options to alleviate the limited ingress/egress situation
- Ensure radio systems at CRNM are compatible with local county/town/USFS/other emergency services
- Develop and implement a communications plan among CRIA, USFS and other emergency provider, which outlines a plan of action and radio frequencies to be used during a wildfire incident or other emergency situation
- Develop and implement an emergency plan at CRNM
- Develop and implement a safety training for emergency events for volunteers and employees of CRNM
- Require a safety discussion and review of the communication/safety action plan for additional events held at CRNM (Native American Cultural Gathering or other larger events held at CRNM)

Partnership Opportunities

Organization: Archuleta County Senior Transportation
Link: http://www.archuletacounty.org/index.aspx?NID=240
Explanation: Archuleta County Senior Transportation provides door-to-door service on Mondays, Tuesdays, Wednesdays and Fridays for seniors 60 and older from their home to The Den for lunch; to the post office, the pharmacy, the grocery store and other necessary errands. Archuleta County has one 18 passenger shuttle for seniors 60 and older. There is a suggested donation of $2 and reservations are

required.
Partnership Scenario: For larger events at CRNM, the USFS could work with Archuleta County to utilize their shuttle and/or drivers to shuttle visitors within CRNM.
Advantages/Disadvantages: This would be a great option because additional shuttles are needed to shuttle visitors at CRNM during larger events. While this would be a great option, there are certain considerations such as shuttle size. Depending on the size of Archuleta County's shuttle, it may be too large to pass through safely the summit parking lot. Another consideration in regard to shuttle size is the need for a commercial driver's license (CDL). Since a CDL is required and an Archuleta County driver is not available, locating a driver with a CDL could be a problem. Additionally, this partnership would require pre-event planning, coordination and transparent communication to ensure a successful event and partnership.

Organization: Archuleta School System
Link:http://www.pagosa.k12.co.us/Default.asp?PN=MainPage&L=2&DivisionID=12293&DepartmentID=12610&LMID=533447&ToggleSideNav=DivisionOnly
Explanation: The Archuleta School System utilizes school buses to transport students to/from designated bus stop locations.
Partnership Scenario: For larger events at CRNM, the USFS could work with Archuleta County School System to utilize their school buses and/or drivers to shuttle visitors within CRNM.
Advantages/Disadvantages: While school buses have a larger capacity to shuttle visitors, visitors may not be comfortable riding in a school bus. Additionally, the summit site constraints mean that the school bus would not be able to pass through the parking lot and would require a multipoint turn before entering the summit parking area. School buses at CRNM conduct this multipoint turn safely often for school tours, but at larger events a safety concern arises because there could be more pedestrians walking around.

Organization: Mountain Express Public Transit/Archuleta County
Link:
http://www.pagosadailypost.com/news/19792/Mountain_Express_Initiates_'Call_&_Ride'_System/
Explanation: Mountain Express Public Transit/Archuleta County has a call and ride service for $2 one-way. A person would call Mountain Express the day before their anticipated need for transportation to make a reservation. Once the reservation is made, Mountain Express would pick up the person from their home and transport them to their desired location. Their hours for call and ride are 8:00am - 9:50am & 11:00am - 4:00pm.

Additionally, they have a fixed route in morning and afternoon for $1. The fixed route service is from Turkey Springs at 6:45 am, ending at Community Center at 7:10 am and from Community Center at 5:10 pm, ending at Aspen Springs at 5:38pm. The schedule can be found here:
http://www.archuletacounty.org/DocumentCenter/Home/View/224

It should be noted that as of May 2013, this transportation system could potentially be defunded by the County due to declining property tax revenues. More information can be found here:
http://www.pagosaspringscdc.org/wp-content/uploads/2013/07/Archuleta-County-Community-

Development-Action-Plan-CDAP-Progress-Report-May-2013.pdf

Partnership Scenario: For larger events at CRNM, the USFS could work with Mountain Express to utilize their shuttles and/or drivers to shuttle visitors within CRNM.

Advantages/Disadvantages: If the program were to continue, this could be a great opportunity to bring both shuttles and drivers to CRNM for larger events. While this would be a great option, there are certain considerations such as shuttle size. Depending on the size of the Mountain Express shuttles, it may be too large to safely pass through the summit parking lot. Additionally, this partnership would require pre-event planning, coordination and transparent communication to ensure a successful event and partnership.

