

Great Smoky Mountains National Park

U.S. Department of the Interior  
National Park Service



# Laurel Falls Trail Management Plan Environmental Assessment



May 2023

**United States Department of the Interior  
National Park Service  
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# CHAPTER 1: PURPOSE AND NEED

## Introduction

The National Park Service (NPS) is preparing an environmental assessment (EA) for the Laurel Falls Trail Management Plan in Great Smoky Mountains National Park (the park) in Tennessee. Laurel Falls Trail is the longest and most popular of four paved trails in the park and is one of the park's most popular destinations. Parking at the trailhead is limited, and the area is especially busy on weekends (year-round) and on weekdays during the summer.

## Project Area

The park is located in the southern Appalachian Mountains and straddles the border between North Carolina and Tennessee. The park encompasses more than 800 square miles and is dominated by ancient mountains, with elevations ranging from 850 feet to 6,643 feet at Clingmans Dome. The park is world-renowned for the diversity of its plant and animal life, beautiful scenery, and the size and integrity of the wilderness sanctuary within its boundaries (NPS 2016a). The park is consistently the most-visited national park in the country. It is situated within a day's drive of one-half the population of the United States and was visited more than 14.1 million times in 2021 (NPS 2022a). Since 2011, annual visitation to the park has increased by 57%, resulting in congested roadways, overflowing parking lots, unsafe parking along roads, roadside soil erosion, vegetation trampling, crowded destinations, and long lines at visitor facilities (NPS 2022b).

Laurel Falls Trail is accessed from Fighting Creek Gap Road (also referred to as Little River Road) and is located approximately 4 miles west of the Sugarlands Visitor Center and 5.5 miles from Gatlinburg (figure 1). The 4-mile trail leads to the 80-foot-high Laurel Falls, approximately 1.3 miles from the trailhead, and then ascends to the Cove Mountain Fire Lookout. The trail is paved from the trailhead to the falls. The falls consists of an upper and a lower section. The viewing area includes a pedestrian bridge at the base of the upper falls. Visitor-created trails lead to the base of the lower falls. The project area includes the 1.3-mile paved trail section, the area around the falls, the trailhead, associated parking areas, and approximately 0.5 miles of Little River Road.

## Purpose of and Need for Action

The purpose of the Laurel Falls Trail Management Plan is to guide future trail management, investment in trail infrastructure, safety, and visitor use of the trail.

The proposed project is needed to:

- Protect park resources and improve the visitor experience.
- Rehabilitate the deteriorated trail surface.
- Improve pedestrian flow and reduce safety risks at the trailhead, along the trail, and at the falls.
- Enhance opportunities for visitors to view and enjoy the falls.
- Address crowding and congestion concerns at the falls, in parking areas, and along Little River Road.
- Address safety and congestion concerns associated with informal roadside parking along Little River Road.
- Reduce resource impacts associated with visitor-created trails and informal roadside parking.

The existing asphalt surface of Laurel Falls Trail is rough and uneven and includes sections that are cracked and missing, requiring frequent repairs. Trail edges are eroded and exposed, creating potential tripping and fall hazards, and portions of the trail have steep drop-offs and limited shoulders. The paved surface of Laurel Falls Trail is about 5 feet wide, and visitors often leave the crowded trail surface to pass other hikers. This behavior combined with high visitor traffic in the areas surrounding the trail has denuded vegetation, eroded soils, and exposed tree roots, especially at curves where visitors travel off-trail to avoid other users and create numerous informal trails. Over the past several years, the park has spent approximately 1,000 hours repairing the deteriorating trail to keep it open to the public. These measures represent only temporary fixes—storm events continue to deteriorate and undermine the stability of the trail surface. The park needs to completely replace the surface of the trail from the parking area to the falls (approximately 1.3 miles) and rehabilitate the retaining walls to address the need for stabilization and slope stability in degraded areas. Additionally, the area surrounding the falls can be hazardous because of slippery rocks, steep drop-offs, and crowded conditions. These conditions combine to create safety concerns and negatively affect the visitor experience.

Designated, paved parking for the Laurel Falls trailhead is limited to about 39 spaces. This parking also serves the Sugarland Mountain trailhead and various backcountry destinations. Demand for parking frequently exceeds paved parking capacity, resulting in visitors parking in undesignated spots between the edge of the road and the parking area. In addition, visitors park in unpaved, undesignated locations along Little River Road up to a half a mile from the trailhead and then walk along the road shoulder, which creates a safety hazard for both pedestrians and drivers, contributes to road congestion, compresses soils and tree roots, and denudes vegetation.

## **Trail Background**

Laurel Falls Trail is one of the most-visited trails in the park with more than 375,000 visitors in 2020. Visitation increased by more than 110,000 people between 2019 and 2020 (unpublished park data). The proximity of the trail to the busiest entrance to the park (Gatlinburg) and the relatively short distance to an impressive waterfall make this trail a popular destination for many users. While the trail continues beyond the falls, most visitors hike the 1.3 miles to the falls and then hike back to the trailhead.

Laurel Falls Trail was originally built to allow fire crews access to the Cove Mountain area. Planning for the trail and a fire tower to be built at the top of Cove Mountain began in early 1930s. The trail was completed in 1932, and the fire tower was completed three years later. By the early 1960s, Laurel Falls had become a popular hiking destination for visitors, and erosion was taking a toll on the trail as a result of heavy visitor use. As part of the 1963 Accelerated Works Projects grant to the Department of the Interior, the first 1.3 miles of trail were reconditioned, graded, and paved to halt the erosion. The entire length of Laurel Falls Trail is eligible for listing in the National Register of Historic Places (National Register) as a historic district based on a determination of eligibility completed by the NPS and concurrence from the Tennessee State Historic Preservation Office (TN SHPO).

Although no Congressionally designated wilderness presently exists in the park, 464,544 acres have been formally recommended or proposed as wilderness (NPS 2016a). The NPS manages recommended and proposed wilderness areas to preserve their wilderness character until Congress decides whether to designate them as wilderness (see NPS *Management Policies 2006* §6.3.1). The Laurel Falls Trail corridor from the trailhead to the falls was not recommended or proposed as wilderness and is designated as Natural Environment – Type II in the 1982 General Management Plan (NPS 1982) because it was paved in the 1960s. Therefore, the Laurel Falls Trail corridor from the trailhead to the falls is not managed as wilderness. The trail corridor beyond the falls is designated as Natural Environment – Type I in the General Management Plan and is managed as wilderness.

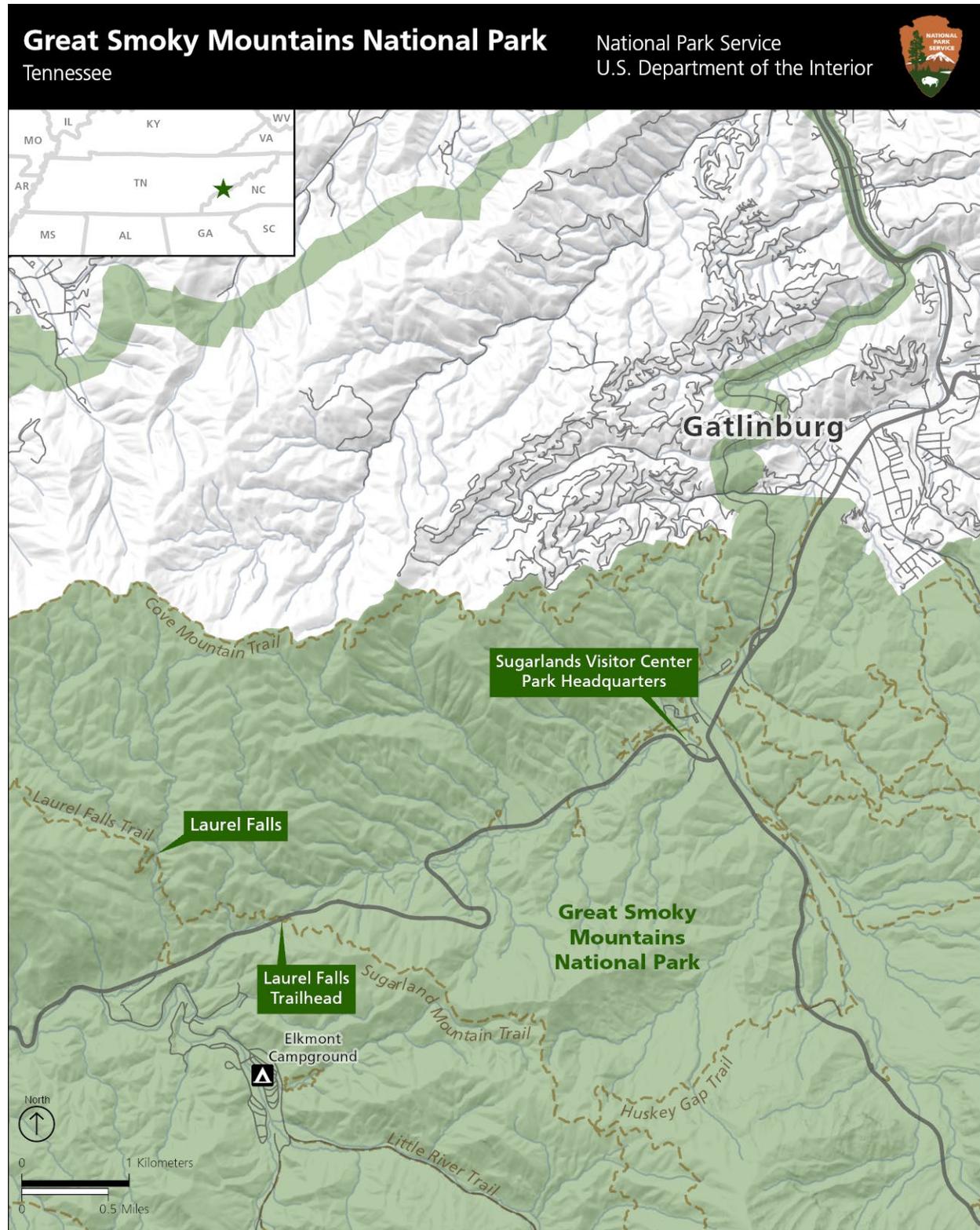


FIGURE 1. PROJECT VICINITY

## **Climate Change**

Based on a 2014 analysis for the park, recent climatic conditions are shifting beyond the historical range of variability, and climate change will likely affect all aspects of park management (NPS 2014). Climate change impacts in the Smokies are more subtle than in many other parks, with many of the potential impacts related to changes in water from cloud cover, flash flooding, and droughts (NPS 2022c). Increased heat in the air and waters around the southeastern US puts more water into the atmosphere, often leading to stronger storms and more rain. In the past 10 years, some park roads have experienced severe flooding or landslides, causing closures for extended periods of time (NPS 2022c). Increased rain may also come irregularly, with periods of intense wetness mixed with periods of intense drought. Other climate impacts can include displacement of native plant communities by invasive plants. While the rehabilitation of the trail and associated management strategies are not anticipated to alter carbon emissions from existing conditions, the design of the bridges at the falls considers the potential for increased severity in storm events and associated high water events, as well as the long-term maintenance associated with high water events. This EA considers the long-term effects of climate change as part of the “Trends and Planned Actions” section of chapter 3.

## **Relationship to Other Park Planning Efforts**

### **VISITOR USE MANAGEMENT**

Visitor use management is the proactive and adaptive process of planning for and managing characteristics of visitor use and its physical and social setting using a variety of strategies and tools to sustain desired resource conditions and visitor experiences. Visitor use management is important because the NPS strives to maximize opportunities and benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences. Managing visitor access and use for visitor enjoyment and resource protection is inherently complex. Managers must acknowledge the dynamic nature of visitor use, the changing types and preferences of visitors, the vulnerabilities of natural and cultural resources, and the need to be responsive to changing conditions.

As one of the most-visited parks in the country, the park has recognized a need to employ various management strategies to enhance the visitor experience while protecting the resources that people come to enjoy. The park has been using the visitor use management framework to address visitor use issues across the park. Projects vary from site-specific (like this Laurel Falls Trail Management Plan), to general efforts like roadside protection measures, which are described below. These actions use the visitor use management planning process to develop a long-term strategy for managing visitor use in the park (see table 1). The general planning process used for this plan is described below and is consistent with the guidance outlined by the Interagency Visitor Use Management Council (IVUMC 2016). “Desired conditions,” “indicators and thresholds,” and “visitor capacity” are all important components of the visitor use management framework that are applied as part of this trail management plan.

**TABLE 1. VISITOR USE MANAGEMENT AND THE PLANNING PROCESS**

<b>Visitor Use Management Framework Elements</b>	<b>Framework Steps and Alignment with the Planning Process and Corresponding Chapter Location</b>
<p><i>Element 1: Build the Foundation</i></p> <p>Building the foundation is the first of the four elements of the visitor use management framework. The purpose of this element is to help managers understand what needs to be done, how to organize the plan, and how to define the resources needed to complete the plan.</p>	<ol style="list-style-type: none"> <li>1. Clarify the plan purpose and need (chapter 1)</li> <li>2. Review the area’s purpose and applicable legislation, agency policies, and other management direction (chapter 1).</li> <li>3. Assess and summarize existing information and current conditions (e.g., current conditions of natural, cultural, and recreation resources and visitor experience opportunities in the area) (chapter 3).</li> <li>4. Develop a plan strategy (chapter 2).</li> </ol>
<p><i>Element 2: Define Visitor Use Management Direction</i></p> <p>The purpose of this element is to answer critical questions about what the planning effort is trying to achieve and the acceptable levels of impacts from visitor use.</p>	<ol style="list-style-type: none"> <li>5. Define desired conditions for the planning area (chapter 2).</li> <li>6. Define appropriate visitor activities, facilities, and services (appendix A and chapter 2).</li> <li>7. Select indicators and establish thresholds (appendix A).</li> </ol>
<p><i>Element 3: Identify Management Strategies</i></p> <p>This element is intended to help managers identify management strategies and actions to achieve and maintain the desired conditions of the plan area. This element also identifies visitor capacity. The goal of element 3 is to define how visitor use would be managed to achieve desired conditions.</p>	<ol style="list-style-type: none"> <li>8. Compare and document the differences between existing and desired conditions; for visitor use-related impacts, clarify the specific links with visitor use characteristics (chapter 3).</li> <li>9. Identify visitor use management strategies and actions to achieve desired conditions (appendix A and chapter 2).</li> <li>10. Where necessary, identify visitor capacities and strategies to manage use levels within capacities (appendix A).</li> <li>11. Develop a monitoring strategy (chapter 2; appendix A).</li> </ol>
<p><i>Element 4: Implement, Monitor, Evaluate, and Adjust</i></p> <p>This element focuses on implementing management actions, monitoring, evaluating monitoring results, and making adjustments to management strategies and actions based on monitoring results. This phase of the planning process focuses on making progress toward meeting desired conditions as well as evaluating potential unintended consequences of the actions for visitors or resources.</p>	<ol style="list-style-type: none"> <li>12. Implement management actions.</li> <li>13. Conduct and document ongoing monitoring and evaluate the effectiveness of management actions in achieving desired conditions.</li> <li>14. Adjust management actions if needed to achieve desired conditions and document rationale.</li> </ol>

## **VISITOR EXPERIENCE STEWARDSHIP ENGAGEMENT**

The park initiated a visitor experience stewardship engagement process in October 2020 by holding eight virtual workshops with the public, employees, volunteers, and partners to collect input on congestion and crowding in the park, desirable visitor experiences, management issues, and possible management practices to improve the visitor experience. Based on input received during the engagement process and

subsequent internal scoping, park staff identified Laurel Falls Trail as a high-priority area for addressing visitor use issues and initiated the planning process for the Laurel Falls Trail Management Plan.

As an outcome of the visitor stewardship engagement process, the park also recently completed a planning and compliance process for other visitor use management strategies such as public information campaigns, education, enforcement, and reduction of unsafe and resource-damaging roadside parking at eight high-use areas. Education and enforcement efforts include renewed emphasis on issuing verbal warnings, written warnings, warning stickers, and citations to those parking inappropriately or littering.

## **ROADSIDE PROTECTION MEASURES**

Given the park's high visitation, demand for parking frequently exceeds capacity of designated parking areas. As a result, parking along road shoulders and other inappropriate areas such as grassy medians has become a common visitor behavior throughout the park. This roadside parking creates safety concerns, contributes to road congestion, damages vegetation, affects the integrity of cultural resources, causes roadside soil erosion, diminishes park aesthetics, and contributes to crowding at park destinations. In some cases, it can also hamper access for emergency response. Based on the magnitude of the problem in some areas, the use of traditional education and enforcement strategies alone are not feasible.

In early 2023, the park began installing approximately 25,000 linear feet (4.7 miles) of roadside protection measures (boulders, wooden guardrails, wooden bollards, and split rail fencing) at eight high-priority areas identified during the visitor use planning process to physically prevent unsafe and resource-damaging roadside parking. These areas include Newfound Gap Road at Chimney Tops and Alum Cave Bluffs trailheads; Newfound Gap Road at the Two Mile/Gatlinburg entrance; Clingmans Dome Road; Little River Road near the Laurel Falls trailhead; Laurel Creek Road near the Schoolhouse Gap Trail parking area (temporary cones used during the 2023 wildflower season); portions of Cherokee Orchard Road and Roaring Fork Motor Nature Trail, including near the Rainbow Falls and Trillium Gap trailheads; Big Creek entrance road/day use area; and the Deep Creek entrance road/day use area.

Near the Laurel Falls trailhead, the park installed approximately 6,600 linear feet (1.25 miles) of roadside protections along Little River Road, which equates to eliminating about 254 de facto parking spaces. The park installed "no parking" signs in areas where underground utilities or other constraints limited the use of physical protections. While some visitors continue to park in undesignated locations, further decreases in inappropriate roadside parking near the trailhead are expected as visitors adjust to the roadside protection measures and as the NPS implements focused public education and parking enforcement campaigns. Collectively, roadside protections, "no parking" signs, public education, and parking enforcement are anticipated to substantially reduce roadside parking near the trailhead and ultimately reduce crowding at Laurel Falls Trail during periods of peak visitation.

## CHAPTER 2: ALTERNATIVES

The National Environmental Policy Act (NEPA) requires federal agencies to explore a range of reasonable alternatives aimed at addressing the purpose of and need for a proposed action. Reasonable alternatives include alternatives that are “technically and economically practical or feasible and meet the purpose and need of the proposed action” (43 Code of Federal Regulations [CFR] § 46.420(b)). The alternatives under consideration must include a no-action alternative as prescribed by Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR Part 1502.14).

The alternatives analyzed in this document, in accordance with NEPA, consider the feedback from internal (NPS), public, and agency scoping. Alternatives and actions that were considered but are not technically or economically feasible, do not meet the purpose of and need for the project, create unnecessary or excessive adverse impacts on resources, or conflict with the overall management of the park or its resources were dismissed from detailed analysis. These alternatives or alternative elements and their reasons for dismissal are discussed at the end of this chapter. Two alternatives are analyzed in this EA: the no-action alternative and one action alternative. A preferred alternative is the alternative that best accomplishes the purpose and need of the proposed action while fulfilling the statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. In this management plan, alternative 2 has been identified as the preferred alternative.

### **Alternative 1: No Action**

CEQ defines the no-action alternative as the alternative that represents no change from current management, and the analysis provides a baseline of continuing with the present course of actions (CEQ 1981). Under the no-action alternative, existing conditions along Laurel Falls Trail would persist, including in the parking area and at the falls viewing area.

The trail width would remain between 4 to 5 feet wide with deteriorated asphalt. Five culverts of various sizes and materials exist along the trail. Three metal culverts range from 8 to 18 inches wide, and two polyvinyl chloride culverts range from 8 to 10 inches wide and are either undersized or clogged with debris. Under the no-action alternative, there would be no changes to the existing culverts. No trailside rest areas would be provided, and visitor-created trails would continue to denude vegetation and increase erosion. Access to the falls viewing area would continue to be limited to the existing pedestrian bridge and rock area, which can be slippery. Parking would continue to be limited to the 29 striped parking spaces between two paved parking areas at the Laurel Falls trailhead, and an additional 10 unstriped parking spaces would continue to be available within a parallel parking area located just west of the trailhead on Little River Road. Under the no-action alternative, the park would not implement management strategies to reduce congestion on the trail. There would continue to be no bathroom facilities in the vicinity of the trail.

The park would continue to conduct periodic trail maintenance, but trail conditions would continue to deteriorate. Routine maintenance activities would include cutting and removing encroaching plant growth; removing blowdowns (fallen trees) that have blocked the trail; repairing erosion of the trail surface and cleaning out water drains when needed; performing in-kind maintenance, minor repairs, and/or replacement of trail structures such as drainage crossings; and removing hazard trees.

Parking capacity would continue to be insufficient to meet demand, and safety issues and visitor congestion concerns would persist. Photos depicting the existing trail conditions and parking areas are provided in figures 2 through 5.



**FIGURE 2. EXISTING TRAIL CONDITIONS AND OFF-TRAIL PEDESTRIAN PATH**



**FIGURE 3. EXISTING BRIDGE AT FALLS VIEWING AREA**



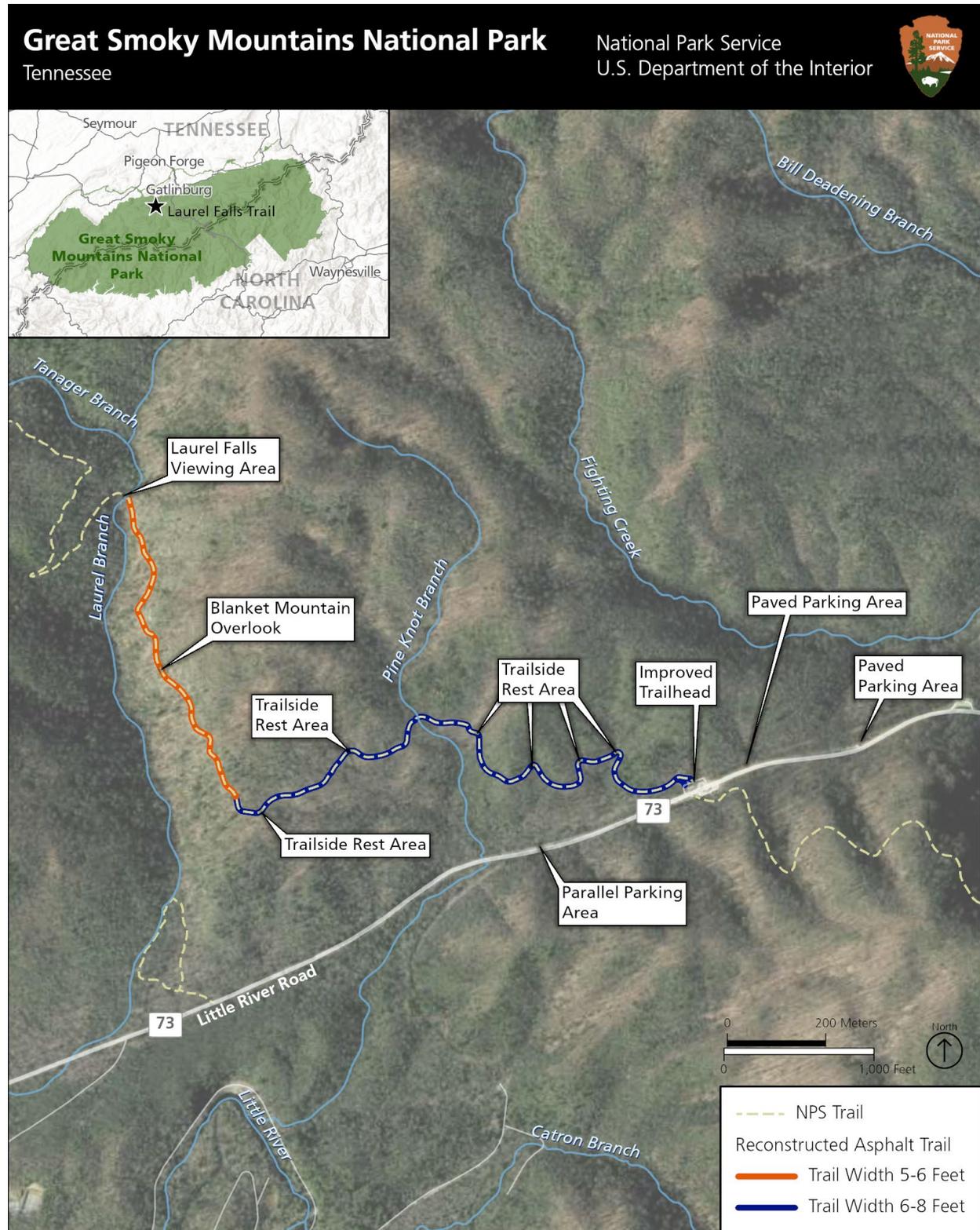
**FIGURE 4. CONGESTION AT THE FALLS AREA**



**FIGURE 5. LAUREL FALLS TRAILHEAD PARKING AREA**

## **Alternative 2: Proposed Action and NPS Preferred Alternative**

Under alternative 2, the NPS would implement improvements to the Laurel Falls Trail, parking area, and falls viewing area to address trail deterioration and congestion. As noted in chapter 1, Laurel Falls Trail is eligible for listing in the National Register as a historic district. Accordingly, the design for the trail improvements would follow the Secretary of the Interior's Standards for Rehabilitation. Further information about each proposed element is provided below. Figure 6 displays the location of the proposed elements.