Organization: Wilderness Journeys

Link: http://wildernessjourneyspagosa.com/ShuttleTaxi.html

Explanation: Wilderness Journeys provide year round tours of attractions in the area such as: Mesa Verde, Chaco Canyon, Ute Mountain Cliff Dwellings and Aztec Ruins. Narrows Gauge Trains, river rafting, backcountry hikes, 4x4, and other tours. Additionally, they provide transportation to/from Wolf Creek Ski Area, Durango Airport, and as a taxi service. They use 12-15 passenger vans to shuttle visitors to/from Wolf Ski Area. Currently the Wolf Creek Shuttle runs twice daily from the Wyndham Activities Center and downtown Pagosa Springs. Additionally, they provide transportation and tours to different sites and activities in the Four Corners region. Reservations are required.

Partnership Scenario: Since this organization offers tour to a variety of Ancestral Puebloan sites in the region, they could potentially offer transportation to/from CRNM and CRIA could utilize their shuttles to shuttle these types of visitors in CRNM. For larger events at CRNM, the USFS could work with Wilderness Journeys to utilize their vehicles/drivers to shuttle visitors within CRNM.

Advantages/Disadvantages: A partnership with Wilderness Journeys, CRIA and the USFS could be a great way to bring additional visitors to CRNM. Since they already provide transportation to a variety of other sites in the region, this partnership could address visitors that do not have access to a vehicle. This would require a lot of pre-event coordination, coordination and transparent communication to ensure a successful event and partnership. It could be difficult to coordinate with this organization for larger CRNM events since they already have a set schedule for transporting their own customers. Another option for partnership could entail leasing the USFS vehicles to this organization during the CRNM off-season. An additional consideration in regard to shuttle size is the need for a CDL. If a CDL is required and a Wilderness Journeys driver is not available, locating a driver with a CDL could be a problem.

Organization: Wolf Creek Ski Area

Link: http://www.wolfcreekski.com/wolf-creek-stats-facts.php

Explanation: Wolf Creek Ski Area is open early November to April. Currently they shuttle visitors from the parking areas (Lower and Alberta Parking Lots, Upper and Lower Tranquility Lot, Snow shed/Overflow Lot) to the base of the Wolf Creek Ski Area.

Partnership Scenario: During the CRNM off-season, Wolf Creek could potentially use the shuttle vans from CRNM during their season. CRNM could potentially use Wolf Creek's shuttles during Wolf Creek's off-season at CRNM in daily operations and/or for larger events.

Advantages/Disadvantages: This partnership would ensure that the CRNM shuttles are used and taken

care of during CRNM's off season. Additionally, utilizing Wolf Creek's shuttles during CRNM's season could provide needed additional vehicles on exceptionally busy days when the three shuttles are not enough capacity to shuttle visitors. The Wolf Creek shuttles could also be a needed capacity for larger CRNM events. Of course, there are certain considerations such as the size of the shuttles

This would be a great option because additional shuttles are needed to shuttle visitors at CRNM during larger events. While this would be a great option, there are certain considerations such as shuttle size. Depending on the size of Wolf Creek's shuttle, it may be too large to pass through safely the summit parking lot. Also, depending on the shuttle size, there could be a need for a CDL. If a CDL is required and a Wolf Creek driver is not available, locating a driver with a CDL could be a problem.

Of course, any kind of partnership with Wolf Creek would require pre-event planning, coordination and transparent communication to ensure a successful event and partnership.

Shuttle Recommendations/Conclusions

Based on observations, data and information collected, Chimney Rock National Monument is an appropriate location for the integration of alternative transportation such as shuttles. However, with the testing of the shuttles at the Native American Cultural Gathering and CRIA's Full Moon Event, there are certain recommendations that should be accounted for to ensure the shuttle system operates smoothly (please see the Pilot Shuttle Study Report page 10 for specific recommendations about those events).

- Pilot 2014 season
- Communications
- Additional USFS staff
- Kick Off Event
- Safety
- Parking
- Partnerships
- Vehicle storage at CRNM
- Further analysis

Pilot 2014 Season
It is recommended that the USFS purchase the three shuttles for the 2014 CRNM season. This will require meeting with CRIA to further discuss and agree upon details of the shuttle such as schedule, storage, shuttle training and most importantly shuttle cost.

Communication between USFS & CRIA
The USFS and CRIA should meet over multiple meetings well before the 2014 season begins. It is critical that the USFS and CRIA are on the same page in regard to shuttle operations and management. Additionally, identifying a fitting shuttle scenario for different CRIA events will be critical to a smooth shuttle pilot season. It is encouraged that the USFS and CRIA work together to identify a shuttle schedule that CRIA feels appropriate. This scenario will likely the use of shuttles and private vehicles until lightning shelter at the summit can be created and base parking. Three shuttles will hold 33 visitors,

so a certain number of private vehicles may be allowed to drive to the summit. Additionally, encouraging visitors to carpool is highly advised. It was observed upon numerous occasions that friends and couples (two people) met other couples and friends at CRNM and drove separately. Encouraging carpooling in this situation is highly advised.

Additional USFS staff

Both CRIA and the public responded positively to the extra USFS presence at the Native American Cultural Gathering and the CRIA Full Moon event. It is recommended that either a full time USFS staff person or USFS seasonal employees be in charge of working at CRNM. Shuttle operations and management at CRNM will need a designated staff person to help facilitate the shuttles and to serve as a liaison between CRIA and the USFS. This person will be a key piece to ensure sustainable and efficient operations of the shuttles at CRNM. Additionally, having a shuttle point person can identify strategies and mechanisms to improve the shuttle system and enable it to run more efficiently.

Kick Off Event

The USFS and/or CRIA could host a kick-off fundraising event to raise awareness about the shuttles at CRNM. Hotels, Chamber of Pagosa, tour agencies, locals and people from the region should be invited to this event. This event could help to identify potential partnership opportunities with regional organization or person. Additionally, this party can help ensure consistent messaging and advertisement of the shuttles at CRNM.

Safety

Lightning

Until lightning shelter can be provided for the number of anticipated visitors, volunteers and employees at the summit of CRNM, a scenario blending the three shuttles with a certain number of private vehicles should be created. Depending on how many visitors are at the summit will determine the number of private vehicles allowed to drive to the summit. Once enough lightning shelter exists for anticipated number of visitors, volunteers and staff at the summit, the need for a specific number of private vehicles at the summit will decrease.

Visitation Capacity

No more than the current cap of 150 people should be allowed at the CRIA Full Moon event. 150 people at the Great House area is difficult to manage and increasing this capacity is highly discouraged because of compromising visitor safety. At two separate Full Moon Events, visitors were observed wandering from the programming, going off-trail and walking very close to cliff edges without CRNM staff noticing. Additionally, increasing the current capacity of 25 people per tour is highly discouraged.

Shuttle Drivers

A safety orientation with all volunteers and staff at CRNM should be held to ensure that all (driver/non-driver) are aware of rules and guidelines related to the shuttles.

Shade Structures

On hot, sunny days, volunteers were observed sitting in the middle of the summit parking lot where shade existed. This is highly discouraged because visitors, volunteers or staff may not anticipate this. A

more permanent solution would be to install some kind of shade structure at the summit not only for volunteers, but for visitors.

Signage

Speeding is a currently issue among vehicles at CRNM. Signage with speed limits and signage to alert vehicles of pedestrians at the base and summit areas are recommended. Temporary or permanent signage for pick up and drop off areas for shuttle riders would help to corral riders in a safe location.

Parking

Until a location for additional parking at the base can be implemented, full integration of the shuttles will be difficult because the base parking lot does not have a enough capacity. For overflow and RV parking, it is recommended that the graveled area north west of the visitor center be used sine this area is already disturbed.

Partnerships

Larger Events

At larger events, such as the Full Moon Event and the Native American Cultural Gathering, either renting additional shuttle vehicles or identifying potential shuttle partners would help to ensure smooth, efficient and quick transport of visitors. As visitation to CRNM grows, the USFS and CRIA should explore options to either purchase additional shuttles or find a shuttle partnership in order to meet new demand.

Shuttle Storage at CRNM

It is recommended that during the CRNM season, the shuttles are stored safely at CRNM instead of moving them back and forth each day between Pagosa Springs and the site. This will eliminate about 40 miles per day added to each vehicle and decrease some vehicle wear and tear. In addition, it will eliminate the need for three volunteers or staff to move the vehicles each day.

Further analysis

It would be beneficial for data to continue to be collected in the 2014 season. In addition, traffic data and visitation data for the 2013 season could be analyzed and could reveal trends or patterns that could help inform the integration of the shuttles in the 2014 season. Regardless, due the West Fork Fire, it can be assumed that visitation to CRNM was not as high as it could have been. Visitation in the 2014 season may be a better indicator of the impact of designation status on the monument.