**FIGURE 6. ALTERNATIVE 2: PROPOSED ELEMENTS**

The visitor experience stewardship engagement process yielded the following key features for a desirable visitor experience on the Laurel Falls Trail:

- Access to safety information before beginning the hike.
- A well-ordered flow of foot traffic to the falls.
- Adequate physical space and time to enjoy and perhaps take photographs of the falls.
- Available parking in designated spots.
- The ability to safely travel from their vehicle to the trailhead.

Participants in the engagement process also proposed various management practices to improve Laurel Falls Trail, including:

- Reducing or eliminating roadside parking.
- Charging a parking lot fee.
- Making repairs to the trail and falls viewing area.
- Increasing the presence of rangers and volunteers in the parking area and on the trail.
- Providing information about congestion conditions to the public.
- Providing alternative transportation to the trailhead from the surrounding gateway communities.

The park considered these recommendations when developing the preferred alternative, the desired conditions, and the visitor use management strategies.

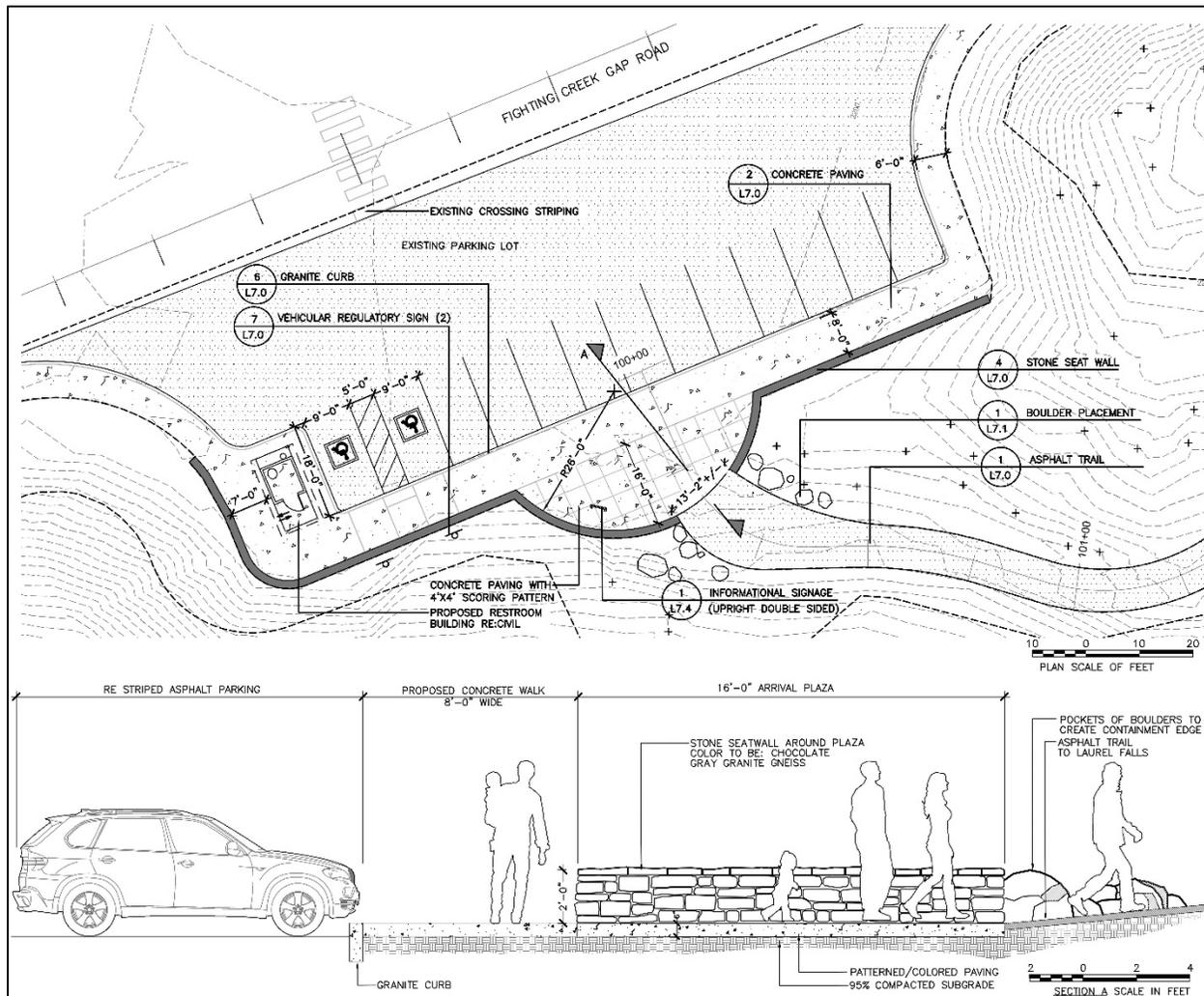
## **TRAIL REHABILITATION, TRAILSIDE REST AREAS, AND FALLS VIEWING PLATFORM**

### **Trail Resurfacing and Trailhead**

Under alternative 2, approximately 31,000 square feet (SF) (0.7 acres) of deteriorating, existing asphalt trail surface along the 1.3-mile trail would be removed and replaced. The resurfaced trail would be widened to 8 feet where possible to allow visitors to comfortably pass each other without stepping off the paved area. Trail widening would improve visitor circulation and reduce visitor-created trails and associated denuded vegetation. In locations constrained by steep drop-offs, rock outcrops, and existing trees, the paved trail surface would be widened to 5 to 6 feet. As a result of trail widening, the total asphalt trail surface would increase to approximately 47,000 SF (1.08 acres). The cross slope of the trail would provide positive drainage across the trail to allow stormwater runoff to flow directly off the paved surface. The improved trail would follow the existing alignment of the historical 1930s fire trail and match existing grades, which range from 4.5% to 16%. Five retaining walls totaling approximately 230 linear feet would be required in locations where the trail is widened. Two of the five retaining walls would be at the Laurel Falls viewing area and are discussed below. Additionally, in the six locations where the trail contains historical stone edging, those stones would be relocated to the new widened trail edge in the same location, or as close to the original location as possible. Similarly, the trail design would include 1,800 feet of rock batter (i.e., dry-stacked stone and rubble fill) walls on the downslope side of the trail to stabilize the slope and mitigate future erosion. The rock batter walls would be 1 to 3 feet tall and would be composed of local or imported, rough-hewn stone that is compatible with the existing historical stonework and setting. The rock batter would replace and supplement existing earthen fill. Widening the trail would disturb approximately 105,000 SF (2.4 acres) along the trail corridor, including the existing trail and denuded areas, and would remove approximately 120 to 160 trees that generally vary between 6 to 20 inches diameter at breast height (dbh). Over time, vegetative cover along the trail would recover through passive and active restoration, as described below in the “Restoration of Trailside Vegetation and Visitor-Created Trails” section.

The park would install new signage at the trailhead and along the trail to provide wayfinding, Leave No Trace practices, and safety (including bear activity/safety) information. Signage near the trailhead would include information about trail conditions, including distance, trail surface, and steepness, to allow visitors to make informed decisions before initiating their hike. Signage could be consolidated to minimize the number of signposts and provide a unified appearance.

The Laurel Falls trailhead area would be improved to include an arrival plaza with a 16-foot radius and tinted concrete to allow visitors more space to gather before their hike as well as an 8-foot sidewalk between the parking lot and the plaza (see figure 7). A stone seating wall would be built around the perimeter of the trailhead and plaza area to provide visitors a location to prepare for their hike while improving the separation of pedestrians and the parking area (as noted in figure 7). A single stall vault toilet would be installed adjacent to the parking lot.



**FIGURE 7. PROPOSED TRAILHEAD IMPROVEMENTS**

## Trailside Rest Areas

The park would construct five trailside rest areas where the existing trail makes sharp turns and conditions allow for widening to up to 12 feet. These areas are already highly impacted by off-trail visitor use (i.e., short-cutting and visitor-created trails). These trailside rest areas would improve circulation and allow visitors to pass one another without stepping off the trail and adversely impacting natural resources. They would also provide visitors with a place to rest and allow space for rangers to provide interpretive talks without affecting pedestrian flow on the trail. Stone walls would be provided for seating and to contain visitors. Containment edges along the trail would be constructed using stone retaining walls to reduce off-trail visitor use, protect vegetation, and reduce soil erosion.

A sixth, larger rest area with a 20-foot radius and tinted concrete is proposed 0.8 miles northwest of the trailhead. A stone retaining wall would provide seating and prevent visitor-created trails and increased erosion. This rest area would be sized for small gatherings and groups of visitors for educational/interpretive opportunities and could also serve as a staging area for emergency response, as needed. In total, the park would construct approximately 730 linear feet of stone seat wall ranging between 24 to 30 inches tall within the trailside rest areas. An example of a proposed trailside rest areas is displayed in figure 8.

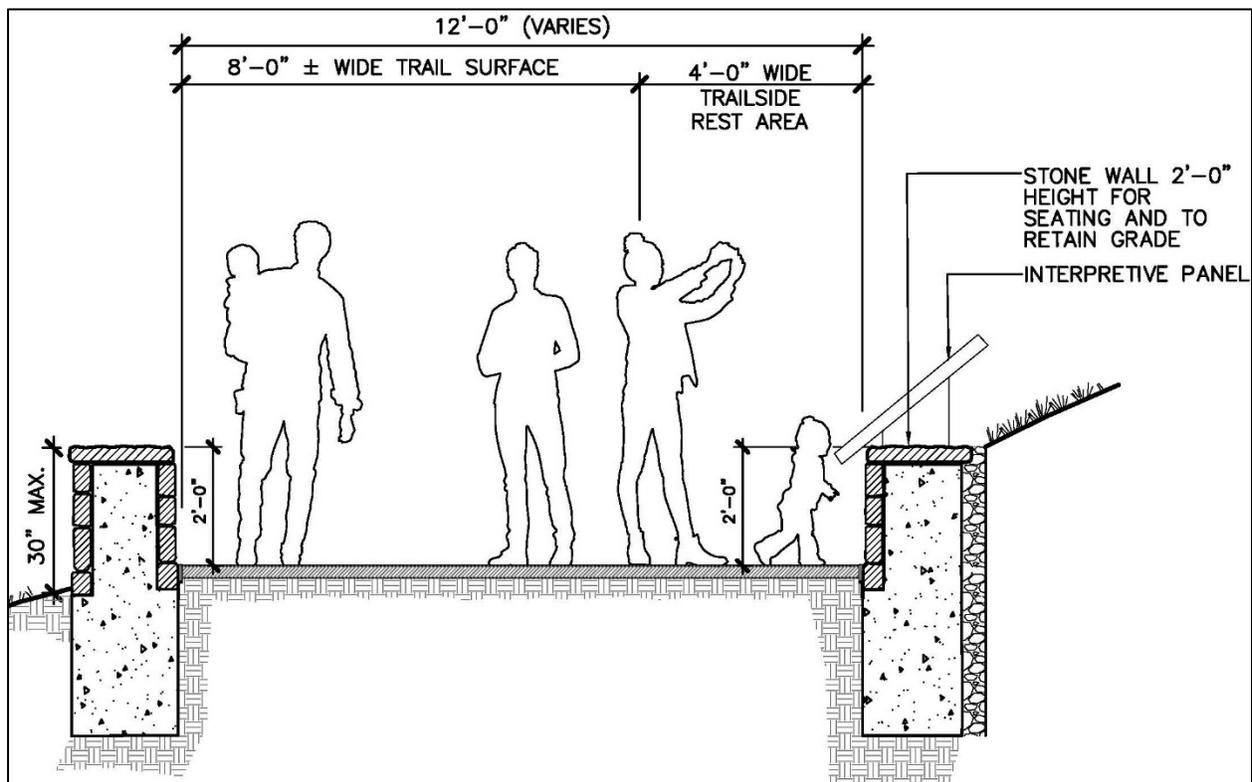


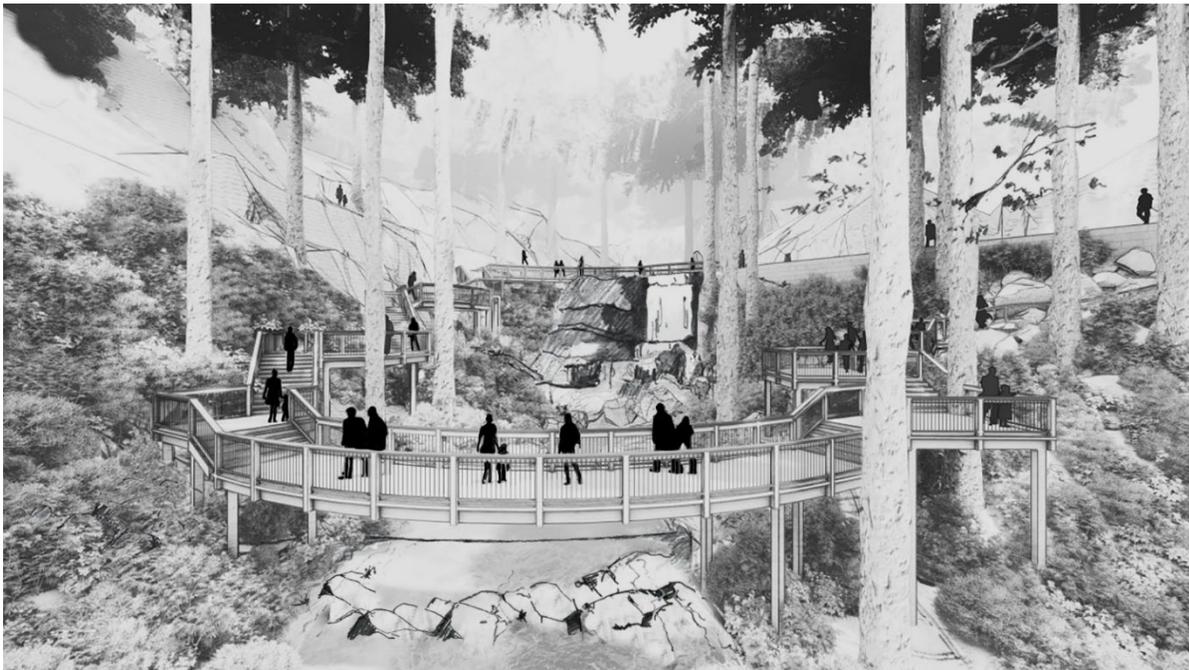
FIGURE 8. REPRESENTATIVE EXAMPLE OF A TRAILSIDE REST AREA

## Laurel Falls Viewing Area

At the falls, the NPS would construct a multitiered viewing area that includes five platforms and two bridges at the upper and lower falls, connected by walkways and stairs. The viewing area would encircle the lower falls and add stone steps with railings between existing boulders to transition visitors directly from the trail to the lower viewing platforms. The bridges and viewing platforms would create a looped trail around the falls area and approximately 2,350 SF of viewing decks for visitors. The existing concrete

bridge (figure 3) at the upper falls area would be replaced with a longer (35 feet) and wider (12 feet) concrete bridge that would allow for two-way pedestrian traffic. The deck of the new bridge would be slightly higher than the deck of the existing concrete bridge. The bridge would serve as a new viewing platform with railings and would be constructed on top of the bedrock that visitors are currently using as a viewing area and where slips and falls commonly occur. The new upper falls viewing area would provide visitors a safe location to view and photograph the upper and lower falls. Existing visitor-created trails leading to the lower falls would also be formalized as a series of steps and platforms to provide safer access, improve pedestrian flow, and offer more opportunities to view the upper and lower falls. As noted above, stone steps between the existing boulders would transition visitors directly from the trail to a series of platforms. The viewing area would descend below the falls and cross over the Laurel Branch before traversing back up the opposite side, where there would be additional steps and multiple platforms.

Materials used to construct the viewing area would include wood posts and rails with metal pickets, wood decking, wood risers and fiberglass reinforced plastic treads for the steps, and a steel frame with concrete and steel columns. The bridge over the lower falls area would be approximately 55 feet long. Column placement for the bridge would be determined during the final design process. Based on in-progress designs, up to four 27-inch-diameter concrete columns could be installed within the channel of Laurel Branch. To stabilize the slope along the trail just east of the falls, two mechanically stabilized earth walls (modular block retaining walls with stone veneers) would be constructed to replace existing timber and stone retaining walls. The new masonry walls with stone veneer would replace remnants of historical stone retaining wall segments that failed and have required various repairs over the decades. One wall would be approximately 35 feet long and 7 feet tall, while the second wall would be 85 feet long and 15 feet tall. Figures 9 through 10 provide examples of what the viewing area may look like.



**FIGURE 9. LAUREL FALLS VIEWING PLATFORM**

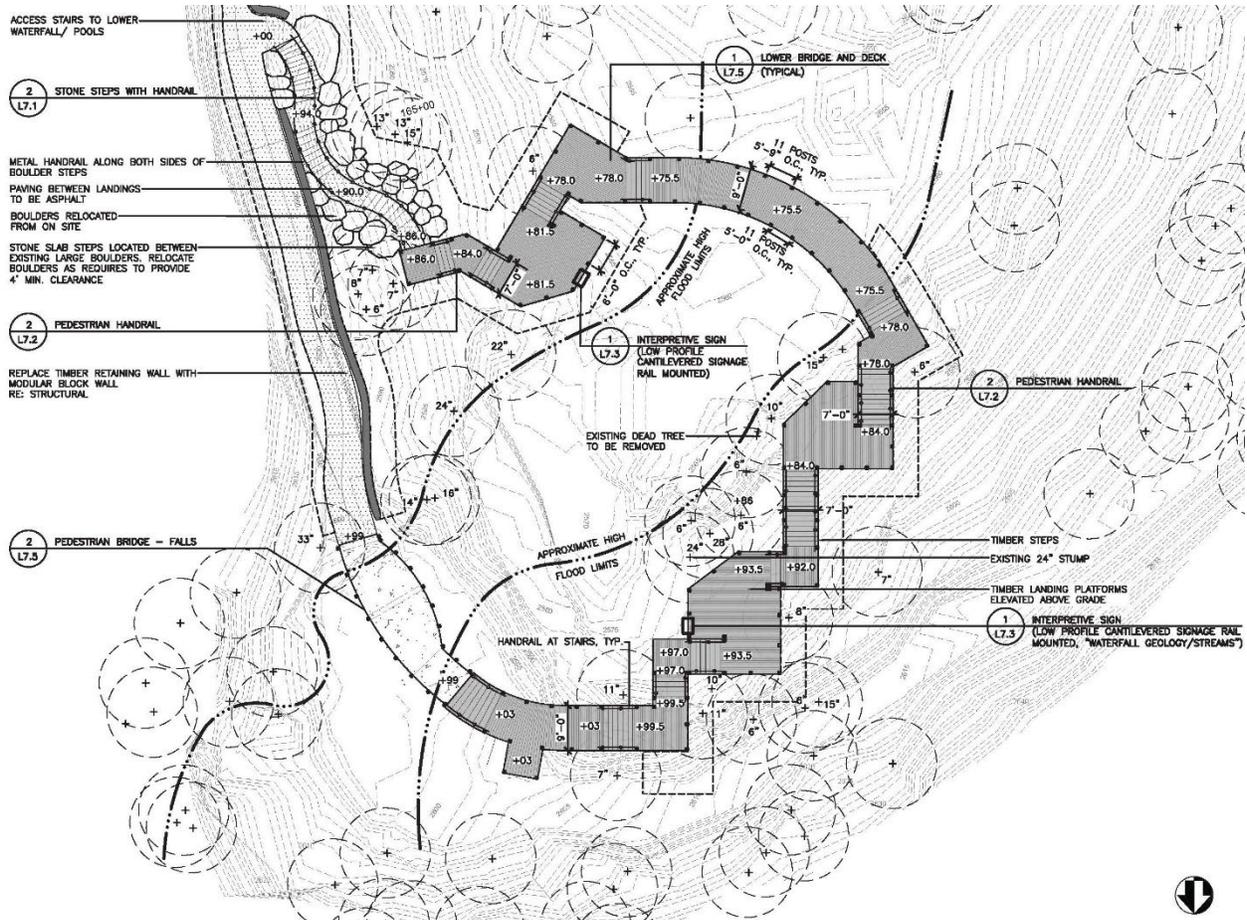


FIGURE 10. LAUREL FALLS VIEWING PLATFORM – AERIAL VIEW

### Blanket Mountain Overlook

The park would construct a smaller overlook of approximately 70 SF about 1,300 feet east of the falls where the existing tree canopy opens to provide long-distance views of the park, including Blanket Mountain. The overlook would provide interpretive material and allow visitors to pause to enjoy the view or take photos while not being directly on the trail corridor. The overlook would be constructed using similar materials as the Laurel Falls viewing area (figure 11).