Works Cited

BBC Research & Consulting. (2012). *Economic Impacts of National Monument Designation, Chimney Rock, Colorado.* Denver: BBC Research and Consulting.

Chimney Rock Interpretive Association . (2013). *Welcome to Chimney Rock!* Retrieved September 18, 2013, from http://www.chimneyrockco.org/

Chimney Rock Interpretive Association. (2013). *Excavation and Research*. Retrieved from http://www.chimneyrockco.org/excavationresearch.php

Chimney Rock Interpretive Association. (2013, September 23). *Walking Tour Description*. Retrieved from http://www.chimneyrockco.org/walktourdescrip.php

Forest, U. S. (2012, September). Chimney Rock Alternative Transportation Grant Application. Pagosa Springs, Colorado: USFS.

Hanel, J. (2013, August 29). *West Fork Fire forced firefighters to hang back*. Retrieved from The Durango Herald: http://www.denverpost.com/news/ci_23973334/west-fork-fire-forced-firefighters-hang-back

Inciweb the Incident Information System. (2013, July 19). *West Fork Complex*. Retrieved from http://www.inciweb.org/incident/3436/

Obama, B. P. (2012, September 21). *Presidential Proclamation -- Establishment of the Chimney Rock National Monument.* Retrieved from http://www.whitehouse.gov/the-press-office/2012/09/21/presidential-proclamation-establishment-chimney-rock-national-monument

Ramussen, B. (2012, May). The Potential for Alternative Transportation at Chimney Rock, San Juan National Forest. U.S. Department of Transportation, John A. Volpe National Transportation Systems Center.

San Juan National Forest Pagosa Ranger District. (1992). *Design Narrative Capital Investment Project Chimney Rock Archaeological Area.* Pagosa Springs: San Juan National Forest.

United States Forest Service Pagosa Ranger District. (2013). *Chimney Rock National Monument*. Retrieved from http://www.fs.usda.gov/detail/sanjuan/specialplaces/?cid=stelprdb5390324

Appendices

Laws, regulations, policies identified in spreadsheet

Laws, Regulations and Policies	
Laws, Regulations and Policies	http://www.fs.fed.us/forestmanagement/aboutus/lawsandregs.shtml
Document	Citation/Link
USFS Visitor Policies	http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5391261.pdf
Safety	You are responsible for your own safety. Watch for natural hazards when you are in the forest. If you hike off trails, swim or dive in streams or lakes, you do so at YOUR OWN RISK.
	Please, remember to be careful.
Federal Regulations	All visitors and users of national forests are subject to federal regulations. The points of conduct listed are generally included in and enforceable through federal regulations. All of the regulations are published in Title 36 of the Code of Federal Regulations and are on file at all Forest Supervisor and District Ranger offices. Violation of orders and regulations is subject to punishment by fine or imprisonment. Authority: 16 USC 551, 7 USC 1011(f)
State Traffic and Game Laws	State traffic and game laws apply to national forests unless otherwise specified.
Operation of Vehicles	Obey all traffic signs. State traffic laws apply within a national forest unless otherwise specified.
	When operating vehicles of any kind, do not damage the land or vegetation or disturb wildlife. Avoid driving on unpaved roads or trails when they are wet or muddy.
	Within campgrounds and other recreation sites, use cars, motorbikes, motorcycles or other motor vehicles only for entering or leaving, unless areas or trails are specifically marked for them. Park only in marked parking areas.
	Do not block, restrict or interfere with the use of roads or trails.
	Obey area and trail restrictions on use of trail bikes and other off highway vehicles (OHVs) and all-terrain vehicles (ATVs).
Fireworks and Firearms	Fireworks are prohibited throughout the forest. Do not set off fireworks or other explosives within campgrounds and other recreation sites.

	Weapons are not allowed on national forest lands outside of hunting seasons. (See State Game Regulations.) Firearm ranges are the exception.
	Firing a gun is not allowed: a) in or within 150 yards of a residence, building, campsite, developed recreation site or occupied area; b) across or on a road or body of water; c) in any circumstance whereby any person may be injured or property damaged; and d) outside of hunting season.
Pets and Animals	Pets must always be restrained or on a leash while in developed recreation sites.
	Pets (except guide dogs) are not allowed in swimming areas.
	Saddle or pack animals are allowed in recreation sites only where authorized by posted instructions
Public Behavior	No fighting or boisterous behavior.
	Keep noise at a reasonable level. Please be considerate of fellow visitors.
	Many recreation areas prohibit the possession of alcohol. Details will be posted elsewhere on this board.
Property	Do not carve, chop, cut or damage any live trees.
	Preserve and protect your national forests. Leave natural areas the way you find them.
	Enter buildings, structures or enclosed areas in national forests only when they are expressly opened to the public.
	Indian sites, old cabins and other structures, along with objects and artifacts associated with them, have historic or archaeological value. Do not damage or remove any historic or archaeological resources.

Forest Service Manual (FSM) directive issuances	
7000	Engineering
7130	Fleet Equipment Management
7130.44	District Rangers and Job Corps Center Directors
	It is the responsibility of District Rangers and Job Corps Center Directors to:
	1. Manage and account for all fleet equipment under their administrative control.
	2. Ensure the efficient and economical use of all equipment.
	3. Ensure that all equipment is properly inspected, maintained, and serviced.

	4. Maintain required records and data for each item of equipment.
	5. Report any excess equipment, parts, and supplies promptly to higher offices for possible use elsewhere.
	6. Designate an Equipment Manager, Equipment Specialist, or Equipment Coordinator and to document responsibilities of equipment management including equipment maintenance, service, inspections, inventory, and maintenance of all required data and records.
7131.71	Official Tags
	1. Requirements. Each item of fleet equipment owned or rented by the Forest Service for periods longer than 3 months and for which a State would normally require registration by private parties shall bear official Government identification tags. See the Federal Property Management Regulations, chapter 101, part 38 (FSH 6409.31 - FPMR 101-38) for exemptions from the requirement to display the tags.
	2. Record. The Department of Agriculture, Office of Operations, maintains a record of all tags issued to each agency. Each Region, Station, or Area shall maintain a record of all tags issued to them (FSM 7131.04b).
7131.72	Color Identification
	The standard color for all Forest Service motor vehicles is green, Federal Standard 595, color chip No. 14260. When manufacturers cannot supply the standard green color, specify the manufacturer's standard color white. Vehicles with nonstandard paint shall be repainted the standard green color upon arrival at the delivery point, unless the Regional Forester, Station Director, or Area Director finds that the proposed use does not require or justify repainting.
	Use the manufacturer's standard color for construction equipment, such as crawler tractors, wheel tractors, motor graders, and crawler loaders.
7131.73	Required Markings
	1. Display Markings. Federal Property Management Regulations and Department of Agriculture Property Management Regulations require equipment identification markings
	(FSH 6409.31). Display other appropriate safety instructions and warnings (for example, a safety-prop decal warning to block or prop all elevating-type bodies before undertaking any work on or under the vehicle).

	2. Remove Markings. Remove all official identification and decal Form AD-185, For Official Use Only, when a vehicle is retired from Government service. Do not remove Form AD-185 when a vehicle is transferred to another Government agency.
7133.03	Policy
	Provide a preventive maintenance program for all fleet equipment, by which maintenance of equipment meets the standards prescribed by the applicable manufacturer's service instructions, unless specific operating conditions require modification. Modifications due to extreme conditions should be applied only while the extreme conditions exist.
	Use contract maintenance and repair services whenever it is in the Government's economic interest.
	Ensure that each item of fleet equipment receives (1) a monthly inspection by the driver/operator and (2) an annual mechanical/safety inspection by a qualified mechanic.
7133.04b	Forest Supervisors, District Rangers and Project Leaders
	It is the responsibility of the Forest Supervisors, District Rangers, and Project Leaders to:
	1. Specify maximum dollar limitation for repair of fleet equipment without prior approval from the Forest Fleet Manager.
	2. Conduct a commercial industrial review of maintenance and repair systems in accordance with supplement 1 to the Office of Management and Budget Circular A-76 (FSM 1310).
7133.1	Maintenance and Repair
	The Working Capital Fund shall pay for maintenance and repair of capitalized fleet equipment. See FSH 6509.11f, section 38.13, for direction on the recovery of maintenance and repair costs resulting from abnormal use from appropriated funds or from third parties. See FSH 7109.19, section 42, for the definition of abnormal use and related direction.
7133.2	Inspection of Rented Vehicles
	A certified mechanic or an individual who has demonstrated a technical competence shall conduct a mechanical inspection of all rental equipment before it is put in operation and again immediately before its release. The intent of these inspections is to ascertain and document the physical condition of the equipment. Charge the benefiting appropriation for the cost of these inspections.
7134.02	Objective