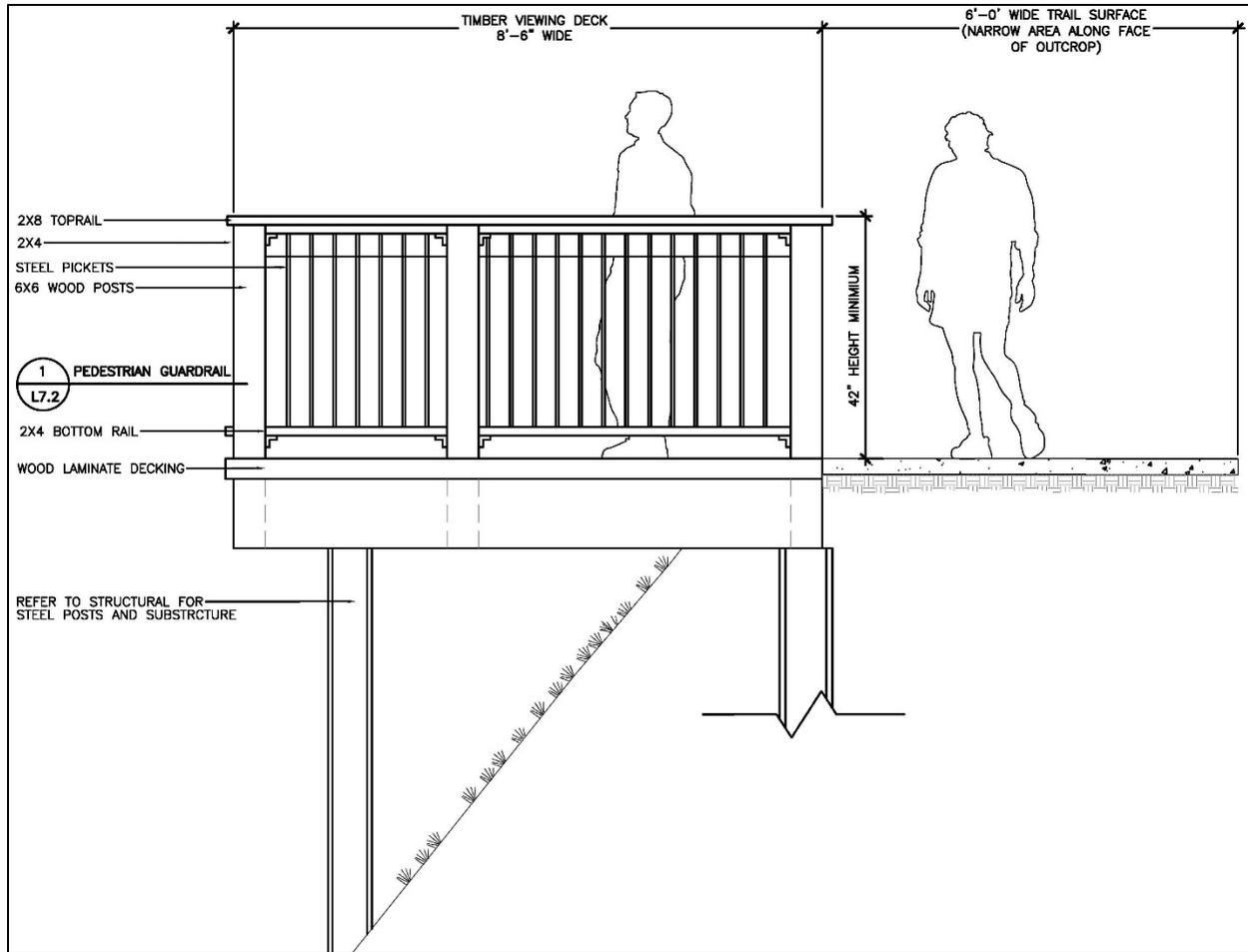


FIGURE 11. BLANKET MOUNTAIN OVERLOOK

### Drainage Improvements

Under alternative 2, the park would replace four of the five existing drainage culverts under the Laurel Falls Trail with new, appropriately sized, reinforced concrete pipe (RCP) culverts (18-inch diameter minimum) to improve water flow and reduce clogging with debris and sediment. The fifth culvert that crosses the Pine Knot Branch would be removed, and the park would install a new three-sided box culvert that would allow the bottom of the waterway to remain in its natural state after the existing culvert is removed. For the two existing culverts with stone headwalls, the headwalls would need to be partially deconstructed to install the new culverts. The headwalls would then be reconstructed with the original stone to match the existing stone headwalls. The park would also install five trench drains constructed near trailside rest areas or where water seasonally crosses over the existing trail.

### Restoration of Trailside Vegetation and Visitor-Created Trails

After construction is complete, the park would implement measures to restore the trailside vegetation that has been impacted by existing visitor use and during construction. A site-specific vegetation restoration plan would be developed as part of the design; however, a variety of restoration methods could be used. In general, soils would be aerated to loosen areas that have been compacted by pedestrian use. Pinning logs with topsoil, small native seedlings, and leaf litter could be used in areas of steeper slopes along the trail. Trees removed as part of the trail widening would be left in place downslope of the trail and could be used to help prevent visitors from going off-trail. Areas of fill greater than 4 feet would be seeded and

covered with leaf litter collected from areas adjacent to the trail or other weed-free cover material. In larger, flat areas, wood chips from felled trees could also be used. Similarly, weed-free hydromulch could be used to cover seeding in the disturbed areas surrounding the parking areas.

## **PARKING IMPROVEMENTS**

### **Existing and Proposed Parking Lots**

Under alternative 2, designated parking areas to support Laurel Falls and Sugarland Mountain trailheads would be expanded to accommodate approximately 50 additional vehicles. The park would construct two new asphalt parking areas to the east of the Laurel Falls trailhead on the same side of Little River Road as the trailhead. The first parking area would be built approximately 450 feet west of Maloney Point and would accommodate about 44 parking spaces (approximately 16,000 SF of permanent disturbance). Parking in undesignated areas at this location has occurred for many years and has denuded vegetation. While the park placed gravel over the dirt surface, soil erosion continues. Most of the proposed parking area would be constructed in this previously disturbed location. Construction would require grading and filling to reduce the steepness of the site and a series of retaining walls, varying in height from 2 to 20 feet. The portions of retaining walls visible from the road would be faced with stone veneer that matches the existing stone along Little River Road. Additionally, approximately 1,000 linear feet of underground utilities in the vicinity would be relocated from the north side of Little River Road to the south side. All utility work would occur within the existing roadway.

A second parking area would be built approximately 200 feet east of the Laurel Falls trailhead parking and would accommodate about 10 parking spaces (approximately 4,000 SF of permanent disturbance). This area is mostly a previously undisturbed site with turfgrass and some trees. Construction for this parking area would require excavation (cut) of the adjacent slopes and retaining walls with a stone veneer, ranging in height from 2 to 10 feet.

Both parking areas would include stone curbs to match the existing stone along Little River Road. The park would construct a designated pedestrian pathway to the trailhead, using concrete around the parking areas and asphalt along the roadside. Alongside the roadway, a wooden guardrail would be installed to keep pedestrians and motor vehicles separated. A wall on the back side of the pathway in the parking areas would be constructed to keep vehicles and pedestrians safely within the designated areas.

In addition to the two new parking areas, the parallel parking area west of the existing trailhead would be slightly widened, should future funding become available, to provide more room for people to exit their vehicles. Widening this location would temporarily disturb approximately 5,000 SF and would increase the current paved area by 1,200 SF.

Figures 12 through 14 provide the proposed layout of each parking area.

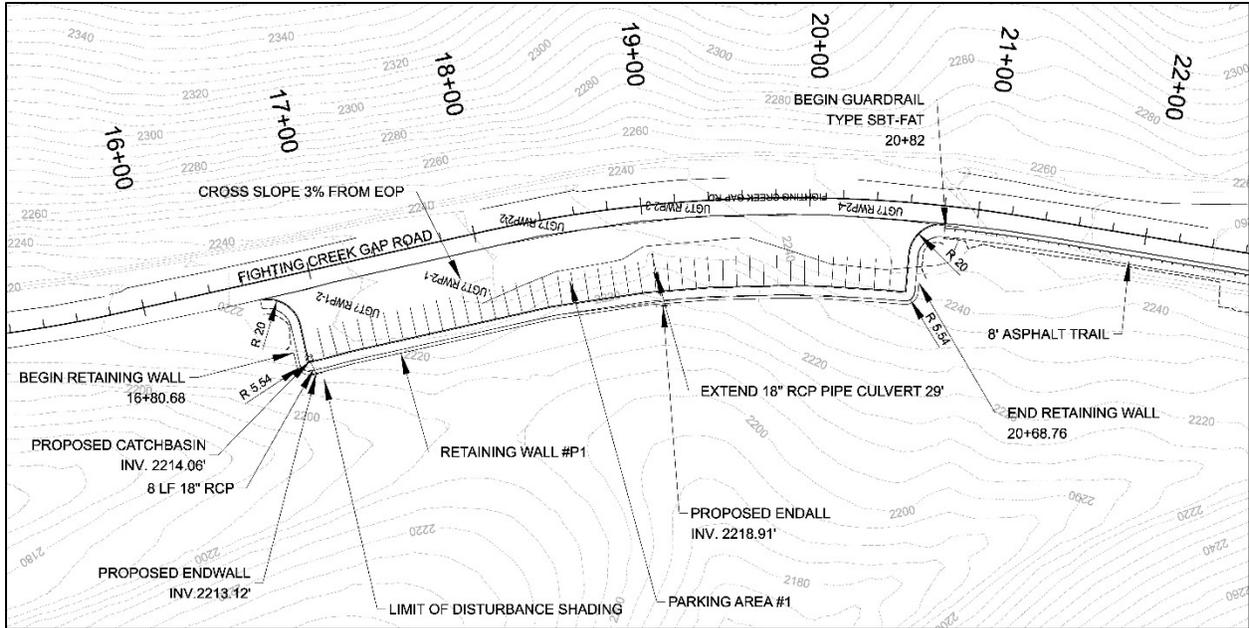


FIGURE 12. PROPOSED PARKING AREA 1

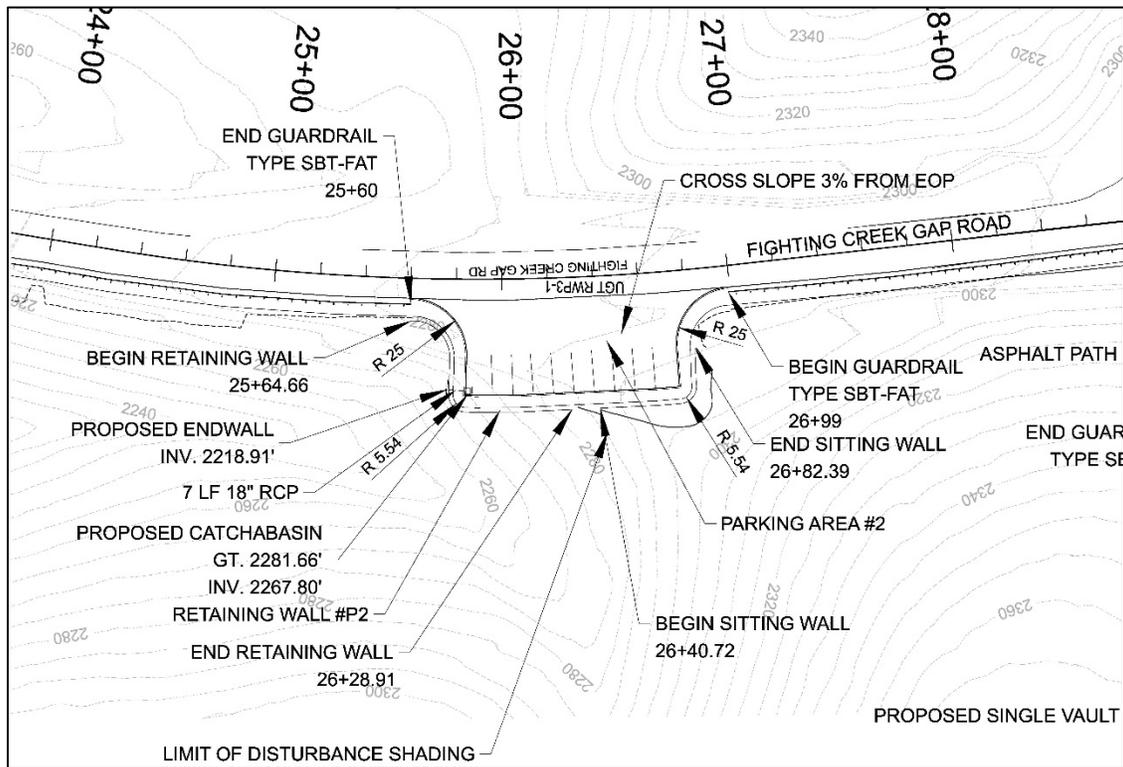
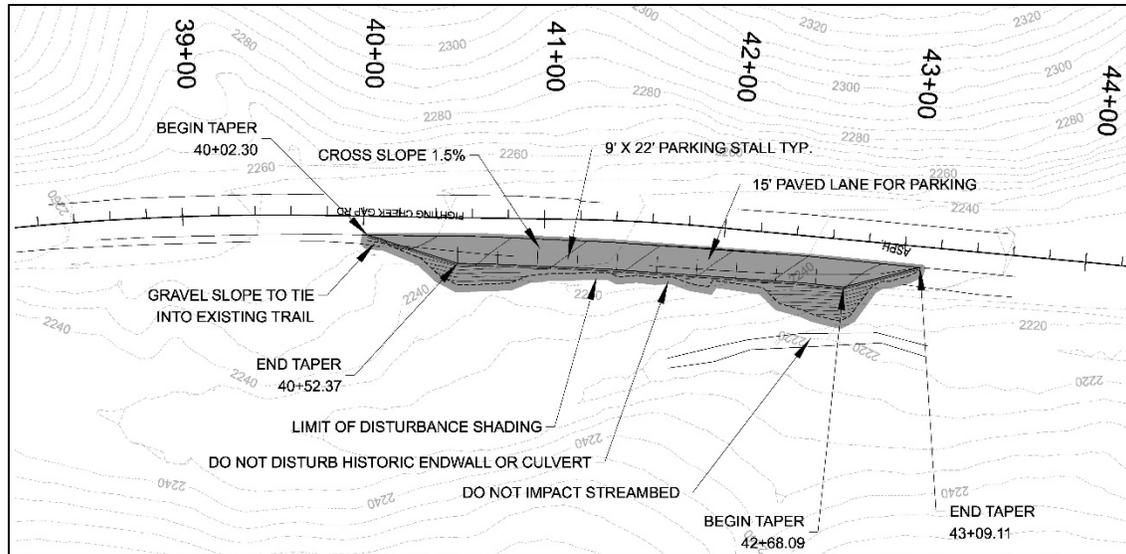


FIGURE 13. PROPOSED PARKING AREA 2



**FIGURE 14. WIDENED PARALLEL PARKING AREA**

The existing parking areas would be used as staging areas during the construction period and would be repaved and restriped once construction is complete, resulting in 27 parking spaces including 2 accessible parking spaces. The existing parking lot would also be restriped to provide a designated area for shuttle drop-off/pickup alongside Little River Road, in the area that is currently used for undesignated parallel parking (see figure 15, below, under “Visitor Use Management Strategies”).

In total, parking improvements under alternative 2 would provide approximately 50 additional designated parking spots for a total of 90 designated parking spots for visitors to the Laurel Falls Trail and Sugarland Mountain trailhead. As noted above, after construction is complete, the park would restore roadside areas that have been denuded as a result of unofficial visitor parking and visitor-created trails.

### **CONSTRUCTION AND ROUTINE TRAIL MAINTENANCE**

During construction, the 1.3-mile section of the Laurel Falls Trail and existing trailhead parking areas would be closed for up to 18 months, and the trail surface would be removed, widened, and regraded to include a stone subbase. The newly widened trail and gravel surface would then be used to transport and stage equipment/materials for improvements to the falls area. In general, construction supplies would be delivered to the trailhead and stockpiled in the existing parking areas. Asphalt would be brought to the trail using equipment that can operate in narrow spaces. Parking and trail construction may not occur at the same time, pending park funding availability.

Preventive and routine maintenance activities along the trail would be completed according to park maintenance standards and as described under the no-action alternative. The durability and availability of materials as well as safety in a wet environment were identified as priorities during the planning and design process in consideration of future maintenance needs. Additional maintenance activities under alternative 2 would include inspection of the railings and viewing platforms for needed repairs or vandalism and to address any damage from fallen trees, consistent with industry standards and existing operations.

## DESIRED CONDITIONS, INDICATORS, THRESHOLDS AND VISITOR CAPACITIES

Under alternative 2, the park would establish site-level desired conditions, indicators, and thresholds as well as visitor capacities (see appendix A) developed in accordance with the Interagency Visitor Use Management Council, Visitor Use Management Framework (IVUMC 2016).

### Desired Conditions

Desired conditions are defined as statements of aspiration that describe resource conditions (including fundamental resources and values), visitor experiences and opportunities, and facilities and services that an agency strives to achieve and maintain in a particular area. Desired conditions describe what conditions, outcomes, and opportunities are to be achieved and maintained in the future, not necessarily what exists today. Desired condition descriptions help to outline what a particular area will look, feel, and sound like, and how it will function in the future.

Desired conditions correspond to natural and cultural resources, visitor experience, types and levels of development, and commercial visitor services. Detailed descriptions of desired conditions were developed based on comments received during the visitor experience stewardship process, a review of earlier planning efforts for Laurel Falls Trail rehabilitation, discussions with park staff, and information provided in the foundation document (NPS 2016a). Desired conditions for the Laurel Falls areas are described below.

#### *Visitor Experience*

- Visitors can access the trailhead from the parking lot in a way that minimizes dangerous interactions with vehicular traffic.
- Visitors with different social interaction preferences can experience the trail and the falls.
- Visitors who seek less frequent interaction with people can do so by visiting the trail during times of lower visitation.
- Visitors have a high-quality experience that is not substantially degraded by crowding or safety concerns.
- Visitors with different levels of experience, fitness, equipment, and time can enjoy a high-quality hiking experience.
- Visitors are able to stop and rest along the trail at appropriate intervals.
- Visitors are able to experience the falls through multiple appropriate modes: seeing the falls, hearing the rumble of the falls, and feeling the mist of the falls.
- Visitors have the opportunity to learn about and connect with natural and cultural resources as part of their Laurel Falls experience.
- Visitors experience forest and stream ecosystems where natural processes predominate.

#### *Natural Resources*

- Native vegetation, water resources, and other natural resources are maintained and restored where appropriate and feasible.
- Laurel Branch has well-developed riparian vegetation and largely intact streambanks.
- Mountain laurel (*Kalmia latifolia*) is protected and preserved.
- Trailside resources experience minimal resource degradation through social trail creation, vegetation damage, litter, and other resource impact behaviors.

- Interactions between humans and bears are minimized so that bears remain wild, and bears and humans are not harmed.

#### *Cultural Resources*

- Impacts from visitor use in the Laurel Falls Historic District, which is eligible for listing in the National Register are minimized.
- Visitors have the opportunity to learn about the history and significance of the Laurel Falls Trail Historic District. Through interpretation and education, visitors can learn how the trail was constructed in 1931 as a fire track to access Cove Mountain, and how the trail landscape, visitor use patterns, and visual character of the area have evolved over time. Visitors will understand how the trail's construction and evolution are representative of early NPS naturalistic design principles.

### **Indicators and Thresholds**

Indicators translate desired conditions into measurable attributes that when tracked over time may be used to evaluate changes in resource or experiential conditions and are considered part of the preferred alternative. NPS considered the central issues and developed related indicators that would help identify when the level of impact becomes cause for concern and management action may be needed. The indicators described in the following sections were considered the most critical, given the importance and vulnerability of the resource or visitor experience affected by types of visitor use.

Thresholds represent the minimum acceptable condition for each indicator and were established by considering qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, professional judgment of staff from management experience, and public preferences. Although defined as “minimally acceptable,” thresholds still represent acceptable conditions. Establishing thresholds does not imply that no action would be taken prior to reaching the threshold. Thresholds identify when conditions approach unacceptable levels and serve as mechanisms to alert managers and the public that corrective action should be taken to keep conditions acceptable. Ultimately, indicators and thresholds provide managers with good monitoring protocols to allow desired conditions to be met and tracked over time. For a complete description of the proposed indicators, thresholds, monitoring protocols, and management strategies for Laurel Falls Trail, refer to appendix A. Not all strategies related to the indicators, thresholds, and visitor capacity would be implemented immediately; instead, these would be implemented only as thresholds are approached or exceeded. The impact analysis is included in chapter 3 so that the park can employ those strategies as necessary to achieve desired conditions.

### **Visitor Capacity**

Visitor capacity is a component of visitor use management defined as the maximum amount and types of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences, consistent with the purpose for which the area was established (as well as goals and objectives for this plan).<sup>1</sup> By establishing visitor capacities and implementing appropriate management strategies, the NPS can help ensure that resources are protected and visitors have the opportunity for a range of high-quality experiences.

Park staff collected data on the amount and timing of visitor use in the area. After careful analysis of these data, the park recognized that the maximum observed count of visitors was more than the area could

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<sup>1</sup> To fulfill the requirements of the 1978 National Parks and Recreation Act (54 United States Code 100502), visitor capacity identifications and implementation strategies are legally required for all destinations and areas that this planning effort addresses (IVUMC 2016).

accommodate at once without adverse impacts on resources and the visitor experience, and a significant decrease from the maximum number of visitors at one time was necessary to achieve the desired conditions. However, because the various management strategies and new trail design aim to disperse people and minimize impacts to the resources, the park estimated that Laurel Falls could sustain periods of visitor use that exceed the average observed during peak hours. As a result, the park determined a capacity of 450 people at one time would help achieve desired conditions. Appendix A details visitor capacity considerations and the process used to identify visitor capacity for the Laurel Falls area (which includes both the trail and the falls).

## **VISITOR USE MANAGEMENT STRATEGIES**

Under alternative 2, the park would employ a variety of management options to maintain desired conditions and meet the identified visitor capacity. Some management strategies, like trail improvements, construction of additional parking, improved wayfinding, inclusion of a vault toilet, and protection of park resources, are described above. Broader management strategies also include visitor education regarding the desired conditions, Leave No Trace practices, resource protection measures for Laurel Falls, availability of other hiking opportunities, and trying to disperse visitation by encouraging visitors to visit the trail earlier or later in the day or during the off-peak season. Proactive management strategies would also include monitoring for off-trail use and increasing monitoring if impacts from visitor-created trails continue or increase as well as increasing enforcement for roadside parking and littering.

The park would implement several strategies to manage visitor capacity at Laurel Falls Trail. As discussed in chapter 1 in the “Relationship to Other Planning Efforts” section, the park has already implemented a separate project to substantially reduce unsafe roadside parking. This project effectively eliminated about 254 unofficial, de facto parking spaces in the Laurel Falls area and is expected to help reduce congestion on the trail and at the falls. Construction of two new parking areas described above would add 50 spaces. With roadside parking substantially reduced and new parking constructed, park staff estimate that parking demand would continue to exceed parking capacity, and trail use would be below the proposed visitor capacity. As outlined below, shuttle service and a parking reservation system could be used to address the gap between available parking and visitor capacity.

### **Shuttle Service**

A shuttle service could provide additional visitors access to the site beyond those who access the site via personal vehicle. NPS, a nonprofit partner of the park, a commercial entity, or a combination of partners would own and operate the shuttle. If the shuttle system required NPS financial investment, Director approval would be required (NPS 2006). See appendix A for additional information regarding the shuttle service.

A commercial use authorization (CUA) is the legal instrument for park-approved business entities including nonprofit organizations to operate in the park. NPS issues authorizations for commercial operations in the park not covered by a concessions contract. If there is sufficient interest, the most time efficient means of implementing a shuttle system would be through a CUA holder. If CUA holders do not deem the service to be profitable, the park may investigate other means of providing a shuttle service.

The shuttle route could be part of multiple existing shuttles that already operate within the park with potential for other stops to be added as deemed necessary. Parking for the shuttle would be outside park boundaries because parking at the visitor center and other facilities inside the park is already often over capacity.

A fee may be charged for the shuttle service. Shuttle service may be reserved through the third-party provider and/or may be offered on a first-come, first-served basis. Limiting shuttle service to advanced reservations only could be a means of controlling capacity if necessary. For example, if monitoring indicates that the area is exceeding visitor capacity, the number of people per shuttle could be reduced or

the interval between each shuttle could be increased. Pulsing large numbers of visitors to the site would be avoided by using smaller vehicles. Existing parking areas would be restriped to accommodate shuttle pickup and drop-off locations (figure 15).