	To ensure safe, productive, and energy efficient operation of fleet equipment.
	1. Operate all Forest Service equipment and vehicles within the manufacturers' design standards.
	2. Use benefiting project funds to pay costs associated with the following:
	a. Agency training of incidental motor vehicle operators, and agency training, testing, and qualification of special equipment operators;
	b. Programs and activities to promote safe driving and equipment use;
	c. Training and testing for commercial driver's license program requirements.
7134.1	Qualification
	Ensure that all operators of Government-owned or -leased motor vehicles are qualified, tested, and certified through State licensing programs. Special equipment driver/operators shall be qualified, tested, and certified though Forest Service programs. When operating government vehicles or equipment the Form OF-346, United States Government Motor Vehicle Operator's Identification Card, or a Forest Service issued identification card indicating the type of vehicle or equipment the holder is authorized to drive or operate must be in the employee's possession. The identification card may be issued with an indefinite expiration date subject to review as required by the Federal Personnel Manual, chapter 930.
7134.2	Training
	1. Operators. Provide all operators of fleet equipment with training that fully informs them of their responsibilities. Include procedures for obtaining repairs, correcting deficiencies, driving defensively, driving to conserve energy, using preventive maintenance checks, and safely operating vehicles and equipment in a Forest environment.
	2. Equipment Management Personnel. Provide training to develop and sustain a nucleus of equipment management personnel, equipment, inspectors, and shop personnel who are knowledgeable in the following:
	a. Equipment inspection and servicing procedures.
	b. Shop production standards.
	c. Cost records and financial reports.
	d. Operator training, testing, and qualification.
7135.1	Required Reports

	The following required reports are currently prepared by the National Finance Center:
	1. Report FS-7100-D, Annual Motor Vehicle Report. This report is due in the Washington Office Engineering Staff by November 15 of each year.
	2. Report FS-7100-Z, Annual Motor Vehicle Report Department of Labor-Owned. This report is due in the Washington Office Engineering Staff by November 15 of each year.

Forest Service Handbooks	
7000	Engineering

No specific citations found related to shuttles

Publicity ideas

Ideas to promote shuttles

- Hotel Association
  - Pagosa Springs
  - Durango
  - Other?
- Chambers of commerce in the region
  - Pagosa Springs
  - Durango
  - Other?
- Local Media
  - Pagosa Sun
  - Durango Paper
  - Tourist guides/booklets
  - Brochures
- Websites
  - CRIA
  - USFS
    - Pagosa
    - Durango
  - Southwest Colorado websites
    - *www.swcolotravel.org/*
    - *www.**colorado**.com/**southwest***
    - *www.**swcolorado**heritage.com/*
  - Pagosa websites
    - www.visitpagosasprings.com

        - www.pagosa.com
        - www.pagosachamber.com
        - www.**pagosa**springs.co.gov/
        - www.colorado.com/cities-and-towns/**pagosa**-springs
        - **pagosa**outside.com/
        - *www.**pagosa**trails.net/*
    - Durango websites
        - www.durango.org
        - www.durango.com
        - www.godurango.com
        -
- Social Media
    - Facebook
        - CRIA page
        - Pagosa page
        - Durango Page
        - USFS page?
    - Twitter
    - Blog
    - Email blasts
    - Newsletters

Presentations made by the Transportation Scholar

Transportation Scholar Presentations		
Audience	Topic	Date
Meeting with Kevin Khung, Pagosa Ranger District, District Ranger	Get Kevin up to date on the status of the shuttles, preliminary findings about CRNM, reviewed shuttle data and challenges at CRNM. Set expectations for deliverables from the transportation scholar.	8-Aug-13
Chimney Rock Interpretive Association Pot luck	Reviewed results of the pilot shuttle test, shuttle data and anticipated next steps to integrate shuttles at CRNM. Question and answer session.	8-Aug-13
Chimney Rock Interpretive Association Board Meeting	Meet with the board to discuss results from the pilot shuttle study, mitigating challenges identified in the pilot and next steps for the integration of the shuttles at CRNM. Question and answer session.	19-Aug-13