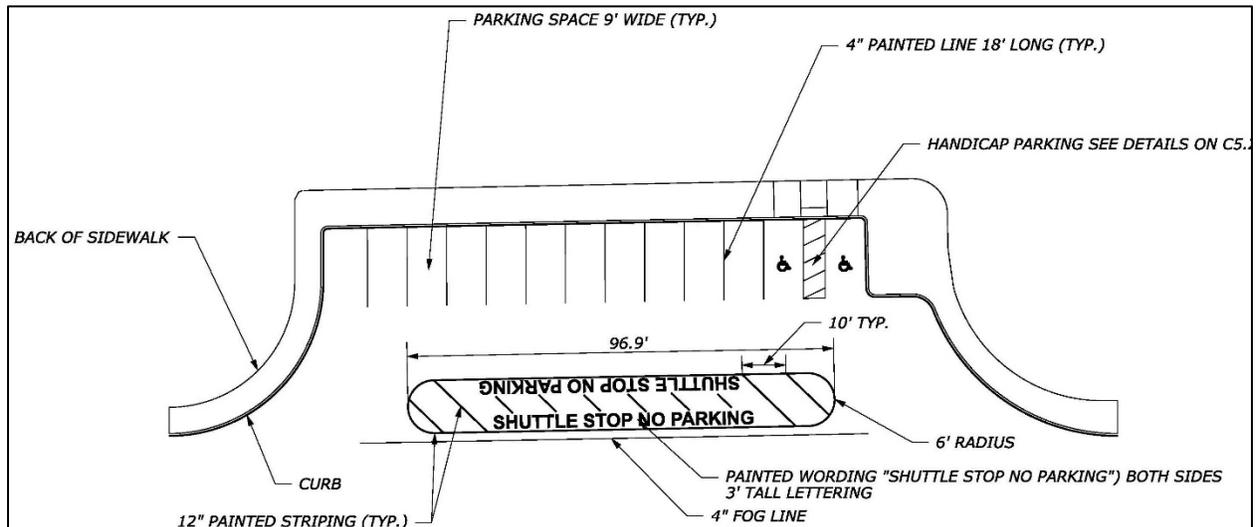


FIGURE 15. PROPOSED PARKING AREA SHUTTLE STRIPING

### Timed-entry Parking Reservation System

Park staff would actively manage access to Laurel Falls Trail by establishing a timed-entry parking reservation system for all modes of motorized access. Reservations for parking spaces would include all trailhead parking areas associated with the Laurel Falls Trail.

Reservations are unlikely to be required for all months of the year. Reservations would initially be required only for periods of peak visitation; this period would be adjusted as needed based on monitoring of indicators and visitor use. If visitation during months when reservations are not initially required begins to consistently exceed capacity, reservations may become a requirement. A fee may be required for a parking reservation ticket to cover the cost of operating the reservation system. Parking reservation tickets would be obtained through a third-party operator for a nominal transaction fee. Currently, the cost of operating a reservation system on recreation.gov is approximately \$2 per transaction.

The number of reservations released by the system would be managed to maximize capacity while maintaining desired conditions. A percentage of reservations would be set aside for short-term purchase (i.e., day of, day before, week of). After initial implementation of the reservation system, the number of reservations or the length of time a parking reservation is valid would be adjusted to ensure the highest possible use of the existing parking supply while avoiding parking-related congestion. This would allow park staff to manage to desired conditions within related thresholds and identified visitor capacities.

While Laurel Falls is the primary destination for visitors parking near the Laurel Falls trailhead, the reservation system would also accommodate users of the trail beyond the falls, users of the Sugarland Mountain Trail, and backcountry permit holders. The block of time (entry and exit time) for the parking reservation is one means by which users seeking access to areas and trail sections other than the falls would be accommodated. For example, while the most common reservation window may be designed to accommodate short hikes to the falls and back, half-day and full-day reservation windows could also be provided to accommodate other uses.

## Mitigation Measures

- Conduct tree and vegetation clearing between November 15 and March 31 to avoid impacts on federally listed bats and nesting birds unless otherwise approved by the NPS.
- Implement a project-specific revegetation plan, to include at a minimum: (1) locations of revegetation sites, (2) soil preparation needs such as aerification and decompaction, (3) locations and details for any needed topsoil storage, (4) plant species/seed mixes to be used, (5) time of year that the seeding would occur and the methodology of the seeding, (6) any needed measures to control invasive vegetation including but not limited to those measures described below, and (7) post-construction monitoring and control for invasive plants for one to three years.
- Implement measures to stop further spread of invasive plants into and out of the project area, including:
  - Clean all earth-moving and seeding equipment prior to entering park lands.
  - Use only topsoil, rock, sand, gravel, or other natural materials from park-inspected and approved sources.
- Implement sediment- and erosion-control measures consistent with the permitting requirements and recommendations contained in the Tennessee Department of Environment and Conservation's (TDEC) *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012). File a Notice of Intent with TDEC to obtain coverage under the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activities (Permit Number TNR100000). Develop a site-specific stormwater pollution prevention plan in accordance with Part 3 of the General Permit that would:
  - Specify erosion-control materials that are weed-free, pest-free, and do not pose an entanglement risk to wildlife. Use natural fiber logs or fascines and natural fiber blankets that are certified as weed-free. Prohibit specific materials in the park, including (1) imported hay bales, straw bales, wood chips, or mulch; and (2) all forms of plastic/synthetic mesh netting, including those that are labeled as biodegradable or photodegradable.
  - Include provisions for removal of temporary erosion and sediment control measures after vegetation is established and the site is stable.
- Require the contractor to develop and adhere to a spill prevention control and countermeasures plan during construction.
- Adhere to the Best Management Practices and Conditions included in appendix 2 of NPS Procedural Manual 77-1 (NPS 2016b) and the terms and conditions of the TDEC Aquatic Resource Alteration Permit and US Army Corps of Engineers section 404 permit, if applicable, to minimize any potential impacts on streams and wetlands during any in-water work, including removal of the concrete bridge and culvert replacement.
- Temporarily stop work and immediately notify the Superintendent and Park Archeologist if cultural resources are inadvertently encountered during the project. Do not proceed with work until authorized by the Superintendent, in consultation with the Park Cultural Resources Program Manager or the Park Archeologist. Apply the discovery process defined by 36 CFR 800.13, the implementing regulations for the National Historic Preservation Act (16 United States Code [USC] 470). Evaluation of the discovery's significance would include consultation as appropriate with the state historic preservation office, the Advisory Council on Historic Preservation, and all Tribes associated with the park. If human remains, funerary objects, sacred objects, or objects of cultural patrimony were discovered, the process defined by 43 CFR 10.4-5, the implementing

regulations of the Native American Graves Protection and Repatriation Act (25 USC 3001), would be applied.

- Close the project area to visitor use during the construction period.
- Require the contractor to remove food trash daily or use a bear-proof dumpster.
- Implement measures to preserve historical stone materials, including:
  - Avoid disturbance of historical stone trail edging materials, where feasible. Record, remove, and stockpile historical stones prior to construction in areas where historical stone edging could be disturbed by trail grading, trail repaving, or other construction activities. Following construction, reset historical stones at the new trail edge in the same location or as close to the original location as possible.
  - Avoid disturbance of historical stone retaining walls, where feasible. Record, number, remove, and stockpile the top course or the top two courses of each historical stone retaining wall prior to construction in areas where historical stone retaining walls could be disturbed by trail grading, trail repaving, or other construction activities. Following construction, reset historical stones in their original location.
  - Prior to construction, salvage stones associated with the two remnant historical stone retaining walls that are not structurally sound and require replacement. Use salvaged stones in support of other trail improvements, including rock batter and stone headwall locations.

As outlined in chapter 4 “Consultation and Coordination,” additional mitigation measures for cultural resources may be developed as part of the ongoing National Historic Preservation Act section 106 consultation process.

## **Alternatives Considered but Dismissed**

During development of conceptual designs, additional alternative elements were considered. When discussing the appropriate trail width, the team explored options that retained the existing trail width as well as an option that widened the entire 1.3-mile trail section to 8 feet. Retaining the existing width did not meet the purpose and need of the project (i.e., improve pedestrian flow and reduce safety risks at the trailhead, along the trail, and at the falls), while widening the entire trail width to 8 feet resulted in unacceptable impacts on park resources and increased construction costs. A second loop trail was explored but dismissed due to the need for additional funding and the additional vegetation clearing that would be required. Similarly, the NPS interdisciplinary planning team analyzed four different layouts for the falls viewing area in a value analysis, using a choosing by advantages process (NPS 2021a). The falls viewing area layout proposed in alternative 2 was identified as the preferred layout based in part on the following advantages relative to the other alternatives: better improvement in life safety and access for emergency response; significantly better visitor flow/circulation and creation of viewing opportunities; and much better interpretative opportunities. The team explored the potential of making the trail more accessible in terms of trail slopes and grade; however, the topography and geographic constraints limit the ability to reduce the grade in multiple locations along the trail.

## **CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

This chapter describes the affected environment and analyzes the potential environmental impacts of each alternative for the resources described below. The affected environment describes existing conditions for those elements of the human environment that would be affected by the implementation of the alternatives considered in this EA. Impacts on each of these resources are then analyzed in the “Environmental Consequences” section for each alternative.

### **Issues and Impact Topics**

NPS identified a range of issues and impact topics to evaluate in this EA. Several issues were also eliminated from further consideration. The *NEPA Handbook* provides specific guidance for determining whether to retain issues for detailed analysis. Issues should be retained for consideration and discussed in detail if:

- the environmental impacts associated with the issue are central to the proposal or of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue (NPS 2015).

Issues carried forward for detailed analysis, which are discussed later in this section, fall under the following impact topics:

- Visitor Use and Experience
- Vegetation
- Special Status Species - Bats
- Historic Districts

If none of the considerations above apply to an issue, it was dismissed from detailed analysis. Issues and impact topics dismissed from detailed analysis, including dismissal rationale, are provided below.

### **TOPICS DISMISSED FROM DETAILED ANALYSIS**

#### **Air Quality**

The project area is located in Sevier County, which is in a maintenance area for the 1997 ozone standard. Trail construction would require the use of vehicles and motorized equipment that could contribute emissions that affect local air quality; however, impacts from construction would be temporary. No long-term impacts on air quality are anticipated. Impacts on air quality are not central to the proposal, and this impact topic was dismissed from further analysis.

#### **Wildlife**

The alternatives would have minimal, temporary and long-term impacts on aquatic or terrestrial wildlife in the area, as described in detail below. As a result of minimal habitat disturbance and because all work

would occur along corridors with an already active pedestrian and vehicular presence, wildlife was dismissed from further analysis. Temporary impacts would occur during construction, which would likely occur between November 15 and March 31 to avoid impacts on federally listed bats and migratory birds. A detailed analysis on potential impacts on bats is provided within this chapter under the “Bats” section.

#### *General Wildlife*

Long-term impacts on terrestrial wildlife would be minor and similar to existing conditions. Wildlife in the area are habituated to continual human presence and noise during daylight hours along the trail corridor and near the falls viewing area; wildlife are also habituated to vehicular noise near Little River Road. Neither the level of human activity nor vehicular traffic would be noticeably altered by the project. Up to 160 trees and an additional 0.5 acres of potential habitat would be removed during the construction period. However, all proposed actions would occur in areas either already disturbed and denuded of vegetation or adjacent to highly active road and trail corridors where habitat quality is lower due to road activity and human disturbance. In comparison to the surrounding available habitat, the impacted habitat area would be minimal and insignificant. Furthermore, following project construction, disturbance to and trampling of wildlife habitat by off-trail visitor travel would be reduced because the wider trail and retaining walls would accommodate more people and discourage the need for shortcuts or visitor-created trails.

#### *Migratory Birds*

More than 200 species of resident and migratory birds have been documented at the park, many of which could occur in the project area (NPS 2023). Noise during construction could temporarily disturb or displace birds. Any displaced birds would likely use similar habitats elsewhere in the park. Tree removal would result in a slight loss of canopy cover and nesting habitat over the long term. In comparison to the surrounding available habitat, the impacted habitat area would be minimal and insignificant. Tree removal would be conducted from November 15 to March 31, which is outside the nesting season for most migratory birds. According to information obtained from the US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system, 10 migratory bird species that are considered Birds of Conservation Concern, or that the USFWS considers warrant special attention, could occur in the project area. Tree removal would be conducted outside the period when all of these species are likely to be present.

#### *Federally Listed Species*

Based on a review of the USFWS IPaC system on April 20, 2023, eight federally listed endangered species have the potential to exist in the project area. As noted above, three bat species are carried forward for detailed analysis in this EA. Additional federally listed endangered species with the potential to exist in the project area include one threatened fish (snail darter [*Percina tanasi*]), two endangered clams (finerayed pigtoe [*Fusconaia cuneolus*] and oyster mussel [*Epioblasma capsaeformis*]), one experimental population bird (whooping crane [*Grus americana*]), and the monarch butterfly (*Danaus plexippus*), which is a candidate for listing.

The snail darter, finerayed pigtoe, and oyster mussel inhabit rivers larger than Laurel Branch and are therefore not anticipated in the project area, although suitable habitat may occur more than 13 miles downstream in Little River. Downstream of the park, the Little River sustained one of five known finerayed pigtoe populations, which was listed under the Endangered Species Act (ESA) in 1976. Impacts on aquatic species would be negligible, as detailed below, and the use of mitigation measures would eliminate the potential for indirect impacts to the snail darter and both clam species; therefore, they were dismissed from further analysis.

Whooping cranes have been seen in Wears Valley, Tennessee, near the park. Some birds may occasionally fly over the park, but they have not been documented in the park. The project would have no effect on this species because the Laurel Falls area does not contain suitable habitat for the species.

Monarch butterflies live mainly in prairies, meadows, grasslands, and along roadsides across most of North America. While they feed on the nectar of many flowers, monarch butterflies lay their eggs only on certain types of milkweed plants. The project would have no adverse impacts on the monarch butterfly because neither milkweed nor an abundance of nectar-producing flowers occur in the project area. However, tree removal and revegetation of disturbed areas near the Laurel Falls Trail and parking area could benefit the species by indirectly increasing the number of flowering plants.

#### *Bears*

The Laurel Falls Trail is a hotspot for bear-human interactions, largely because food or garbage associated with visitors attracts bears. This presents a safety issue for both visitors and bears. However, the number of visitors is not expected to increase because of the project, and improved signage and visitor education opportunities are anticipated. New trailside rest areas would provide opportunities to share information on appropriate practices for hiking in bear habitat. Therefore, adverse impacts on bears are expected to decrease relative to existing conditions.

#### *Aquatic Species*

Aquatic species may experience temporary disturbance from in-water work associated with the replacement of the existing drainage culverts and installation of the Laurel Falls viewing area. However, the park would use coffer dams and other erosion and sediment control measures to reduce the potential for impacts. All in-water work would be conducted in accordance with conditions and requirements stipulated in the necessary TDEC and US Army Corps of Engineers permits and associated best management practices, further minimizing potential impacts on aquatic life. As discussed under the dismissal for water resources (below), long-term, beneficial impacts on water quality or quantity are anticipated.

#### *Amphibians*

Amphibian surveys were conducted in the project area in April and May 2021 to develop a comprehensive amphibian species inventory for the project area and to survey for federally and state-listed species and Species of Concern in suitable habitats in the project limits of disturbance. Surveys documented at least eight species in the project area, with black-bellied salamander, seal salamander, and spotted dusky salamander being the most abundant. No federally or state-listed amphibian species were observed in the project area (NPS 2021b). Although project construction could affect amphibians via habitat disturbance and increased sediment in stormwater runoff, no rare, threatened, or endangered species would be affected, and the park would implement mitigation measures to ensure that impacts on amphibians are avoided or minimized. Following construction, amphibians would benefit from improved water flow and habitat connectivity for existing waterways along the trail where larger, properly sized culverts would be installed. Trail design elements intended to keep visitors on the trail would also reduce off-trail visitor disturbance of amphibian habitat throughout the project area.

### **Archeological Resources**

No potentially eligible archeological resources are known to occur in the project area. Based on the findings of a Phase I Archeological Survey for the project, the park has made a preliminary determination that alternatives would have no effect on archeological resources.

All consultation with the state historic preservation office will be documented in the decision document for this project. Under all alternatives, if unknown archeological resources were inadvertently discovered during construction, the park's standard protocol for inadvertent discoveries would apply (see the "Mitigation Measures" section in chapter 2). Because impacts on archeological resources would be avoided, this resource topic was dismissed from further analysis.

## Geology

Impacts on geology would not occur because only minor grading of surface topography would occur. The overall geology of the project area would not be affected. The project is in an area with a medium potential for acidic rock formations; however, disturbance of rock formations is not anticipated, and the trail would be designed to incorporate the existing rock outcrops. Construction would adhere to all measures regarding the treatment of pyritic materials should they be encountered during construction. Therefore, this topic was dismissed from further analysis.

## Lightscaapes

The proposed action does not include installation of lighting. If necessary, construction lighting would follow all applicable requirements. Therefore, this topic was dismissed from further analysis.

## Noise/Soundscapes

Temporary noise impacts would occur during the removal of the existing 1.3-mile Laurel Falls Trail and the construction of new trail surface, falls viewing area, Blanket Mountain overlook, and expanded parking areas. Short-term noise impacts would occur during construction; however, these impacts would be temporary and would only occur during the daytime hours. Therefore, this topic was dismissed from further analysis.

## Soils

High visitor traffic has negatively affected the area around Laurel Falls Trail; these impacts include compaction, erosion, exposed tree roots, denuded vegetation, and the presence of numerous visitor-created trails. Construction of the action alternative would affect soils within the limits of disturbance. The footprint of the existing paved trail is approximately 0.7 acres. The total disturbance of the proposed elements under alternative 2 would be approximately 3.2 acres or 139,300 SF, which includes multiple locations where soils are exposed and erosion is currently occurring. Of the 3.2 acres of total disturbance, 1.6 acres would be permanent disturbance, including the widened trail prism and paved parking areas and 0.7 acres is already paved, resulting in less than an acre of new permanent disturbance associated with alternative 2.

Impacts on soils would be minimized by implementing soil erosion and control measures during construction, consistent with the requirements and recommendations contained in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012). During construction, a Notice of Intent would be filed with TDEC to obtain coverage under the General NPDES Permit for Discharges of Stormwater Associated with Construction Activities (Permit Number TNR100000), and a site-specific stormwater pollution prevention plan would be developed in accordance with Part 3 of the General Permit. The park would use excelsior logs, natural fiber blankets, and/or hydromulch in areas of disturbed bare soil with a potential for erosion to reduce surface runoff velocities and prevent sediment from entering waterways. All erosion-control materials would be composed of fully biodegradable material (i.e., no photodegradable plastic). All exposed soils, including areas where existing visitor-created trails have exposed and compacted soils, would be revegetated after construction is complete, as detailed in chapter 2. The proposed trail improvements would also result in less off-trail use, so overall soil erosion would be reduced throughout the project area, having long-term, beneficial impacts on soils. As a result, this impact topic was dismissed from further analysis.

## Water Resources (Surface Water/Water Quality, Floodplains, and Wetlands)

Construction under the action alternative would have temporary surface water impacts via stormwater runoff and discharge into Laurel Branch, Pine Knot Branch, and other unnamed ephemeral or intermittent tributaries that flow into the Little River downstream. The replacement of approximately 31,000 SF of deteriorated asphalt trail with 47,000 SF of new, wider asphalt trail, and construction of about 21,700 SF of new asphalt parking areas would result in short-term (localized sedimentation during construction) and

long-term (stormwater runoff from new impervious areas) impacts. The removal of approximately 120 to 160 trees along the trail and 0.5 acres of forest vegetation in the parking areas would also lead to increased surface water runoff from the project area, which could increase pollutant loadings in streams. The project has been designed to quickly eliminate water from the trail, and parking area designs include catch basins, area drains, and outlet treatments to reduce the velocity of stormwater runoff. Impacts during construction would be avoided or minimized via sediment prevention and erosion-control measures consistent with the requirements and recommendations contained in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012) as well as a site-specific stormwater drainage plan and management practices. The total project construction area would exceed 1 acre, so a stormwater pollution prevention plan would be developed, as required to obtain coverage under State of Tennessee General NPDES Permit for Discharges of Stormwater Associated with Construction Activities (Permit Number TNR100000). Based on design elements and mitigation measures to avoid and minimize impacts, the action alternative is not expected to result in long-term changes to water surface water quality in the project area or downstream in the Little River.

The existing trail corridor has no drainage swales or other features to manage stormwater runoff. Most sheetflow drains across the trail or is trapped along the trail edges, further exacerbating the deterioration of the trail surface. The project would address drainage issues through trail design and structural measures. The cross slope of the trail would provide for positive drainage across the trail and prevent sheetflow from concentrating stormwater. In other areas, where necessary, stormwater would be collected on the upstream side of the trail and directed under the trail via a culvert. On the downstream side of the trail, any retaining walls would include weep holes to facilitate drainage. The action alternative would replace five damaged, and in some cases undersized, culverts with new culverts, which would improve water flow. Similarly, while no mapped floodplains are present in the project area, the Laurel Branch overtops the existing concrete pedestrian bridge during storm events. The current bridge does not allow for free-flowing water underneath it and instead funnels water through culverts (figure 3). The proposed bridge replacement in the upper falls area as part of the Laurel Falls viewing area would remove the culverts and be elevated compared to the current bridge. Together, these drainage improvements would have long-term, beneficial impacts on water resources.

Construction activities for trail culvert replacements, concrete bridge removal, bridge construction, and building the Laurel Falls viewing area could temporarily alter existing streamflow and introduce point sources for stormwater runoff directly into Laurel Branch. Trail removal and culvert placement work may temporarily disturb less than 100 SF of area that is classified as wetlands in accordance with NPS Procedural Manual 77-1. The park would file permits with the US Army Corps of Engineers and TDEC under sections 404 and 401 of Clean Water Act, if required. A small stream and associated wetland are located in the vicinity of the parallel parking area on Little River Road, but are outside the area of disturbance. Prior to construction, the wetland area would be flagged to ensure it is not disturbed by construction. No long-term impacts on wetlands would occur.

As a result of the long-term, beneficial impacts on water resources and the implementation of mitigation measures to prevent adverse impacts from stormwater runoff, impacts on water resources were dismissed from detailed analysis.

### **Socioeconomics**

The proposed action would not substantially affect socioeconomics in the local area or surrounding county. Changes to the trail surface, including new trailside rest areas, the creation of new waterfall viewing areas, and parking improvements would not increase tourism or population growth in the area. Implementing a shuttle or reservation system for Laurel Falls would not alter visitors' economic contributions in gateway communities. For this plan, a detailed analysis of socioeconomic impacts is not required to make a reasoned choice between alternatives; therefore, socioeconomics was dismissed from further analysis.

## **Wilderness**

Although no Congressionally designated wilderness presently exists in the park, 464,544 acres have been formally recommended or proposed as wilderness (NPS 2016a). The NPS manages recommended and proposed wilderness areas to preserve their wilderness character until Congress decides whether to designate them as wilderness (see NPS *Management Policies 2006* §6.3.1). The Laurel Falls Trail corridor from the trailhead to the falls was not recommended or proposed as wilderness and is designated as Natural Environment – Type II in the 1982 General Management Plan (NPS 1982) because it was paved in the 1960s. The Laurel Falls Trail corridor from the trailhead to the falls is not managed as wilderness. Therefore, this topic was dismissed from further analysis.

## **General Methodology for Establishing and Assessing Impacts**

For each resource topic fully analyzed within this chapter, the affected environment is described. This description serves as an account of the baseline conditions within the project area upon which the impacts of each alternative are compared. CEQ regulations define effects or impacts as “changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives” (40 CFR § 1508.1). Cumulative effects, which are effects that result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, are also analyzed. The impact analyses and conclusions in this chapter are based on a review of existing literature, studies and research, information provided by experts within the NPS, professional judgment, and staff expertise and insights. Mitigation measures presented in “Chapter 2: Alternatives” are included in the analysis of impacts.

## **Visitor Use and Experience**

### **AFFECTED ENVIRONMENT**

Laurel Falls frequently becomes overcrowded, which can negatively impact the quality of the visitor experience. During ongoing visitor use monitoring of Laurel Falls, a maximum count of 1,197 visitors at one time was recorded in 2021, which represents more than the area can accommodate at once without detracting from the visitor experience, as detailed in appendix A. The limited and narrow space for viewing the falls has a steep drop-off to the falls below, and visitors have slipped and fallen, requiring emergency medical response from park staff. Circulation is also difficult in this area, leading to frequent pedestrian congestion. The trail itself is deteriorated, increasing the risks of trips and falls for visitors. The trail is also too narrow for hikers to stop and take breaks without stepping off-trail. There are few places to sit or rest on the trail, and space for park officials to provide interpretation and programming for the public is limited. Informal visitor-created trails, particularly in areas where the trail curves, encourage visitors to walk off the designated path. Off-trail travel, often for the purpose of improper disposal of human waste, has led to denuded vegetation, which detracts from the natural aesthetic of the trail and affects visitor experience. Figures 2 through 5 (in chapter 2) provide examples of the current trail condition and congestion.

In addition to the deteriorating trail condition, demand for parking often exceeds capacity, which historically led visitors to park in undesignated areas, creating safety concerns. Prior to implementing roadside protection measures described in chapter 1, people regularly parked approximately half a mile away from the Laurel Falls parking area and walked along the roadside to reach the trailhead. While some visitors continue to park in undesignated locations, further decreases in inappropriate roadside parking near the trailhead are expected as visitors adjust to the roadside protection measures and as NPS

implements focused public education and parking enforcement campaigns. Little River Road is a winding, busy, two-lane road with limited sight distance in some locations. People walking along the roadside have no protection from traffic, creating a safety concern for pedestrians and motorists. No space exists for hikers to safely convene at the trailhead, and minimal space is provided between pedestrians and motor vehicles in the parking area.

### **Trends and Planned Actions**

As noted in chapter 1, park visitation and trail congestion have noticeably increased over the past five years. The park is consistently the most-visited national park in the country. Since 2011 annual visitation to the park has increased by 57%, resulting in congested roadways, overflowing parking lots, unsafe parking along roads, roadside soil erosion, vegetation trampling, crowded destinations, and long lines at restrooms and visitor center facilities. Visitation patterns have also shifted, with off-peak visitation substantially higher than the previous decade. Climate change is also resulting in warmer weather in all seasons, which may broaden the shoulder seasons and increase visitation year-round at the park. Parkwide visitation is anticipated to increase or remain near historically high levels in future years, based on the visitation trends.

Achieving the park's purpose in the face of increasing visitation presents unique challenges. While park managers welcome all visitors to enjoy and gain inspiration from the park, the unprecedented visitation levels have caused adverse impacts to park natural and cultural resources, as well as the visitor experience. Impacts on the visitor experience include safety risks, traffic congestion, crowding at popular destinations, diminished aesthetics, user conflicts, and fewer opportunities to experience solitude. As visitation continues to increase, visitors may have a diminished experience and fewer opportunities to enjoy and gain inspiration from the park's scenic beauty, extraordinary diversity of natural resources, and rich human history, unless focused management strategies are implemented to address the issues.

Ongoing actions that affect visitor use and experience at Laurel Falls Trail include the roadside protection measures project and the parking tag program. Roadside protections and no parking signs installed in early 2023, along with focused education and enforcement efforts, are expected to substantially reduce unsafe roadside parking near the Laurel Falls trailhead. In addition to improving visitor safety, these actions are expected to improve the visitor experience by reducing crowding on the trail and at the falls. The parking tag program, which went into effect March 1, 2023, would indirectly benefit the visitor experience because all revenue stays in the park to provide sustainable, year-round support focused on improving the visitor experience; protecting resources; and maintaining trails, roads, historic structures sites, and facilities.

Other planned actions that, if implemented, are expected to improve the visitor experience on the Tennessee side of the park include development of the Wears Valley Mountain Bike Trail System, the potential development of Foothills Parkway Section 8D, and implementation of the Gatlinburg Spur improvements. The mountain bike trail system would provide a new recreational opportunity not currently available in the park and may also help distribute visitation and reduce congestion. If built, Section 8D of the Foothills Parkway would provide additional scenic driving opportunities for visitors. The proposed Gatlinburg Spur project would improve the visitor experience by reducing congestion and improving visitor safety.

### **ENVIRONMENTAL CONSEQUENCES**

Based on internal and external scoping, park staff identified the following visitor use and experience issues for analysis:

*Issue – Visitor Safety:* Deteriorating trail conditions present tripping hazards and the current viewing area at the falls is slippery and congested, both which can affect visitor safety.

*Issue – Congestion:* As a result of high visitation, the Laurel Falls Trail experiences congestion and crowding, especially on weekends year-round, and on weekdays during the summer, which can detract from the visitor experience.

*Issue – Limited Parking Availability:* Designated parking spots for the trailhead are currently limited, and demand exceeds the current parking capacity. As a result, visitors create their own parking spaces and walk along the roadside to reach the trailhead.

### **Alternative 1 – No Action**

Under the no-action alternative, Laurel Falls Trail would retain its existing conditions. The current impacts on visitor experience would continue (i.e., deteriorated trail conditions, limited parking, and poor pedestrian flow on the trail). Because there would be no change to existing impacts on visitor use and experience, there would be no cumulative impacts. Past, present, and reasonably foreseeable actions and their impacts would be the same as those described in the “Trends and Planned Actions” section.

### **Alternative 2**

Under alternative 2, improvements to the trail and falls area would improve visitor safety and the quality of the visitor experience compared to existing conditions. In addition to physical improvements, the park would implement strategies to manage the project area within the visitor capacity for the Laurel Falls area, as described in appendix A. These improvements and management strategies would have a long-term benefit on visitor experience by providing visitors with a high-quality experience that is not substantially degraded by crowding or safety concerns.

Resurfacing and widening the trail would reduce tripping hazards for visitors and provide more room for two-way pedestrian traffic without leaving the trail surface. Improved information on wayfinding, Leave No Trace practices, and trail conditions would also enhance visitor safety on the trail. Additionally, the expanded trail width and addition of five trailside rest areas would enhance visitor experience by providing space for visitors to stop along the trail edge without creating congestion or disrupting pedestrian traffic flow. Trailside rest areas would provide locations for visitors to stop and sit and enjoy the park scenery before continuing up the trail. A larger arrival plaza at the trailhead would also offer visitors a place to sit and prepare for their hike in less congested conditions and provide information regarding the trail length and topography to ensure they feel comfortable completing the hike.

The Laurel Falls viewing area improvements would benefit the visitor experience by providing additional locations to view the falls, improving circulation, providing safer conditions from a designated platform with additional room, and addressing the slippery conditions. The proposed bridges, stair steps, viewing platforms, and railings, among other site improvements, would help direct visitors away from the slippery rock outcrops, providing a safer visitor experience. The viewing area and wider bridge at the upper falls would also improve visitor circulation. The existing upper falls bridge is narrow (4 feet wide) and often becomes a pinch point where visitors cannot easily pass each other, and a queue develops along the trail. A wider bridge at the upper falls would allow for two-way pedestrian traffic without a need to queue along the trail.

Designated access points would be provided to the lower falls area, and visitors would be able to circulate around the falls more easily and safely. While some visitors currently access the lower falls area via visitor-created trails through steep and rough terrain, there is no designated trail. Providing access to the lower falls area would allow visitors the opportunity to photograph the falls and appreciate them from multiple vantage points compared to existing conditions. By providing a viewing area that loops down to the lower falls, crosses the Laurel Branch, and traverses back up the opposite side of the falls, visitors would have the opportunity to spread out and view the falls from multiple angles with room to pass each other. These improvements would help meet the desired visitor experience by allowing visitors to experience the falls through multiple appropriate modes: seeing the falls, hearing the rumble of the falls, and feeling the mist of the falls. Visitor perception of the new construction in the falls viewing area could

vary widely. While many visitors would appreciate that the facilities provide safe, relatively easy access to nature, some who travel to Laurel Falls to experience the natural setting may be disappointed in the level of construction. With more than 464,500 acres of the park managed as wilderness, visitors who want to experience a more rustic, natural setting have endless options throughout the rest of the park—many with far fewer people than they would find at Laurel Falls. Because the first 1.3 miles of the Laurel Falls Trail corridor is not managed as wilderness, the trail provides unique opportunities for a wide range of visitors to experience nature safely and easily.

Changes to parking areas and improvements in the flow of pedestrians and motor vehicles would also enhance visitor experience. Expanding and improving the available designated parking spaces at or near the trailhead to accommodate approximately 90 vehicles would reduce parking conflicts and ease vehicle congestion on roads and in parking lots. Eventually widening the existing roadside parking area to allow visitors to open their doors and exit their vehicles more safely would also benefit visitor safety. In addition, the construction of designated pedestrian pathways to the trailhead would separate pedestrians from motor vehicles, improving safety for both pedestrians and motorists.

Implementing a parking reservation system in the project area and a shuttle system would change the way visitors access the site. Some visitors may feel inconvenienced by parking reservation or shuttle systems, while others may welcome the opportunity for better advanced trip planning and more access options. Overall, the reservation and shuttle systems would improve the quality of visits, help the park manage to the appropriate trail capacity, and meet the desired conditions. While short-term, adverse impacts on visitors may occur as they adjust to the new system of reserving parking in advance, the overall long-term impacts would be beneficial from less congestion and less stress associated with the arrival experience. Visitors may have to plan their trips further ahead, although the park plans to release some reservations for same-day bookings for more spontaneous visits. The park would optimize the number of reservations available to maximize capacity while maintaining desired conditions and distributing use of the trail throughout the day. Similarly, the shuttle system might require visitors to plan ahead, adhere to scheduled stops, or make a reservation, if applicable. A shuttle system could improve the visitor experience by increasing access for people who may not have or who do not desire to use a personal vehicle to access the trail. The adverse impact associated with the need to plan ahead may diminish over time as public awareness of the reservation system increases, resulting in a natural shift in visitation patterns into off-peak periods when reservations may be more readily available. Adverse impacts may be further reduced by the availability of the shuttle during peak visitation periods. While the overall visitor experience may be enhanced, visitor use may be negatively impacted by the increased costs associated with both the parking reservations and shuttle use. Over the long term, the use of a shuttle could increase the potential for “pulsing” visitation on the trail, as the shuttle drops off groups of visitors who begin their hike at one time. Adverse impacts associated with pulsing could be reduced by managing the capacity and schedule of the shuttle.

Short-term impacts on visitor use and experience would be adverse during the 18-month construction period because the trail would be closed to all visitors during that time. The park would implement a public information program to notify visitors of the closure and make them aware of available trip planning information to help them choose alternative destinations. Visitation and congestion could increase at other park destinations during this time.

The impacts of past, present, and reasonably foreseeable planned actions would be the same as described above in the “Trends and Planned Actions” section, resulting generally in short-term, adverse impacts as visitors adjust to the implementation of roadside protection measures and reduced parking availability, and long-term, beneficial impacts from the resulting reduced congestion on the trail and increased support from parking tag revenues. The proposed Wears Valley Mountain Bike Trail System and potential development of Foothills Parkway Section 8D would also improve the visitor experience by creating new recreational opportunities, while the Gatlinburg Spur project would improve the visitor experience by reducing congestion and improving visitor safety. Alternative 2 would also contribute short-term, adverse

impacts as visitors adjust to needing a parking reservation or shuttle to access the site, but long-term benefits from an improved hiking experience with a less stressful arrival experience, improved trail infrastructure, less congestion, and the ability to view the falls safely from multiple locations. Compared to current conditions, the actions of alternative 2 in addition to past, present, and reasonably foreseeable planned actions are expected to improve the overall visitor experience at the park in the long term.

Overall, alternative 2 would result in long-term benefits to visitor use and experience. The proposed physical and management changes would improve visitor safety and the quality of visits by reducing congestion, improving the trail surface and falls viewing areas, and managing for the desired conditions. Adverse impacts to visitor experience would be short term as visitors adjust to navigating reservation and shuttle systems. Cumulative impacts on visitor experience would be beneficial.

## Vegetation

### AFFECTED ENVIRONMENT

The project area is almost entirely forested, and mature trees provide dense canopy cover along the Laurel Falls Trail. Cleared areas are limited to parking areas and the right-of-way along Little River Road. Vegetation communities in the project area are primarily made up of native species.

Vegetation in the project area is dominated by low-elevation oak forest of mostly chestnut oak/evergreen shrub communities. This is the most common vegetation type in the park, covering approximately 28% (147,755 acres) of its total area (Hop et al. 2021). Trees representative of this forest type include chestnut oak (*Quercus montana*), scarlet oak (*Q. coccinea*), northern red oak (*Q. rubra*), southern red oak (*Q. falcata*), white oak (*Q. alba*), and sand hickory (*Carya pallida*). Understory species include mountain laurel (*Kalmia latifolia*), beetleweed (*Galax urceolata*), and Blue Ridge blueberry (*Vaccinium pallidum*). Other vegetation communities that occur in the project area include low-elevation mixed deciduous-conifer forest, low-elevation pine woodland, and ruderal deciduous forest (Hop et al. 2021). No federally listed or state-listed plant species are known to occur in the project area.

Vegetation limits broader views from the trail except for one vista of Blanket Mountain when visitors are nearly at the falls. In this location, the tree canopy opens and provides a scenic vista, as provided in figure 16.

Although Laurel Falls Trail is approximately 5 feet wide, high use, crowding, and the degraded trail conditions cause some visitors to go off the trail shoulder or use existing visitor-created trails to pass slower visitors, resulting in frequent off-trail foot traffic. This off-trail use has affected understory vegetation adjacent to the paved trail. Similarly, prior to the implementation of roadside protection measures, the limited availability of parking near the trailhead resulted in frequent parking in undesignated vegetated areas up to half a mile from the trailhead along Little River Road. Visitors would walk along the road shoulder approximately half a mile to the trailhead, which denuded vegetation adjacent to the roadway.



**FIGURE 16. VISTA OF BLANKET MOUNTAIN AND EXAMPLE OF SURROUNDING DENSE CANOPY**

### **Trends and Planned Actions**

As noted above, trends in visitor use patterns, specifically the creation of visitor-created trails has affected understory vegetation communities through trampling and soil compaction in high visitor use locations parkwide. This problem has increased in recent years as visitor use has increased, resulting in crowding along trails and at trailheads, and exacerbated by degraded trail and roadside conditions. Without intervention, the trend of negative impacts on vegetation is expected to worsen over the next years and decades as overcrowding issues persist and trail conditions continue to degrade.

Past actions such as the Elkmont Wastewater Treatment Plant upgrade and construction of the final portion of Foothills Parkway Section 8E removed or altered approximately 17 acres of park forest cover in the general vicinity of the project area within the last 10 years. Planned construction, including the development of the Wears Valley Mountain Bike Trail System and the potential development of Foothills Parkway Section 8D could remove additional acres of forest cover near the project area. However, other ongoing park planning efforts, including visitor use management and roadside protection measures, would help address impacts on vegetation, potentially stabilizing the current trend and reducing vegetation trampling.

### **ENVIRONMENTAL CONSEQUENCES**

Based on internal and external scoping, park staff identified the following vegetation issues for analysis:

*Issue – Tree Removal:* The proposed trail widening and new parking lots would require the removal of trees within the project area.

*Issue – Trampled Vegetation:* Visitors have created multiple visitor-created trails that have denuded vegetation. Similarly, roadside parking and associated visitor-created trails to the trailhead have denuded vegetation in these locations.

### **Alternative 1 – No Action**

Under the no-action alternative, there would be no change to the use of the project area, and no new impacts on vegetation are anticipated. As a result, impacts on vegetation would be the same as described above, in the “Affected Environment” section. Because there would be no change to existing impacts on vegetation, there would be no cumulative impacts. Past, present, and reasonably foreseeable actions and their impacts would be the same as those described in the “Trends and Planned Actions” section.

### **Alternative 2**

The proposed action would require vegetation clearing and tree removal. According to the preliminary project design, approximately 120 to 160 trees would need to be removed to accommodate the proposed trail widening, trailhead improvements, trailside rest areas, falls viewing area, and Blanket Mountain overlook. These trees generally range in size from 6 to 20 dbh and are representative of the low-elevation oak forest including chestnut oak, maple, and hickory species. Only a limited number of trees would be removed in the falls viewing area because the proposed stairs and platforms would be built around them. While the existing canopy over the trail would be thinned, the overall forested character of the trail would remain intact. The two new parking areas would also require the removal of additional trees in two locations, contributing to the removal of an additional 0.5 acres of vegetation. In total, approximately 3.2 acres would be disturbed, including earth-moving activities, although some of these locations are in areas where vegetation has been denuded and bare soils are exposed. The long-term disturbed footprint of the proposed improvements would be 0.9 acres (1.6 acres total; however, 0.7 acres includes the existing trail).

Understory plant communities adjacent to Laurel Falls Trail are generally not intact because plants are trampled by off-trail visitor use. The project would have long-term, beneficial impacts on these plant communities because trail improvements, including the construction of seating walls to discourage visitors from leaving the paved area, new signage to educate visitors about the issue, and implementation of visitor use management strategies, would reduce vegetation trampling associated with visitor-created trails. The addition of a vault toilet at the trailhead would also provide an appropriate bathroom facility and would reduce off-trail trampling associated with improper human waste disposal. Additional parking areas and a designated path from parking areas to the trailhead would discourage foot traffic along the shoulder and reduce vegetation trampling. Furthermore, the suite of management strategies included in the trampled vegetation indicator in appendix A would generally have beneficial effects on vegetation as a result of efforts to educate people about Leave No Trace practices and restoration efforts, signs telling people to “stay on trail,” and physical barriers that would result in less vegetation trampling. However, despite these efforts to control visitor use, vegetation in the project area would likely continue to be influenced by off-trail travel in some areas. Park staff would continue to periodically monitor the amount of trampled vegetation, as outlined in appendix A.

Native plants predominate the project area, and nonnative invasive plant coverage is minimal. The proposed action could introduce new invasive plant species or further the spread of existing invasive species. Seeds or cuttings could be inadvertently distributed by equipment and personnel, although all earth-moving equipment would be cleaned prior to entering NPS lands. Additionally, tree clearing or canopy thinning would increase the amount of light reaching the understory, potentially exacerbating the growth of invasive understory species. However, areas where ground disturbance would be necessary to construct the proposed improvements would be revegetated with native plant species, as detailed in chapter 2. Additionally, rehabilitating the deteriorating trail would stabilize soils adjacent to the trail, limiting erosion and reducing the area of bare soil that could be colonized by invasive vegetation.

Past, present, and reasonably foreseeable future actions have affected or could affect vegetation at the park, as described under “Trends and Planned Actions,” resulting generally in adverse impacts from vegetation removal associated with development projects and long-term, beneficial impacts from management actions that would reduce vegetation trampling. However, the majority of the park is vegetated and remains in good condition overall. While the implementation of alternative 2 would result

up to 1.6 acres of vegetation impacts, it would contribute a beneficial increment to the overall adverse and beneficial cumulative impacts because it would address adverse impacts associated with overcrowding and the formation of visitor-created trails. The overall cumulative impact on vegetation would be both adverse and beneficial.

Overall, while alternative 2 would include permanent disturbance of forested areas, including tree removal, off-trail pedestrian use and associated trampling would be reduced. Areas with bare soils due to trampling would be restored and protected from future off-trail use. Impacts on vegetation in the project area would be both short and long term under alternative 2. Cumulative impacts would be beneficial.

## Bats

### AFFECTED ENVIRONMENT

Woodland habitats in the project area provide roosting and foraging opportunities for several species of bats. The project area does not contain any known hibernacula (caves where bats winter in large colonies); however, hibernacula occur throughout the region, including elsewhere in the park. Several species of bats in the eastern United States have experienced severe population declines as a result of white-nose syndrome (WNS), a fungal disease that is highly contagious among many bat species.

Acoustic surveys were conducted in August 2020 for a different project in the park, located approximately 2.5 miles from the Laurel Falls Trail. It is assumed the same species likely are present, or are present in the vicinity, of the project area. The acoustic surveys confirmed the presence of northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Aeorestes cinereus*), evening bat (*Nycticeius humeralis*), and silver-haired bat (*Lasionycteris noctivagans*) (NPS 2020). Other bats that could occur in the project area include Indiana bat (*Myotis sodalis*), little brown bat (*Myotis lucifugus*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and eastern small-footed bat (*Myotis leibii*). Acoustic surveys detected probable absence for the gray bat (*Myotis grisescens*) in the project area. Therefore, gray bats are presumed not to be present and are not discussed further.

Two bat species that are likely to occur in the project area are listed as endangered under the ESA, and the USFWS has proposed one species for listing, but a final rule has not been published. One other species is currently under review for listing. These species and their statuses are shown in table 2. Their habitat preferences and occurrence in the project area are discussed below.

**TABLE 2. ENDANGERED SPECIES ACT-LISTED BATS IN THE PROJECT AREA**

Common Name	Scientific Name	Status
Indiana bat	<i>Myotis sodalis</i>	Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Endangered
Little brown bat	<i>Myotis lucifugus</i>	Under Review
Tricolored bat	<i>Perimyotis subflavus</i>	Proposed Endangered

### Indiana Bat

During winter, large colonies of Indiana bats hibernate in caves or abandoned mines known as hibernacula. Although no hibernacula are in the project area, the park contains five known Indiana bat hibernacula, and another is located approximately 0.25 miles outside the park. The project area is located within the designated swarming area for the White Oak Blowhole, which is a Priority 1 cave and

designated critical habitat for Indiana bat. Priority 1 hibernacula are those that have a current and/or historically observed winter population of 10,000 or more Indiana bats (USFWS 2007); however, the park's 2022 census of the White Oak Blowhole indicated a significantly reduced bat population from previous census counts, likely due to WNS (NPS 2022d). Indiana bats have not been documented in the abandoned mine complexes within the park.

The project area and most of the park below 4,500 feet elevation is considered suitable summer habitat for Indiana bats. Acoustic surveys conducted near the project area in August 2020 did not detect the presence of Indiana bats. However, the park's geographic information system (GIS) database has records for two Indiana bat roost trees identified in 2012 about 2 miles outside the project area. Based on these records, forests in the project area are considered non-maternity habitat for the Indiana bat. Non-maternity habitat refers to suitable summer habitat used by non-reproductive adult females and/or males. For Indiana bats, the known habitat buffer around a non-maternity record (i.e., mist net or roost tree) is 2.5 miles (USFWS 2017).

### **Northern Long-eared Bat**

Northern long-eared bats have similar habitat requirements as Indiana bats. Like Indiana bats, northern long-eared bats hibernate in caves or mines during winter and migrate to roosting habitats during spring. Although there are no hibernacula in the project area, the park contains six known northern long-eared bat hibernacula, and another is located approximately 0.25 miles outside the park. Northern long-eared bats have not been documented in the abandoned mine complexes within the park.

Summer roosting and foraging habitat for northern long-eared bats is the same as that of Indiana bats, described above (USFWS 2015). Twenty-five northern long-eared bats have been documented within 5 miles of the project area since 1999. The project area is located within the summer maternity buffer for northern long-eared bat.

### **Little Brown Bat**

The habitat requirements of little brown bats are similar to those of Indiana bats and northern long-eared bats, as described above. Although the project area does not contain any hibernacula, the park contains seven known little brown bat hibernacula, and another is located approximately 0.25 miles outside the park. Little brown bats have also been documented at one abandoned mine complex in the park. Additionally, 45 little brown bats have been documented within 5 miles of the project area since 1999, although only two have been recorded since 2010.

### **Tricolored Bat**

The life history characteristics and habitat requirements of tricolored bats are similar to those of the bat species described above. The primary characteristic that distinguishes tricolored bats from other bat species is that it frequently roosts in live trees during summer months, rather than snags (TWRA 2015).