Pagosa District Staff Meeting	Very brief introduction and overview of transportation scholar deliverables and tasks. Overview of how the pilot shuttle study went at the July events.	20-Aug-13
USFS Engineers at the Supervisor's Office in Durango	Reviewed transportation scholar deliverables (transit plan, capital improvement plan (CIP), safety plan, partnership opportunities) Explored specific CIP components being explored and reviewed traffic data showing the benefits of shuttles at CRNM.	16-Sep-13
Town Council of Pagosa Springs	Brief overview of the shuttle pilot study in July. Highlight strengths of the shuttles, give example data numbers comparing with and without shuttles and thanks the council for providing funds to rent the third shuttle for the shuttle pilot.	19-Sep-13
USFS Chimney Rock Interdisciplinary Team	Reviewed transportation scholar deliverables (transit plan, capital improvement plan (CIP), safety plan, partnership opportunities) Explored specific CIP components being explored and reviewed traffic data showing the benefits of shuttles at CRNM.	24-Sep-13

Scholar Observations

Transportation scholar notes and observations from July 5, 2013

Signage/Communications

- Comprehensive Informational Sign at entrance of the road to CRNM
    - Access difficulty for RVs, Motorcycles, School Buses or other larger vehicles
    - Hours of operation in and off season
    - No motorcycles at summit
- Comprehensive Informational Sign at visitor center & summit
    - Safety concerns
    - Road concerns
    - Trail concerns
    - Respect trails/sites
- Signs/barrier at the summit to communicate staying on trails because there are additional unexcavated sites existing off the road.
- Use of social media to communicate with community and visitors

- Facebook
- Twitter
- Other?
- Chamber of Commerce website

Parking/Roads

- Limited Parking at Base (22-stall parking lot)
  - No parking for RVs & Motorcycles
  - Awkwardly shaped parking lot, which increases chances of accidents among cars
- Limited Parking at Summit (26-stall parking lot)
  - No parking for RVs & Motorcycles
  - **VERY** Limited space for RVs, School Buses or other larger vehicles to turn around. Those that do make it up to the top must do awkward 3 point turn. On field trips, school buses do this turn.
- Dusty roads
- Washboarded areas
- Gravel – cars needs to go slower
- Speeding occurring

Safety

- Volunteers sitting in shade in the middle of the parking lot at the summit
- Parking on sides of the steep, gravel road approaching the summit
- Limited vehicle emergency access
- Trail steepness, elevation combined with hot weather conditions
- Liability issues with those that cannot drive to the summit receiving rides from either volunteers or others
- Narrow, winding road
- Events – everyone goes at the same time. No order. Chaotic and potentially unsafe situations created.
- Way to paint/stripe or something at the top visual cues for bus drivers that do turn around?
- Way to stripe or add text on pavement at the summit parking – upper tier for compact cars/lower tier for larger vehicles.

Archaeological

- Much of site not completely excavated/examined
- Delineating space for and not for people to stand/walk through
- Desire trails through unexcavated sites
- When a student group was at CRNM on a very hot day, students and adults were standing off trail in shaded areas since there were no shaded areas on trail. As a result, they were standing in/on unexcavated structures and a few students got cactus embedded into their shoe.

Facilities

- Limited restroom facilities
- Limited shade
- No water

Needed

- With shuttle implementation, shade while waiting for shuttles (base/summit areas)
- Communications about when shuttles arriving/departing, so people can make a plan and have more realistic expectations about waiting.

Full Moon Event Parking Data

	22-Jun-13	22-Jul	20-Aug	19-Sep-13
Parked on the shoulder of the road				
Truck	3	1	5	7
Car	11	4	9	12
SUV	16	5	6	11
Van	2	0	0	3
Jeep	0	0	2	0
Total	32	10	22	33
Parked in Summit Parking Lot				
Truck	5	Data not taken	3	3
Car	7		11	10
SUV	9		8	10
Van	2		2	3
Jeep	0		0	0
Total	23		24	26
Where is everyone from?				
Colorado	32	Data not taken	21	36
Texas	11		7	6
New Mexico	4		5	3
Arizona	4		2	3
Florida	2		0	2
Illinois	1		0	
Nebraska	1			
Utah			1	1
California			3	1
Maryland			1	
Nevada			2	

Missouri			1	1
Oklahoma			1	1
Ohio			1	
South Dakota			1	1
Kansas				1
Oregon				1
Minnesota				1
Michigan				1
Total	55		46	59