Although the project area does not contain any hibernacula, the park contains seven known tricolored bat hibernacula, and two more are located approximately 0.25 miles outside the park. Tricolored bats have not been documented in the abandoned mine complexes within the park. Four live tricolored bats have been documented within 5 miles of the project area since 1999 according to the park's GIS database. Three dead bats were also documented during this time.

### **Trends and Planned Actions**

North American bat populations have experienced severe declines as a result of WNS. Since its discovery in 2007, WNS has rapidly spread throughout the eastern United States and is now considered to be by far the single largest threat to North American bat populations. The disease was first detected near Albany, New York, and appeared shortly thereafter at many sites throughout the eastern United States (Hoyt et al. 2021). WNS was first reported at the park in 2010 when the disease was confirmed in a little brown bat

collected from the White Oak Blowhole, which is within 10 miles of the project area (NPS 2010). In recent years, it has also been detected in Canada and in several hibernacula in the western United States. Based on past patterns of spread, it is anticipated that WNS will reach all or nearly all hibernacula in the United States and Canada by approximately 2030. The declining trend of North American bat populations is expected to continue and worsen over the coming decades as WNS continues to spread, potentially resulting in extirpation or extinction of some species (Hoyt et al. 2021).

Within the park, as noted in the “Vegetation” section, past actions such as the Elkmont Wastewater Treatment Plant upgrade and construction of the final portion of Foothills Parkway Section 8E removed or altered approximately 17 acres of park forest cover in the general vicinity of the project area within the last 10 years. Visitor use management and roadside protection activities may benefit bats by limiting visitor use to designated areas, reducing the potential for disturbance of roosting bats by off-trail visitor use activities. Planned construction, including the development of the Wears Valley Mountain Bike Trail System and the potential development of Foothills Parkway Section 8D could remove additional acres of forest cover near the project area. Tree removal associated with these projects would result in habitat loss and fragmentation outside the project area; most of the park is vegetated, and vegetation at the park remains in good condition overall, and this condition is expected to continue.

## ENVIRONMENTAL CONSEQUENCES

Based on internal and external scoping, park staff identified the following bat issues for analysis in the overview document:

*Issue – Tree Removal:* The proposed trail rehabilitation and parking areas would require tree removal, which may reduce available bat habitat.

### **Alternative 1 – No Action**

Under the no-action alternative, existing trail dimensions and current use of the project area would not change. Visitation would continue to be high, with an active trail corridor year-round and vehicle activity on Little River Road. As a result, impacts on bats would be the same as described above, in the “Affected Environment” section. Because there would be no change to existing impacts on bats, there would be no cumulative impacts. Past, present, and reasonably foreseeable actions and their impacts would be the same as those described in the “Trends and Planned Actions” section.

### **Alternative 2**

Under alternative 2, approximately 120 to 160 trees greater than 6 in dbh along the trail corridor and an additional 0.5 acres of tree removal would be required for the proposed trail rehabilitation and improvements and added parking. Construction would include the removal of some trees greater than 5 inches dbh that may provide suitable summer roosting habitat for bats, including the federally listed Indiana and northern long-eared bat. To avoid impacts on roosting bats, tree clearing would be conducted from November 15 to March 31 when bats are hibernating, making injury or mortality to bats during tree removal highly unlikely. Removal of suitable roosting trees would be avoided wherever possible (e.g., by designing project elements, such as the Laurel Falls viewing area, to go around suitable roosting trees), further limiting impacts on roosting habitat; however, permanent removal of forested habitat would represent a permanent loss of suitable summer habitat for bats, permanent loss of fall swarming habitat and non-maternity habitat for the Indiana bat, and permanent loss of maternity habitat for the northern long-eared bat. Given the small amount of habitat that would be lost relative to the amount of available habitat in the project area and the park, no population-level effects or changes to species composition in the project area are expected. Although most bats have experienced habitat loss and degradation throughout most of their ranges during the past centuries, WNS is by far the single largest threat to North American bat populations (Hoyt et al. 2021).

Construction activities that occur during the summer could adversely impact roosting bats because of temporary increases in noise and human disturbance in the project area. Construction activities would occur during the daytime when bats are normally roosting. Available parkwide data suggest that Indiana and northern long-eared bats typically do not roost within 100 feet of roads. Therefore, activities that would occur along Little River Road, including at the trailhead and parking areas, would have little potential to adversely impact bats because they likely avoid these areas in favor of nearby suitable habitat.

Noise and visual disturbances associated with use of the trail and other visitor areas would be ongoing and are not expected to increase because neither the level of human activity nor vehicular traffic would be noticeably altered by the project. Because the project area currently experiences high levels of visitor use, bats that may occur in the project area are likely habituated to a baseline level of noise and human presence (USFWS 2002).

Past, present, and reasonably foreseeable future actions have affected or could affect bats at the park, as described under “Trends and Planned Actions,” resulting generally in adverse impacts from habitat removal associated with development projects and beneficial impacts from management actions that could reduce the potential for disturbance of roosting bats by off-trail visitor use activities. The proposed action would contribute a slight adverse increment to the overall adverse impact on bats because it could result in additional tree removal. However, the project area is already adjacent to a road and trail corridor that bats are likely to avoid in favor of more suitable habitat. In comparison to the surrounding available habitat and to the threat posed by WNS, the impacted habitat area would be minimal and insignificant compared to the overall bat habitat at the park. The overall cumulative impact on bats would be adverse, with alternative 2 contributing a minimal adverse incremental impact.

Overall, while the park may remove up to 160 trees and an additional 0.5 acres of tree removal, in comparison to the surrounding available habitat, the impacted habitat area would be minimal and insignificant to the overall population. To avoid impacts on federally listed bats during the roosting season, the park would conduct tree and vegetation clearing between November 15 and March 31 when bats are hibernating. Bats may experience temporary disturbance during the construction period, but use of the trail and visitor areas is not expected to result in any new impacts to bats. There would be both long- and short-term impacts on bats in the project area, but alternative 2 is not anticipated to affect bats at the population level or alter species composition. Compared to the current conditions, cumulative impacts on bats would be adverse.

## **Historic Districts**

### **AFFECTED ENVIRONMENT**

The project area includes portions of two historic districts that are eligible for listing on the National Register of Historic Places.

#### **Laurel Falls Trail Historic District**

Laurel Falls Trail was constructed in 1931–1932 as a fire trail meant for use by pack animals and carts. An NPS letter dated November 10, 1931, shows that one of the earliest trails built in the parklands was a 3-mile track called “Laurel Branch [Trail],” the original name for the Laurel Falls Trail. An accompanying statement provides further detail of the “Cove Mountain – Laurel Branch Trail,” stating that the \$234 allotted for its construction had been spent and that construction of the trail proved to be more difficult than anticipated, with only half the work done by November. An estimated \$350 was needed to finish the route, which the author deemed important because it separated “the park from Wears Cove, where many fires originate” (NPS 1931). The author of the statement notes that the Laurel Branch (Laurel Falls) “trail is being scraped to the mineral earth in order to constitute a fire break and I regard its completion as necessary.” Work on the trail was completed by July 1932. From March 1933, the park was

able to secure labor through the Civilian Conservation Corps, enabled by Emergency Conservation Work funds. These laborers made improvements to Laurel Falls Trail through 1935. By the 1960s, Laurel Falls Trail was so popular that it had begun to fail from overuse. To combat erosion of the earthen trail, the NPS reconditioned, graded, and paved the first 1.3 miles (the stretch from the trailhead to the falls) with asphalt between February and July 1963. Mechanized wheelbarrows were pulled up the path, and the hot tar and asphalt were laid in a 6- to 8-foot-wide strip.

The entire Laurel Falls Trail Historic District is 4 miles long. The first 1.3-mile section is located within the project area and is the most developed section of the trail. This section of the trail gradually and steadily climbs nearly 300 feet to the waterfall, which is at an approximate elevation of 2,590 feet. The trail meanders through hardwood woodlands with a dense canopy, so the trek is largely shaded. There are 26 contributing features to the historic district in this section, including the trail itself, culverts and a footbridge with stone headwalls, stone edging, stone retaining walls, and natural features, such as the waterfalls themselves and the vista of Blanket Mountain. Additional contributing elements include the trailhead and two existing parking areas at the trailhead that date to 1938.

The first and primary destination of Laurel Falls Trail is encountered at Mile Marker 1.3. The 80-foot Laurel Falls are divided by a natural ledge into two tiers. At times, the ledge must be forded. A footbridge was erected to the south of and at the base of the upper falls in the late twentieth century (after 1968); its concrete base is punctuated with pipes that allow the water to flow through the footbridge. Wooden handrails line both sides of the concrete footbridge. The bedrock on the north side of the bridge was scored and punctured in 2003 to try to provide more traction to the natural stone surface, which is slippery in wet and dry conditions. Other than a wooden bench on the bedrock ledge at the base of the upper falls (composed of a halved log resting on two stone piers), no built features exist at the waterfall.

### **Little River/Laurel Creek Road Historic District**

In the *Great Smoky Mountains National Park, Park Development Historic District*, Little River/Laurel Creek Road was described as a 24.89-mile, two-lane roadway divided into three segments. The first segment, Fighting Creek Gap Road, runs 4.87 miles southwest from the Newfound Gap Road and Sugarlands Visitor Center past the trailhead for the Laurel Falls Trail. The roadway was considered a contributing feature to the historic district for its fieldstone guardrails, culverts, bridges, and tunnels (Blythe 1992). Twenty-three specific features, including the road itself, multiple bridges, and a tunnel, were named in the *Great Smoky Mountains National Park: Historic Resources Study* as recommended contributing to the eligible Little River/Laurel Creek Road Historic District. The only recommended feature within the project area is the Little River/Laurel Creek Road itself, which includes a 1-mile segment of the 24.89-mile historic roadway span (NPS 2016c).

### **Trends and Planned Actions**

NPS's Cultural Resources Climate Change Strategy establishes goals to preserve and maintain cultural resources as the climate continues to warm. Rising temperatures expedite crystallization of efflorescent salts from increased evaporation rates, which can lead to higher rates of structural cracking and deterioration of existing culverts and retaining walls, including those in the project area (NPS 2016d). Moisture absorption in brick and porous stone structures from the potential increase of intense rainfall events may lead to frost damage, mold growth, and stress from the salt crystallization (NPS 2016d). Surface cracking, flaking, and sugaring (i.e., surface disintegration) of these structures and spalling (i.e., peeling away) of stone could also occur as a result of worsening freeze/thaw cycles, especially at higher elevations in the park. If wildfires become more frequent in the park because of warming temperatures or human-caused activity, cracking and other physical damage to masonry components from thermal stress and discoloration caused by smoke and/or extreme heat may occur. NPS actions that occur in the project area include routine maintenance of the infrastructure within both historic districts as well as the implementation of roadside protection measures, which visually improve the road corridor within the Little River/Laurel Creek Road Historic District. While the park regularly maintains the Laurel Falls

Trail, without improvements, the trail surface is expected to continue to deteriorate and, over time, contributing features like retaining walls and culvert headwalls could be impacted.

## **ENVIRONMENTAL CONSEQUENCES**

Based on internal and external scoping, park staff identified the following historic district issues for analysis in the overview document:

*Issue – Contributing Features:* Proposed improvements and elements to the trail have the potential to alter the historic material and features of the trail that maintain the historic trail’s integrity and eligibility for listing on the National Register.

*Issue – New Features:* Proposed improvements would introduce new built elements to the historic district that could be incompatible with the rustic setting.

### **Alternative 1 – No Action**

Under the no-action alternative, no improvements to the trail would occur. The existing historic materials and contributing elements would remain unaltered. As a result, impacts on historic districts would be the same as described above, in the “Affected Environment” section. Because the no-action alternative would result in no impacts on historic districts, there would be no cumulative effects. Past, present, and reasonably foreseeable actions and their impacts would be the same as those described in the “Trends and Planned Actions” section.

### **Alternative 2**

Under alternative 2, the proposed improvements would impact contributing features of both historic districts within the project area.

#### *Trail and Trailhead Rehabilitation and Trailside Rest Areas*

As a site, the trailhead retains its integrity in location, design, setting, materials, feeling, and association. It was determined to be a contributing resource to the proposed Laurel Falls Trail Historic District. Under alternative 2, the park would construct an arrival plaza with a seating wall and grade a small area to install a vault toilet, which would introduce new and additional elements to the landscape that have no historical precedents. They would change the overall character of the trailhead from one of rusticity with minimal intrusions to a formalized setting. Therefore, alternative 2 would have long-term, adverse impacts on the historic resource that was considered contributing to the Laurel Falls Trail Historic District.

Alternative 2 improvements would not alter the trail’s original alignment and slope; however, asphalt removal and regrading of the trail could affect six segments of historical stone retaining wall along the trail. Accordingly, these wall segments would be protected during construction. Depending on the methods used to grade the trail, the top course or the top two courses of each wall would be removed, numbered, stored, and then reset in place after grading and resurfacing is completed. In addition, two of the historical stone retaining walls closest to the falls area are remnants of a larger wall that structurally failed and was repaired with a timber crib wall in the late twentieth century; these remnants are not structurally sound and require replacement. The stone remnants and the timber crib repair wall would be removed and replaced with new masonry retaining walls. The stone wall remnants and the timber crib repair wall would be demolished and replaced with two new masonry retaining walls approximately 85 feet long and 15 feet tall and 35 feet long and 7 feet tall, respectively. The stones from the demolished historical walls could be used in support of other trail improvements, including rock batter and headwall locations. In addition to stones from the demolished historical walls, local rough-hewn stone could be used for the 1,800 feet of rock batter (i.e., dry-stacked stone and rubble fill) walls that would be placed on the downslope side of the trail to stabilize the slope and mitigate future erosion. The removal and

replacement of these contributing features would contribute long-term, adverse impacts on Laurel Falls Trail Historic District.

Similarly, six segments of the historical fieldstone edging that intermittently line the downslope side of the trail would be removed during the paving process and re-laid afterward. In four locations, the fieldstone edging could be re-laid in the same location but shifted to accommodate the trail widening. In two locations, where the site would be impacted by the construction of a box culvert at the Pine Knot Branch, the fieldstone edging might be placed approximately 30 feet uptrail from their current locations. While there would be no adverse impacts on the historic district, repositioning this contributing feature would result in slight adverse impacts to the edging itself. These impacts would be minimized by the replacement of the edging following construction.

The construction of six new trailside rest areas, where the trail would widen to as much as 12 feet, and the addition of stone walls for seating would be the greatest alteration to the historic trail. The addition of rest areas with stone seating walls has no historical precedent, and the widening would change the dimensions of the historic trail, which has remained intact to date. It also would change the progress, or flow, of the trail because it would introduce stops along a path that is otherwise linear and continuous. This improvement would change the visitor experience: the trail was historically more rugged and naturalistic, with very few places to stop and rest, whereas these proposed alterations would make the trail more accessible, social, and formalized. The rest areas with seating walls would change the character of the historic resource.

The replacement of three of five existing culverts with new, appropriately sized, RCP culverts (18-inch diameter minimum) would improve drainage and ultimately benefit the maintenance and preservation of the trail. These three culverts, which lack fieldstone headwalls, are not historic and are non-contributing features to the Laurel Falls Trail Historic District; their replacement would not impact the trail's historical authenticity or integrity. Similarly, the addition of five new concrete trench drains in proposed rest areas or where water crosses over the existing trail seasonally would benefit the ongoing maintenance of the trail by preventing trail erosion and allowing water to continue flowing downslope. The culvert pipes would be buried beneath the asphalt paving and would be minimally visible to passersby. Therefore, these actions are not anticipated to have any measurable impacts on the Laurel Falls Trail Historic District.

Rehabilitation of drainage features along the lower 1.3 miles of trail also involves replacing culvert 2, which crosses an unnamed spring/tributary, with an RCP culvert and repairing any damage to the fieldstone headwall with compatible masonry. Culvert 2 is a metal pipe that is not historic material; however, the fieldstone headwall may be historic material, the integrity of which is questionable. The culvert feature is a non-contributing element to the Laurel Falls Trail Historic District but is managed as a cultural resource and repairing the headwall would not result in long-term, adverse impacts.

The culvert at Pine Knot Branch is an 18-inch metal conduit with a fieldstone headwall on both sides of the trail. The metal pipe would be replaced with a new three-sided box culvert that would allow the bottom of the waterway to remain in its natural state after the existing culvert is removed and provide a wider area for water to flow beneath the trail. The original fieldstones in the Pine Knot Branch culvert headwalls would be reused to construct new headwalls to match the existing stonework at the culvert as well as the trail's naturalistic setting. The Pine Knot Branch culvert is a contributing resource to the Laurel Falls Trail Historic District, and alternative 2 would result in long-term, adverse impacts on this historic resource.

After construction is complete, the park would implement measures to restore the trailside vegetation that has been impacted by the existing visitor use. The effort to restore the trailside vegetation would maintain similar canopy conditions and floral character of the trail.

### *Laurel Falls Viewing Area and Blanket Mountain Overlook*

Alternative 2 includes proposed construction of two viewing areas. A small (70 SF) overlook at the vista to Blanket Mountain would be an addition to the trail that has no historical precedent. Currently, the spot has no built intrusion or demarcation—it is merely a clearing in the tree canopy that offers passersby a vista of Blanket Mountain. Framed views are a design trope commonly found in early NPS parks, and the vista location is considered a contributing resource to the Laurel Falls Trail Historic District. While a new overlook would bring more attention to the view and improve flow along the trail, it would also change the minimalist and naturalistic character of the historic trail. Therefore, the proposed overlook would have a long-term, adverse impact on the historic resource that is considered a contributing element to the Laurel Falls Trail Historic District.

Similarly, a larger viewing area is proposed for the falls area. The upper and lower falls are the key contributing features to the Laurel Falls Trail Historic District. Prior to 2000, no built infrastructure was present at the falls. Visitor safety concerns in the late twentieth century, however, resulted in the scoring of the bedrock ledge at the base of the upper falls to provide traction and the construction of the modern concrete footbridge. The scale of the proposed Laurel Falls viewing area and its complex design would fundamentally change the character of the waterfalls area from naturalism to an overtly designed setting. While the visual impact of both the viewing area and overlook would be minimized through the use of natural materials that are compatible with the natural setting as well as other structures throughout the park, the proposed work at the falls viewing area and the Blanket Mountain overlook would have a long-term, adverse impact on the character of the Laurel Falls Trail Historic District.

### *Parking Improvements*

Under alternative 2, the park would construct two new parking areas and stripe or widen one existing area in the Little River/Laurel Creek Road Historic District. Parking area 1 could accommodate up to 44 spaces; the scale of this parking facility would be larger than similar parking areas on Little River/Laurel Creek Road. However, its design and associated materials would be compatible with other parking areas on the roadway and throughout the park. While the retaining walls would be concrete block, any portions visible from the roadway would be dressed with a stone veneer that would be consistent with similar features in other parking areas and compatible with the historic character of the historic district. The transformation of this location from a disturbed and eroded area where visitors park informally into a designated, striped parking area would enhance safety, maintenance, and the aesthetics along Little River Road. Similarly, while parking area 2 would also be a new addition to the Little River/Laurel Creek Road Historic District, it would be similar to existing roadside parking areas that are frequently found in early NPS park designs and would be compatible with the historic district. The scale of this second parking area would be small, and the material (asphalt) would be consistent with precedents of the typology. Both parking areas east of the Laurel Falls Trail would also include a designated pedestrian pathway to the Laurel Falls trailhead with a timber guardrail to maintain separation of pedestrians and motor vehicles. The timber guardrail would match the existing guard rail style used throughout the park, resulting in no long-term, adverse impacts on the historic district.

In addition to the two new parking areas, the existing paved, parallel parking area west of the Laurel Falls trailhead would be striped and slightly widened, if funding becomes available. This formalized parking area would be small in scale, and the materials (asphalt) would be consistent with precedents and the current typology. Furthermore, impacts to a non-historic (built ca. 1986) fieldstone culvert headwall located in the existing parallel parking area would be avoided.

For all parking areas, after construction is complete, the park would restore roadside areas that have been denuded due to unofficial visitor parking and visitor-created trails, which would be a visual benefit on the historic district. Establishing permanent grass cover would both enhance the aesthetics of the area and road safety.

As a result, the addition or improvement of three parking areas on Little River/Laurel Creek Road would not alter the location, design, setting, materials, workmanship, feeling, or association of the roadway, and would not result in long-term, adverse impacts on the Little River/Laurel Creek Road Historic District.

Past, present, and reasonably foreseeable future actions have affected or could affect historic districts at the park, as described under the “Trends and Planned Actions” section, resulting generally in beneficial impacts from routine maintenance of the infrastructure within both historic districts as well as the implementation of roadside protection measures, which visually improve the road corridor within the Little River/Laurel Creek Road Historic District. Alternative 2 would contribute a noticeable adverse increment to the overall beneficial impact on historic districts because it would affect historic materials and alter the built environment, but both districts would retain their potential eligibility.

Taken holistically, the proposed trail improvements under alternative 2 would have long-term, adverse impacts on four contributing elements to the Laurel Falls Trail Historic District; however, the trail would retain integrity in terms of location, setting, materials, and association due to the specific design decisions and use of compatible materials. As a result, the Laurel Falls Trail Historic District would maintain its eligibility for listing on the National Register under alternative 2. Similarly, while alternative 2 would include the introduction of two new parking area and one parking improvement within the Little River/Laurel Creek Road Historic District, the parking area design and associated materials would be compatible with the rest of the nearly 25-mile historic district and would not impact the district’s eligibility for listing on the National Register.

## CHAPTER 4: CONSULTATION AND COORDINATION

### Public Participation and Scoping

#### THE CIVIC ENGAGEMENT AND SCOPING PROCESS

Civic engagement and scoping are essential components of the NEPA planning process. The formal scoping process for this EA consisted of public scoping and consultation with federal and state agencies and tribal governments. On July 2, 2021, the NPS issued a press release to local, regional, and national media outlets announcing the start of the civic engagement period for the Laurel Falls Trail Management Plan. The NPS also sent the press release and electronic newsletter to more than 200 interested individuals and organizations notifying them of the opportunity to comment, and the NPS Planning, Environment & Public Comment (PEPC) website (<https://parkplanning.nps.gov/LaurelFalls>) was activated for the public to submit comments. The newsletter, including information about the background, purpose and need of the project, preliminary planning efforts, preliminary project elements, current project status and schedule, and information on how to comment, was also available on the PEPC website. One virtual meeting was held on Thursday, July 22, 2021, from 5:00 p.m. to 6:00 p.m. Forty-three people attended the virtual meeting. The meeting included an introduction by Superintendent Cassius Cash, a PowerPoint presentation with an overview of the project, and a question-and-answer session. Seventy-one public comments were received.

On December 1, 2022, the NPS issued a press release to local, regional, and national media outlets announcing the start of the public scoping period for the Laurel Falls Trail Management Plan in compliance with the National Historic Preservation Act and NEPA. The NPS also sent the press release and electronic newsletter to more than 200 interested individuals and organizations notifying them of the opportunity to comment, and the NPS PEPC website (<https://parkplanning.nps.gov/LaurelFalls>) was activated for the public to submit comments. The newsletter, including information about the background, purpose and need of the project, desired conditions, preliminary proposed action, potential issues and impact topics, current project status and schedule, and information on how to comment, was also available on the PEPC website. Forty public comments were received. Comments from both comment periods were used to inform the development of the EA, including elements of the proposed action.

#### PUBLIC COMMENT

The EA will be available for formal public and agency review for 30 days. Interested individuals, agencies, and organizations will be notified of its availability. The EA will be available for public review on the NPS PEPC website <https://parkplanning.nps.gov/LaurelFalls>.

### Agency Consultation

#### ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

In accordance with section 7 of the ESA, the NPS will initiate informal consultation with USFWS and will request concurrence that the preferred alternative *may affect but is not likely to adversely affect* Indiana bats and northern long-eared bats. The park will complete the section 7 consultation process prior to finalizing the NPS decision document for this EA.

## **NATIONAL HISTORIC PRESERVATION ACT SECTION 106 AND TRIBAL CONSULTATION**

The NPS initiated consultation with the TN SHPO on December 22, 2022, when the NPS provided the draft Area of Potential Effect, Phase I Archeology Report, and the Laurel Falls Trail Determination of Eligibility for SHPO review. On January 23, 2023, the TN SHPO responded and concurred with the eligibility of the Laurel Falls Trail under Criterion A and also noted that Criterion C may be applicable. The TN SHPO provided two minor comments on the Phase I report and requested a revised report, which was provided.

The NPS initiated consultation with seven traditionally associated Native American Tribes associated with the park on December 22, 2022, when it provided the draft Area of Potential Effect, Phase I Archeology Report, and Determination of Eligibility for review. Tribes included the Catawba Indian Nation, Cherokee Nation, Eastern Band of Cherokee Indian, Eastern Shawnee Tribe of Oklahoma, United Keetoowah Band of Cherokee Indians in Oklahoma, Muscogee Nation, and the Poarch Band of Creek Indians. No replies have been received to date.

Based on findings of the archeological survey, the NPS has made a preliminary determination that the preferred alternative (alternative 2) would have no effect on archeological resources. As noted in chapter 3, elements of the project would adversely affect two historic districts, and the NPS has made a preliminary determination that the preferred alternative would have an adverse effect on historic properties. As a result, an assessment of effect has been developed and provided to TN SHPO for its review and concurrence. The NPS has also invited the seven Tribes listed above to review and provide input on the assessment of effect.

A final determination of effect is pending completion of the section 106 process, including consideration of any public comments on this EA and ongoing consultation with TN SHPO and traditionally associated Native American Tribes. Development of a memorandum of agreement in partnership with the TN SHPO is anticipated. The park will complete the section 106 consultation process prior to finalizing the NPS decision document for this EA. Furthermore, if additional information on ethnographic resources or traditional uses is provided by the Tribes, the park will work with concerned parties to resolve any potential impacts associated with the proposed action.

## **CHAPTER 5: LIST OF PREPARERS**

US Department of the Interior, National Park Service

### **GREAT SMOKY MOUNTAINS NATIONAL PARK**

Cassius Cash, Superintendent  
 Alan Sumeriski, Deputy Superintendent  
 Lisa McInnis, Chief, Resource Management and Science Division  
 Barbara Hatcher, Chief, Facility Management Division  
 Mark Collins, NEPA Coordinator  
 Thomas Colson, GIS Program Manager (former)  
 Troy Evans, Vegetation Ecologist  
 Allison Harvey, Archeologist  
 R. Scott Hussey, Cultural Resource Program Manager  
 Kendra Straub, Management and Program Analyst  
 Matt Kulp, Supervisory Fishery Biologist  
 Stephanie Kyriazis, Deputy Chief of Resource Education  
 Tobias Miller, Trails and Roads Facility Manager  
 Tom Remaley, Inventory and Monitoring Program Manager  
 Bill Stiver, Supervisory Wildlife Biologist  
 Paul Super, Science Coordinator

### **DENVER SERVICE CENTER**

Herbert Kupfer, Project Manager  
 Shane Friese, Landscape Architect  
 Alexa Miles, Natural Resource Specialist  
 Fielding Link, Cultural Resource Specialist

### **REGION 2**

Jami Hammond, Regional Environmental Coordinator  
 Rachel Brady Baldwin, Community Planner

### **WSP USA SOLUTIONS, INC.**

<b>Name</b>	<b>Title</b>	<b>Qualifications</b>
Rudi Byron, AICP	Project Manager	BS, Environmental Science and Policy MURP, Urban and Regional Planning
Phil Baigas	Deputy Project Manager/ Wildlife Biologist	BS, Geography

<b>Name</b>	<b>Title</b>	<b>Qualifications</b>
Joe Dalrymple	Biologist	BS, Environmental Science BS, Marine Biology MS, Marine Science
Lori Fox, AICP	Quality Assurance	BS, Environmental Policy MCP, Land Use and Environmental Planning
Linda Green	GIS Specialist	BA, Environmental Studies
Deborah Mandell	Senior Editor	BA, Government MBA, Finance and Marketing
Heather McMahon	Architectural Historian	MARH, Architectural History
Margaret Stover	Environmental Planner	BS, Environmental Studies MEM, Water Resources Science and Management

## CHAPTER 6: ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CUA	commercial use authorization
EA	environmental assessment
ESA	Endangered Species Act
dbh	diameter at breast height
GIS	geographic information system
IPaC	(USFWS) Information for Planning and Consultation
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
park	Great Smoky Mountains National Park
PEPC	Planning, Environment & Public Comment
RCP	reinforced concrete pipe
SF	square feet
TDEC	Tennessee Department of Environment and Conservation
TN SHPO	Tennessee State Historic Preservation Office
USC	United States Code
USFWS	US Fish and Wildlife Service
WNS	white-nose syndrome

## CHAPTER 7: REFERENCES

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# APPENDIX A: VISITOR USE MANAGEMENT

## INDICATORS, THRESHOLDS, MONITORING, AND MANAGEMENT STRATEGIES

### INDICATORS AND THRESHOLDS

Monitoring is the process of routinely and systematically gathering information or making observations to assess the status of specific resource conditions and visitor experiences and is a critical step in successfully implementing any VUM plan. A monitoring strategy is designed and implemented to generate usable data for periodically comparing existing and desired conditions, assessing the need for management actions, and evaluating the efficacy of management actions. A well-planned monitoring strategy provides for transparency, communication, and potential cost savings through efficiencies and possibly cost sharing. A monitoring strategy includes the selection of indicators, along with establishment of thresholds or objectives, and any needed triggers. It also includes routine, systematic observations or data collection of the indicators over time as well as associated documentation and analysis.

Indicators, thresholds, monitoring protocols, management strategies, and mitigation measures would be implemented as a result of this planning effort and are described below. Indicators would be applied to the action alternatives described within this plan. Indicators translate desired conditions into measurable attributes (e.g., linear extent of visitor-created trails) that when tracked over time, evaluate change in resource or experiential conditions. These are critical components of monitoring the success of the plan and are considered common to all action alternatives. Thresholds represent the minimum acceptable condition for each indicator and were established by considering qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, professional judgment of staff from management experience, and scoping on public preferences.

The interdisciplinary planning team considered the central issues driving the need for the Laurel Falls Trail Rehabilitation. The team developed related indicators that will help park managers identify when the level of impact becomes cause for concern and management action may be needed. The indicators described below were considered the most critical, given the importance and vulnerability of the resource or visitor experience affected. The planning team also reviewed the experiences of other park units with similar issues to help identify meaningful indicators. In addition to the indicators, park staff identified an objective related to visitor safety that they will take management action to address. Adaptive management strategies would be implemented on an as needed basis as thresholds are approached or exceeded.

Indicators:

- Number of People Per Viewscape (PPV) at the Falls
- Number of new locations of trampling
- Volume of trash
- Number of incidences of parking in undesignated locations

Objective:

- Overall decrease in number of EMS & SAR responses

### **Indicator Topic: Crowding at the Falls**

Indicator: Number of People Per Viewscape (PPV) at the Falls

Threshold: No more than 35 PPV at Upper Falls, 80% of the time.

Rationale:

Park managers and researchers often use PPV as a measure to quantify visitor crowding. Crowded conditions have been documented to adversely affect the quality of visitor experience in national parks. Using PPV allows park managers and researchers to quantify visitor crowding impacts along higher use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks.

Laurel Falls is one of the most popular trails in the park. The trail provides a relatively short (i.e., less than 3 miles) round-trip hike, and is accessible to hikers with a broad range of ability levels. Correspondingly, this area frequently becomes overcrowded, which can negatively affect the quality of visitor experience. Currently, there is a limited, narrow space for viewing Laurel Falls. This existing platform has a steep drop-off to the falls below. Circulation at the falls is difficult and pedestrian congestion routinely occurs.

*Threshold Rationale:* It is estimated that there is approximately 500 square feet (SF) of standing area at the upper falls plus 120 SF on the existing bridge (4 ft x 30 ft = 120 SF). This equates to 620 total SF. It was determined that 35 PPV would provide enough personal space per person so that visitors can enjoy the falls in a social, but not crowded, setting. 35 PPV would allow for +/- 4 ft. 5 in. of personal space per person (620 SF / 40 PPV = 15 SF, or 4 ft. 5 in) under the current conditions. The preferred alternative blocks off the current 500 SF of standing area and makes the new bridge 536 SF (8 ft x 67 ft = 536 SF). It also adds a 300 SF viewing platform located right below the upper bridge. The approximate total square footage for the preferred alternative for the upper falls area (new bridge and viewing platform) is 836 SF. Under this alternative, 35 PPV would allow for +/- 5 ft. 6 in. of personal space (836 / 35 PPV = 23.8 SF per person or 5 ft. 6 in. per person).

Despite the social setting, visitors still expect to enjoy the natural features of Laurel Falls. The park-developed desired conditions for this area state that *visitors will have a high-quality experience that is not substantially degraded by crowding or safety concerns, and that visitors are able to experience the falls through multiple appropriate modes: seeing the falls, hearing the rumble of the falls, and feeling the mist of the falls.* This indicator monitors the visitor experience and is in line with the preference for a “well-ordered flow of foot traffic to the falls” as identified in the 2020 Visitor Experience Stewardship engagement.

#### Monitoring:

- The park will periodically (twice per week or more) conduct an observational study of PPV at the site location (via photo monitoring and direct counts) to establish and update the correlation between trail counter data and PPV counts. The photo should be taken from a point that captures the majority of visitors at the falls. Currently, most visitors to the area remain at the upper falls, and while a photo taken from here would be the most accurate reflection of the visitor experience, it would not provide an expansive enough view to capture the total people within view. Visitor patterns for lingering at the upper falls are likely to change when the design alternative is implemented. However, the park anticipates that change in design will provide more space to improve visitor opportunities at the falls. Essentially, a photo taken at the bridge would be blocked by the many people that congregate there. To provide a better view of the primary visitor experience, it may be best to cross the bridge and walk a few feet further up the trail (toward Cove Mountain) and look back at the upper falls.

#### Management Strategies:

- Develop and implement a public information effort about the desired conditions for the area and actions the NPS is taking to achieve those conditions and how visitors can best experience the falls. This information could be distributed through direct visitor contact, park publications, wayside exhibits, social media, websites, audiovisual media on a shuttle or other Alternative Transportation System (ATS) and/or in the visitor center, and through park partners.

- Increase the development and distribution of information pertaining to the unique attributes of other hikes in the area.
- Increase maps, wayfinding and other signage at the trailhead.
- Encourage visitors to visit Laurel Falls earlier or later in the day, or at other times of the year to avoid periods of peak use.
- Manage roadside parking to meet the capacity established for the analysis area.

Adaptive Management Strategies:

- Implement an ATS and alter the schedule as necessary to disperse the appropriate number of visitors at one time on the Laurel Falls Trail to manage for the agreed upon capacity for the area of analysis.
- Manage the number of people hiking the trail at one time through timed-entry reservation system or via parking permits.

### **Indicator Topic: Resource Damage**

Indicator: Number of new locations of trampling.

Threshold: No more than two new locations of substantial trampling.

Objective: Reduce the number of impacted areas by 10% within a year of trail reconstruction.

Rationale:

Laurel Falls Trail is a heavily trafficked area that currently experiences extensive off-trail use and associated impacts. Off-trail use and its impacts are predominantly associated with visitors short-cutting the horseshoe shaped switchbacks in the trail and visitors seeking a private place for a bathroom break. This kind of repeated off-trail travel leads to increases in erosion and is most common in areas of gradual slope. Current deteriorating trail surface conditions also contribute to off-trail travel as visitors navigate around hazards on the existing trail surface. Much of the impacts in the trail corridor will be addressed with design solutions. The Laurel Falls Trail rehabilitation is designed in a way to minimize off-trail travel and associated resource impacts to achieve desired conditions.

This indicator can also be a proxy to monitor for several other associated challenges with off-trail travel.

- The indicator can help monitor for an influx of invasive plants that results from trampling of native species, soil compaction, and dispersal of invasive seed which allows for invasive plants to colonize new areas.
- Off-trail travel in the stream can lead to an increase in sedimentation in the stream channel and erosion.
- Off-trail travel can lead to trail widening as a result of visitors navigating around trail hazards such as downed trees.
- This indicator is also connected to monitoring the visitor experience as denuded areas conflict with the desired condition: *Visitors experience forest and stream ecosystems that are largely undeveloped with natural processes predominating.*
- Social trails and denuded areas detract from the area's aesthetic.

Threshold rationale: There are currently approximately sixty substantial areas impacted by off-trail travel including social trails in the Laurel Falls area. The threshold is relatively low because this is an area where off-trail travel would be discouraged through engineering techniques in the trail redesign and unsafe for visitors. Trampling, and resulting impacted areas can develop slowly over time or can develop

quickly depending on a number of variables including surface type and the amount of use. Therefore, it is important for the park to identify and detect these areas early.

#### Monitoring:

The park will use the existing volunteer rover program to collect data on the number of newly trampled areas after the new trail is constructed. Monitoring will be more frequent after trail redesign and implementation, which is likely to be complete within the first two to three years and could decrease after social trails and visitor-created areas are reduced. Vegetation trampling will be defined for the volunteers and those involved with monitoring. Monitoring for the objective, evidence of revegetation, will also help ensure the park is achieving desired conditions where *visitors experience forest and stream ecosystem where natural processes predominate*.

#### Management Strategies:

- Increase education about the natural resources in the area. This could include the importance of staying on the trail; Leave No Trace campaign specific to durable surfaces in that location. Education could be delivered by the volunteer rovers and kiosk signage.
- Develop signs such as "stay on trail" and use barriers where social trails and visitor impacted areas are starting to form to discourage visitors from leaving the trail.
- Use temporary signage for restoration efforts in impacted areas; public education campaign about the restoration efforts; public information campaign about lack of bathrooms at trailhead or along trail.
- Visually mask impact areas using vertical mulching to deter continued use. Disruption/trampling of vertical mulch will allow monitors to detect continued use and the park to determine adaptive management strategies to curtail use.
- Formally survey/map the impacted areas after trail is constructed if substantial impact areas begin to form.
- Increase monitoring if substantial impact areas begin to form.

#### Adaptive Management Strategies:

- Evaluate engineered design. If something is unintentionally causing an increase in impact, develop solutions to remove or modify it.
- Add a permanent restroom at the trailhead.

### **Indicator Topic: Litter**

Indicator: Volume of Trash

Threshold: No more than 1,449 cubic inches (approximately 1 standard, plastic grocery bag) of trash collected during an average volunteer shift.

#### Rationale:

Visible trash and litter degrade the visual experience visitors and conflicts with desired conditions for *visitors to have a high-quality visitor experience and opportunities to learn about and connect with natural and cultural resources as a part of their Laurel Falls experience*. In addition, desired conditions for natural resources provide for *trailside resources experience minimal resource degradation through social trail creation, vegetation damage, litter and other resource impact behaviors*. The presence of trash and litter can also increase the potential for bear/human conflicts as the trash attracts bears to the area. There have been bear incidents on the trail previously. The visible presence of trash may encourage other visitors to engage in similar behavior rather than providing opportunities for education and establishment of group norms around decreasing the presence of trash in the area. The amount of trash

and litter was also noted as a primary issue during civic engagement with suggestions to improve the visitor experience by reducing the visible presence of trash and litter.

Volume was selected as the metric for this indicator and threshold rather than weight. The need to weigh trash could be an added burden on volunteers and park staff. Since bags of litter can be different sizes it was important to standardize the size of the bag and provide an estimate on volume of the bag in order to ensure consistency when monitoring for this indicator. The standard size of a grocery store bag is 11-1/2" x 6" x 21" which translates to a volume per bag of 1,449 cubic inches using the equation of calculating volume of length x width x height.

Threshold rationale: The per shift average of trash collected is 2.172 bags (3148 cubic inches) of trash based on data collected from March to August 2021 which represents an increase compared to the 2010 average of one bag (1,449 cubic inches). The current volume of trash collected is out of alignment with the desired condition of having a litter-free trail experience. Therefore, the threshold is identified below the current average to align with desired conditions.

#### Monitoring:

Volunteers currently work in four hours shifts, with one to two volunteers a day assisting with trash collection in addition to their other duties, with the goal of seven day a week coverage when possible. Trash is being collected in standard grocery store size bags with handles to make it easier for volunteers to carry the bags in and out. In some cases, the trash can be in a location that is difficult or dangerous to remove, in which case, it is left in place until a technical trash removal can be coordinated which requires a short-term trail closure.

The standard approach for monitoring will continue to employ volunteers using the standard grocery store size bags. The estimated volume of those bags is 1,449 cubic inches per bag which will be recorded based on the number of bags of trash. The park will also keep a log of the number of volunteers and hours dedicated to trash removal. Tracking volunteer hours, hours spent in technical trash retrieval, as well as volume of trash will help to ensure that an increase in volume is truly representative of more trash in the area rather than increases in volunteer hours.

#### Management Strategies:

- Educate visitors using active and passive techniques on-site and prior to the visit. Consider implementing a parkwide litter campaign using multi-platform tools and resources. Include Leave No Trace messaging such as 'pack it in, pack it out.' Include education messages on the ATS if that adaptive management strategy is implemented.
- Provide opportunities for volunteers to participate in Leave No Trace Trainer program, which focuses on communicating messaging.
- Provide opportunities for volunteer clean-up days in addition to the Laurel Falls Rover program.

#### Adaptive Management Strategies:

- Increase enforcement around litter and provide citations as necessary.
- Increase participation in Laurel Falls Rover volunteer program.
- Require more frequent trash pick/up retrieval outside of peak visitation to prevent bears from getting food rewards.
- Trash removal through technical means which would be conducted outside of peak visitation hours to reduce the impact on the visitor experience and circulation in the area.
- Install user friendly bear containers at trailhead with appropriate signage. This site previously experienced challenges with small trash receptacles that quickly filled leading to piles of trash left out and around the receptacle. Therefore, receptacle size is an important consideration.

**Indicator Topic: Parking Issues**

Indicator: Number of incidents of parking in undesignated locations.

Threshold: Parking does not exceed the design capacity of the parking lot more than 25% of the time (about 2 hours per day or 14 hours per week) during the peak hours of the day (9:00 a.m. to 5:00 p.m.).

Rationale:

Monitoring and managing visitor use according to this indicator helps provide for safer and more enjoyable visitor access to this popular destination by reducing vehicle congestion and conflicts in parking lots. Currently, on most days of the week the designated spaces are full by early morning and remain full throughout peak times (9:00 a.m. to 5:00 p.m.). Visitors park their vehicles up to half a mile east and west of the parking lot and walk alongside the road to get to the trailhead. Little River Road is a busy two-lane road with limited sight distance in some locations. People walking along the road with no designated pathway or barrier and with vehicles sometimes parked in the lane of travel, causes a safety issue for motorists and pedestrians alike. This indicator provides an important measure of parking lot conditions in relation to visitor access and safety as well as potential resource impacts as a result of parked vehicles in undesignated areas when lots are full.

As previously noted, during the Visitor Experience Stewardship engagement, the public expressed a desire for parking to be available in designated spots, and the ability to safely travel from their vehicle to the trailhead. Participants also noted that they are concerned over the resource damage and dangerous conditions resulting from roadside parking. Park staff reiterated this when developing desired conditions for the Laurel Falls area, wanting visitors to be able to access the trailhead from the parking lot in a way that minimizes dangerous interactions with vehicular traffic.

Monitoring:

Conduct an observational study of number of vehicles parked in unpaved areas east and west of the Laurel Falls trailhead, focusing on the presence or absence of vehicles. Citations and warnings for parking in undesignated spaces will continue to be tracked by law enforcement.

Management Strategies:

- Develop and implement a public information about the desired conditions for the area and actions the park is taking to achieve those conditions and how visitors can best experience the Falls. This information could be distributed through direct visitor contact, park publications, wayside exhibits, social media, websites, and through park partners.
- Increase the development and distribution of information pertaining to the unique attributes of other hikes in the area.
- Encourage visitors to visit Laurel Falls earlier or later in the day to avoid periods of peak use.
- Educate visitors on the dangers of parking on the road, park rules and regulations, and Leave No Trace practices.

Adaptive Management Strategies:

- Implement an ATS to reduce the number of personal vehicles parking at the trailhead and alter the schedule as necessary to disperse the appropriate number of visitors at one time on the Laurel Falls Trail.
- Manage the parking lot through a timed-entry reservation system or via parking permits, and some sort of physical barriers to meet the capacity established for the analysis area.
- Utilize brightly colored warning stickers for vehicles parked in undesignated spaces.
- Increase enforcement of endorsed parking only.

- Provide visitors with information on the status of the parking lot. This information would be conveyed to visitors before and/or on arrival to the trailhead to facilitate seeking alternative experiences.
- Identify and implement improvements to the parking lot to withstand visitor use and protect natural resources.

## Objective

In addition to thresholds, managers may establish specific, positive targets or objectives for resource conditions or visitor experiences. Unlike a threshold, an objective is defined as a specific result that an agency aims to achieve within a specified timeframe. Another distinction between objectives and thresholds is that objectives typically reflect conditions that are affected directly by agency action, whereas thresholds reflect conditions that result from the effects of visitor use under a particular management strategy. In practice, objectives are typically stated as managerial performance goals, whereas thresholds are typically based on physical, biological, or social conditions. For these reasons, the planning team decided to identify an objective related to visitor safety rather than establish a threshold. If thresholds are markers to prevent negative consequences and unacceptable conditions, objectives are markers to help ensure positive progress toward achieving and maintaining desired conditions.

Indicator Topic: Visitor Safety

Indicator: Number of incidences of accidents or other safety issues that require law enforcement response (Emergency Medical Services or Search and Rescue).

Objective: Reduce the number of safety incidents on the trail and at the falls by 20% within six months of new trail construction.

Rationale:

Visitor safety is a primary priority of the park staff. Visitor injuries and safety-related concerns are mitigated as much as possible but occur in areas with erosion and unauthorized visitor use. Unauthorized visitor use and diversions such as visitor-created trails can result in increases in safety issues and accidents, as well as resource impacts. During the Visitor Experience Stewardship civic engagement, concerns were raised that visitors climbing off-trail around the falls area is causing safety issues as well as degrading natural resources. These behaviors have been observed by park staff and volunteers. Serious injuries have occurred at both the falls and along the trail. The park-developed desired conditions also express a preference for a safe visitor experience: *Visitors with different levels of experience, fitness, equipment, and time-allotment can enjoy a high-quality hiking experience and Visitors have a high-quality experience that is not substantially degraded by crowding or safety concerns.* The planning team decided to include this objective as part of the plan to help ensure positive progress toward achieving and maintaining the desired conditions.

Monitoring:

Park staff will monitor through incident management analysis and reporting systems (IMARS) and EMS Reports.

Management Strategies:

- Increase visitor contacts with park staff and volunteers by increasing personnel to the area for orientation and education training. Specifically, using a strategy such as a Preventive Search and Rescue (PSAR) program which focuses on educating visitors on making sound decisions while hiking, having the necessary equipment to stay safe, respecting guidelines that protect resources and promote visitor safety, and overall, how to enjoy their experience at Laurel Falls.
- Increase visitor education on safety, trail conditions and resource protection behaviors through various means, including social media posts, park website, kiosks, trail signs, etc.

- Identify and implement improvements to the trail and falls viewing area to keep visitors from straying off the trail.

## **VISITOR CAPACITY IDENTIFICATION AND IMPLEMENTATION STRATEGIES**

### **OVERVIEW**

This report provides additional information about the visitor capacity identification as it relates to the VUM framework for the Laurel Falls Trail Management Plan EA. IVUMC defines visitor capacity as the maximum amounts and types of visitor use that an area can accommodate, while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established. To fulfill the requirements of the 1978 National Parks and Recreation Act (54 U.S.C. 100502), visitor capacity identifications and implementation strategies are legally required for all destinations and areas that this planning effort address. Visitor capacities were identified using best practices and examples from other plans and projects across the NPS. Based on these best practices, the planning team describes the process for identifying capacity following guidelines: 1) determining the analysis area, 2) reviewing existing direction and knowledge, 3) identifying the limiting attribute, and 4) identifying visitor capacity.

### **THE ANALYSIS AREA(S)**

This guideline has far-reaching effects on identifying visitor capacity because it involved recognizing (1) where geographically the visitor capacity will be implemented, (2) displacement or other unintended effects of managing visitor use levels, and (3) the effect of managing allocation(s) of visitor use within the analysis area(s). To determine the appropriate analysis area(s), the project team sought to understand the relationship between existing and potential visitor use patterns and desired conditions.

The entire Laurel Falls area including the trails and the falls viewing areas comprises the analysis area for the visitor capacity. The trail and falls are interconnected experiences, if there are more people on the trail that will lead to an increase in use at the falls. The majority of visitors use the trail to get access to the falls (with a minority continuing on past the falls toward Cove Mountain). The park will manage the visitor capacity for the 1.3-mile trail and falls as an interconnected system. As discussed in the “Indicators and Thresholds” section above, the park proposes to use Number of People Per Viewscape (PPV) at the Falls as an indicator. Accordingly, the park will manage the PPV at the falls as a part of the visitor capacity for the area.

### **REVIEW EXISTING DIRECTION AND KNOWLEDGE**

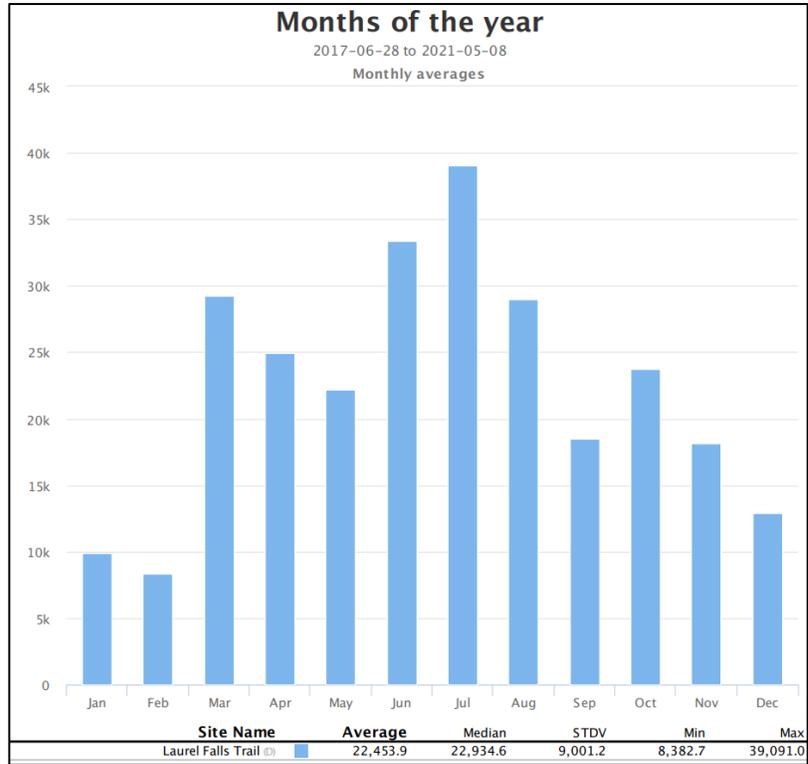
During this step, the planning team reviewed desired conditions, indicators, and thresholds, with detailed consideration of the park values that must be protected and are most related to visitor use levels. Desired conditions of key areas can be found in at the beginning of this document. For each of the key areas described below, relevant indicators, thresholds, and associated monitoring strategies are listed.

The amount, timing, and distribution of visitor use in the project area influences both resource conditions and visitor experiences. Visitor impacts influence the ability of the NPS to maintain desired conditions. Appropriate management strategies can be selected and implemented to maintain desired resource conditions and visitor experiences consistent with the purposes for which the park was established.

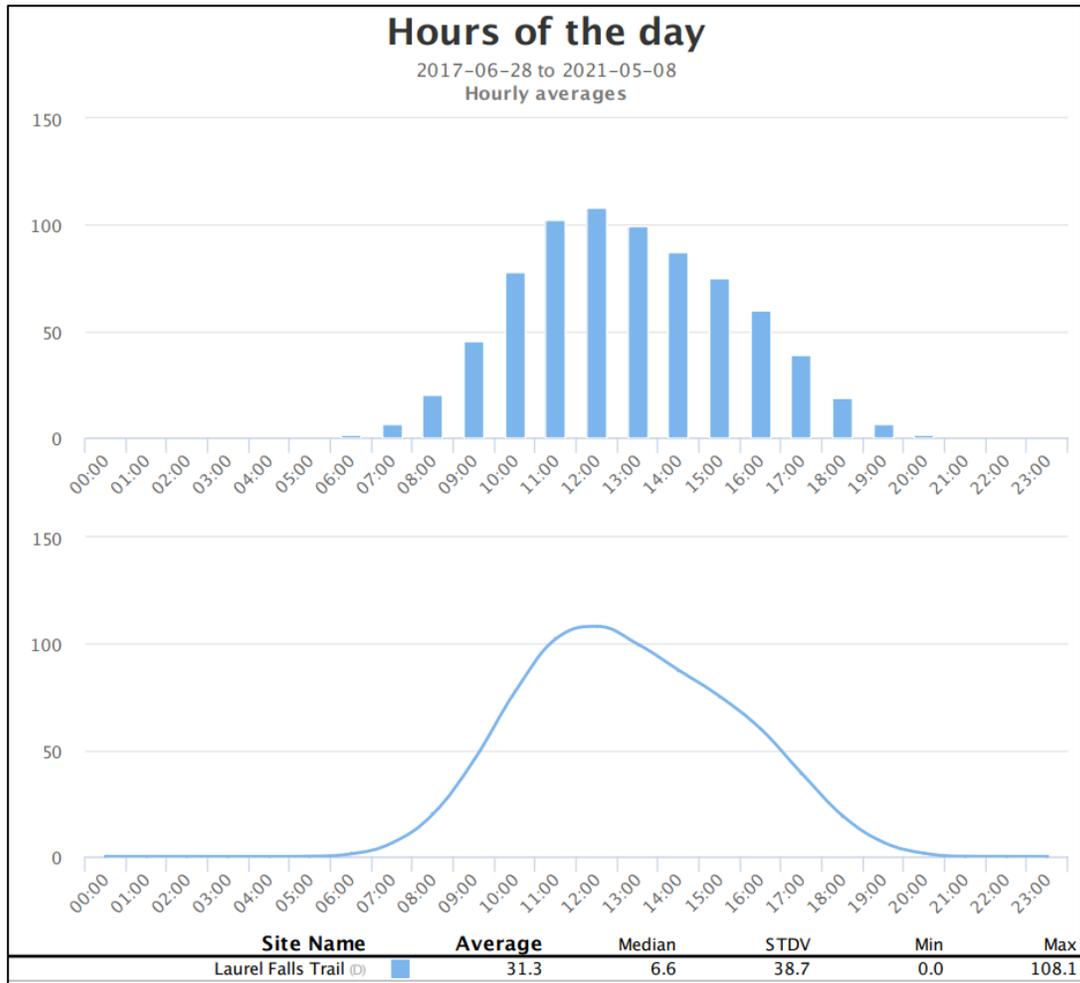
### **VISITOR USE DATA INFORMING THE VISITOR CAPACITY**

A trail counter was established on Laurel Falls Trail in 2017. Since that time, counts of visitors utilizing the trail have been collected. Monthly averages of visitors on Laurel Falls Trail vary from a low of

approximately 8,300 in February to a high of nearly 40,000 in July (see figure A-1). Maximum daily use is approximately 2,800 with an average of 750. The highest maximum use days occur in June and July. The average daily use in the month of July is 917 people. Average hourly trail counter data shows the peak at about noon and the high-use period between 10:00 a.m. and 3:00 p.m. (see figure A-2).



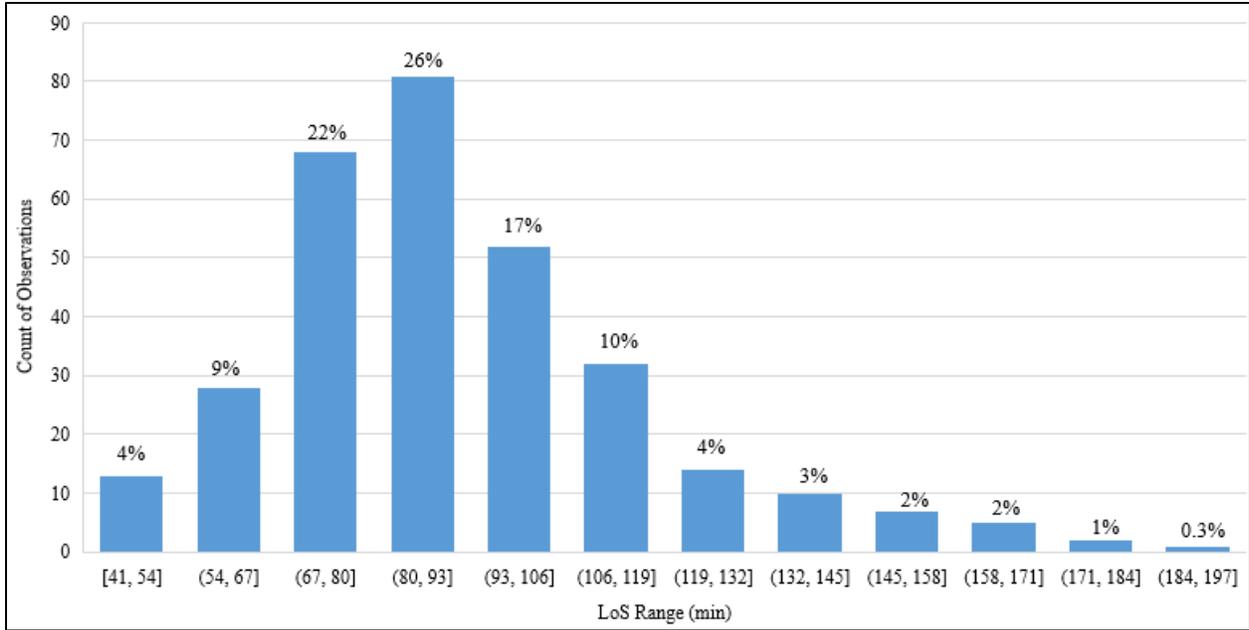
**FIGURE A-1. MONTHLY AVERAGE TRAIL USE BASED ON TRAIL COUNTER DATA COLLECTED FROM JUNE 2017 THROUGH MAY 2021.**



**FIGURE A-2. HOURLY AVERAGE TRAIL USE BASED ON TRAIL COUNTER DATA COLLECTED FROM JUNE 2017 THROUGH MAY 2021.**

Length of stay (LoS) measures how long visitors stay in an area – this metric is also often referred to as dwell time and is an indication of the turnover rate for the parking lot. LoS data were collected in May of 2021. Over the course of 10 days, over 400 cars in the Laurel Falls parking lot were monitored for arrival time, departure time, and number of occupants. To process these data, LoS observations less than 30 minutes were removed from analysis with the assumption that these visitors chose not to hike the trail therefore the data was not representative of trail use. The average LoS was 90 minutes.

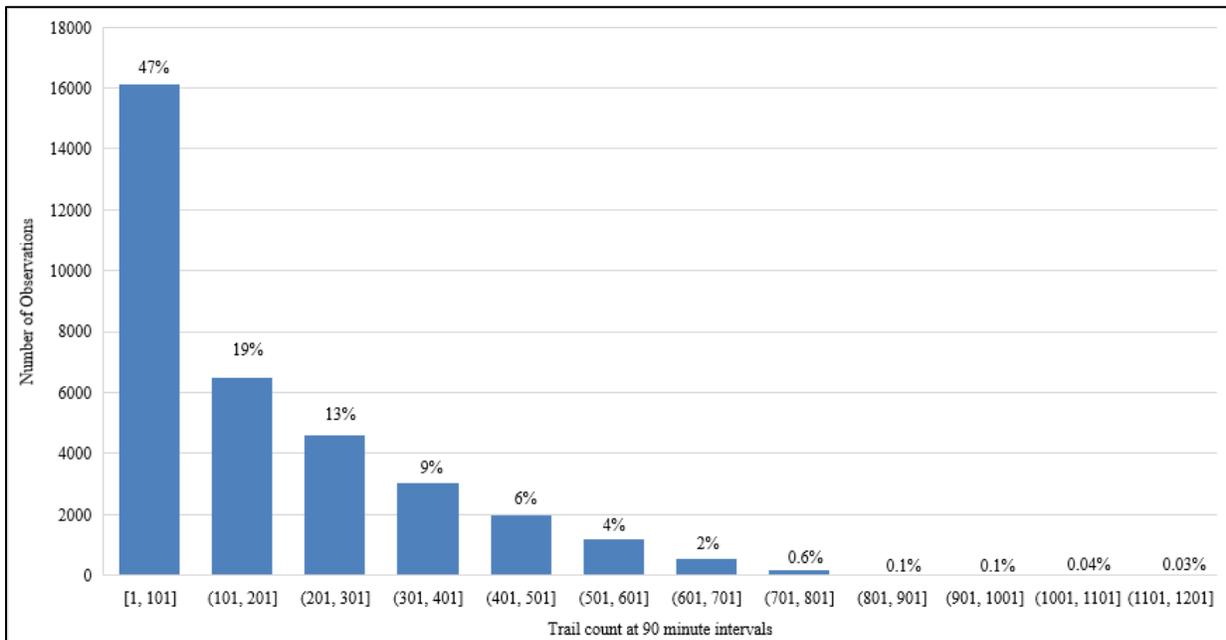
LoS frequencies are analyzed in figure A-3. The most prevalent LoS is between 80 and 93 minutes with 26% of observations falling into this category.



**FIGURE A-3. LENGTH OF STAY HISTOGRAM.**

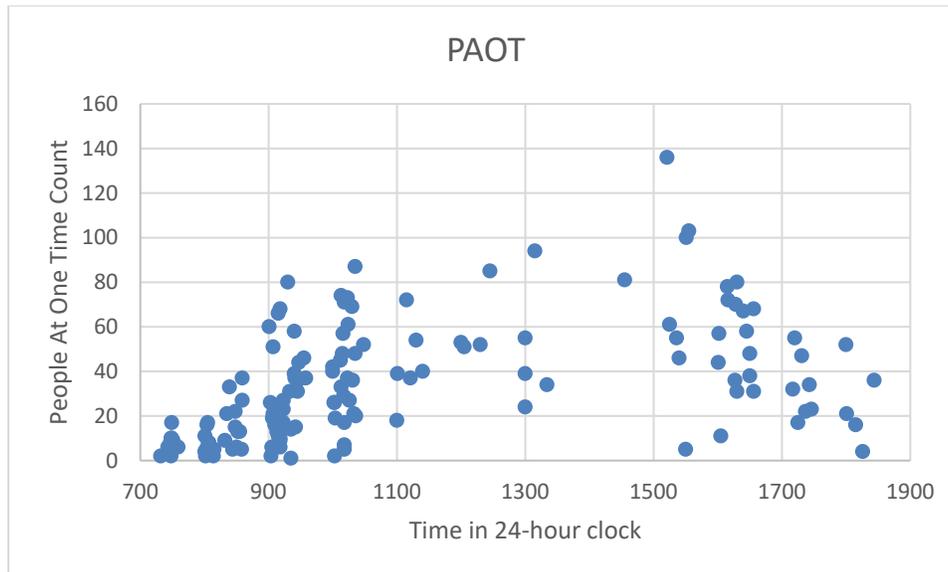
LoS did not substantially vary based on the day of the week, with a standard deviation of 4.7 minutes. The range of the LoS average is from 86 on a weekday to 97 minutes on Sundays. Similarly, LoS did not vary substantially based on the hour of arrival, with a standard deviation of 6.5 minutes.

Based on a LoS of 90 minutes, trail counter data were analyzed in 90-minute intervals (figure A-4). In processing the trail counter data for the 90-minute analysis timeframe in figure A-4, counts of zero visitors were removed. During 47% of the observations, 90-minute counts are between one and 101 people. 19% of the time, 90-minute counts are between 101 and 201 people. 19% of the time, 90-minute counts are between 101 and 201 people.



**FIGURE A-4. 90 MIN INTERVAL TRAIL COUNT HISTOGRAM.**

In addition to the trail counter and LoS data, a corps of volunteers monitor conditions in the Laurel Falls area. In addition to other metrics, volunteers collect observational counts of visitors at the falls. These counts are called People At One Time (PAOT) counts. They are a snapshot of all the individuals the volunteer can see from a vantage point that allows them visuals of the upper falls, the existing bridge structure, and the majority of the lower falls. The average PAOT based on this observational data set is 33, the maximum observation is 136. Observational count data were collected during the spring, summer and fall of 2020 and 2021 (figure A-5).



**FIGURE A-5. PEOPLE AT ONE TIME (PAOT) COUNTS OF THE UPPER FALLS, THE LOWER FALLS AND THE BRIDGE. THE X-AXIS INDICATES TIME IN A 24-HOUR CLOCK.**

As previously stated, the Laurel Falls area (trail and falls combined) received over 375,000 visitors in 2020. The 90 minutes average trail count is 135 people based on data from 7:00 a.m. to 7:00 p.m., the time period during which the majority of use is concentrated. The maximum observed 90-minute count was 1197 people in the area. Typically, the highest 90-minute counts occur between the hours of 11:00 a.m. and 12:00 p.m. with average counts of about 320 people. With both the no-action alternative and the preferred alternative, there will exist approximately 6,547 linear feet of trail. Current use (as defined by the average 90-minute count during the peak hours of 320 people) would equate to about 1 person per 20 feet of trail (total linear feet of trail divided by the average 90-minute count during the peak hours).

Under the preferred alternative, the trail would be resurfaced and improved, reducing the number of locations where there is a major height difference between the level of the hardened surface and the surrounding dirt. These improvements will help to reduce the number of incidents of slips, trips, and falls along the trail. Additionally, numerous wayside areas would allow visitors a place to pass one another without going off the trail and impacting the natural resources. A variety of management strategies would be employed to ensure that thresholds are not reached, and goals and objectives of this plan are achieved. These strategies would help visitors to disperse along the trail and at the falls, would minimize impacts to natural resources, and would provide for a safer, socially oriented visit in a beautiful, natural setting.

### IDENTIFY LIMITING ATTRIBUTES

This step requires the identification of the attribute(s) that most constrains the analysis area's ability to accommodate visitor use. The planning team identified the visitor experience as the most limiting attribute to constrain visitor use levels for the trail and falls area; specifically, the visitor experience at the

falls viewing area and opportunity to view the falls. The desired visitor experience is that *visitors will have a high-quality experience that is not substantially degraded by crowding or safety concerns, and that visitors are able to experience the falls through multiple appropriate modes: seeing the falls, hearing the rumble of the falls, and feeling the mist of the falls.* The park wants to provide the opportunity for various user types to access this natural setting a relatively short hiking distance from the parking lot. While visitors will have a high probability of encountering other visitors, there will also be opportunities to be immersed in the natural setting.

Since the visitor experience at the falls is the most limiting attribute, the indicators and thresholds most related are the incidences of parking in undesignated locations and people per viewscape at the upper falls. Any management strategies implemented to achieve and maintain desired conditions before reaching thresholds would also have an impact on the visitor capacity. For instance, if an ATS or parking reservation / permit system are implemented, this will directly affect the number of people at one time on the trail and at the falls.

### **Identify Visitor Capacity**

To identify the appropriate amount of use at key areas, outputs from previous steps were reviewed to understand current conditions compared to desired conditions for the area. This visitor capacity was identified based on the best professional judgment of park staff and the understanding about current visitor experience and resource conditions. The visitor capacity identified for the Laurel Falls area (trail and falls) is 450 PAOT (350 PAOT for the trail and 100 PAOT for the falls viewing area).

Park staff recognized that the maximum observed count of 1197 visitors in the area at one time was more than the area could accommodate at once without adverse impacts to the resources and the visitor experience. Therefore, a significant decrease from this number is necessary in order to achieve the desired conditions. However, because the various management strategies and new trail design would aim to disperse people along the 1.3 miles and minimize impacts to the resources, the park estimated that the trail could sustain additional visitor use from the average seen during peak hours. By decreasing the capacity approximately 70% from the maximum observed, and slightly increasing from the average peak of 320 PAOT, a capacity of 350 PAOT would maintain desired conditions. This would suggest that if all 350 people were on the trail at the same time, there would be about one person every +/-19 feet, or one group of 4 people every 75 feet. The maximum people seen at one time at the falls (during periods of active monitoring) was 136, with the average PAOT at the falls is 33. Again, park staff identified a decrease from the maximum 136, and an increase from the average 33 PAOT under the preferred alternative, given the addition of new facilities such as viewing platforms, new trails aligning the water, and another bridge. The limiting attribute of 35 PPV provides for approximately 5 ft. 6 in. of personal space. In order to provide the same visitor experience and opportunities to enjoy the entirety of the falls, a personal space of 5 ft. 6 in. was applied for everyone at both the upper and lower falls. Under the preferred alternative, there is approximately 2,365 SF of space on the upper and lower bridges and viewing platforms. 5 ft. 6 in. of personal space is equal to +/- 24 SF per person. 2,365 SF divided by 24 SF equals +/- 99 PAOT. Park staff identified a visitor capacity of 100 PAOT (rounded up from 99). The combined capacity for the trail leading to Laurel Falls and the falls itself, is 450 PAOT for the preferred alternative (alternative 2).

Since visitation varies throughout the day, the park knows that at a minimum desired social and resource conditions would be maintained even during periods of high use. This combined visitor capacity of 450 PAOT would allow for surges in visitation during busy holiday weekends, while still providing a meaningful visitor experience by preserving the uniqueness of the visitor experience and maintain moderate visitor density in the Laurel Falls area.

## Visitor Capacity Implementation Strategies

Park staff will employ a variety of management options to implement the Laurel Falls visitor capacity. Management strategies would be implemented based on a variety of factors including staff resources, funding, and need as determined by indicator and capacity monitoring. Strategies would be implemented periods of peak use. These strategies include:

- Targeted messaging around the desired visitor experience, Leave No Trace, protecting natural resources, and typical busy times.
- Increase the development and distribution of information pertaining to the unique attributes of other hikes in the area.
- Encourage visitors to visit Laurel Falls earlier or later in the day to avoid periods of peak use.
- Eliminate undesignated roadside parking (using some form of physical barrier) to manage for the agreed upon capacity for the analysis area.
- Implement an ATS and alter the schedule as necessary to disperse the appropriate number of visitors at one time on the Laurel Falls Trail.
- Manage the number of people hiking the trail at one time through timed-entry reservation system or via parking permits.
- Rotate access to the parking lot(s), such as implementing a 1 out, 1 in strategy.
- Parking improvements under alternative 2 would include 90 designated parking spots for visitors to the Laurel Falls Trail. The park's person per vehicle multiplier averages out (over the course of the year) to 2.65. A total of 90 spaces would provide parking for approximately 239 (90 x 2.65) visitors at the trailhead at one time. The number of parking spaces, the average length of stay of visitors, and the timing and frequency of an ATS all contribute to managing the visitor capacity. Management strategies for each should be evaluated and designed to stay within the 450 PAOT capacity.

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