EXHIBIT 27

Chattooga National Wild and Scenic River

Upper River Recreation Use Monitoring

Study Report

Prepared for Sumter, Chattahoochee, and Nantahala National Forests

by

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EXECUTIVE SUMMARY

The Upper Chattooga River is a 21-mile segment of the Chattooga Wild and Scenic River (WSR) that flows through three National Forests in three states. The U.S. Department of Agriculture, Forest Service (Forest Service) January 31, 2012, Decision Notice (DN) and Finding of No Significant Impact (FONSI), Amendment #1 to the 2004 Revised Land and Resource Management Plan specified how the Sumter (South Carolina), Chattahoochee (Georgia), and Nantahala (North Carolina) National Forests would manage recreation uses in the upper segment of the Chattooga WSR corridor. The 2012 DN's include new management direction like allowing whitewater boating, setting visitor use capacities in frontcountry and backcountry areas, designating campsites and group size limits, develop and implement a monitoring plan, and apply adaptive management as needed in response to monitoring findings. The goal of these measures was to protect and enhance the recreation and other Chattooga River outstandingly remarkable values (ORVs).

This report summarizes information collected during the first monitoring effort after the signing to the DN revising the three Land Management Plans. Monitoring was designed to characterize use and social impacts occurring within the upper segment of the Chattooga WSR corridor, identify changes since a previous study in 2008, and consider whether the capacity thresholds are effective at protecting and enhancing the river's ORV's, in particular the social/solitude values. Methods included intercept surveys, spot counts, and traffic and trail counters. Data collection started in September 2015 and ended by October 1, 2017, with samples collected over weekdays, weekends, and holiday weekends every month throughout the study period.

This report focuses on using the data from the recreation use monitoring effort to answer four specific monitoring questions from the *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor, Sumter, Chattahoochee, and Nantahala National Forests*, January 2012 Environmental Assessment (EA).

- Monitoring Question (MQ) one (MQ1) relates to the change in recreation use over time for frontcountry areas and backcountry reaches.
- MQ2 relates the types of users recreating in the frontcountry areas and backcountry reaches to vehicles at each access point.
- MQ3 relates to the number of encounters visitors are experiencing in the backcountry and how that is affecting their perception of solitude.
- MQ4 covers how frontcountry use levels affect visitors' perceptions of crowding and congestion.

Although the monitoring questions are presented here in a single report, the report presents key findings, an introduction, a methodology, results, and discussion for each question. The monitoring questions focus on data collected during the peak (summer) season (defined as the period between June 1 and August 31, excluding 4th of July weekend) and highlight differences between weekday and weekend use.

From the analysis, we discern the following conclusions:

- There has been a general increase in at-one-time-vehicle counts at most sites across most weekdays and weekends in most months since the 2008 study.
- Average levels of use, although higher than reported in 2008, are less than capacities set by the 2012 DN during summer weekends at all frontcountry areas and backcountry reaches except for Ellicott Rock, which exceeded capacity levels for peak (summer) weekdays and weekends.
- Visitor expectations of solitude while recreating in the WSR were met.
- A majority of visitors recreate in the backcountry (more than 0.25-mile from their vehicle) during their visit.
- Visitors reported very few conflicts between user groups, and 4 conflicts out of 224 visitors surveyed were documented (1.8%), involving unleashed dogs in 3 occasions and a boom box on a fourth.
- Only parking areas received notable crowding scores.
- Over the peak (summer) period, the upper Chattooga corridor exhibits increases in vehicles-at-one time (VAOT) from 2008 levels. Weekdays saw a net increase in VAOT, and weekends exhibited a net decrease.
- Across all backcountry reaches, walking/hiking make up the most popular activity category, followed by fishing then backpacking.
- Using the user type hierarchical analysis, angling was the largest user type category in the Ellicott Rock and Nicholson Fields reaches, day users was the largest user type category in the Chattooga Cliffs reach, and the Rock Gorge reach had a tie for predominant user type between day users and anglers. Nicholson Fields, Rock Gorge, and Ellicott Rock are the most popular reaches for overnight users.
- Across all backcountry reaches, solitude expectations are positive. Although encounters have an impact on solitude perception, crowding and congestion at frontcountry areas are a more significant driver of negative solitude perception.

1.0 INTRODUCTION

In January 2012, the U.S. Department of Agriculture, Forest Service (Forest Service), released a Decision Notice (DN) and Finding of No Significant Impact (FONSI) specifying how the Sumter (South Carolina), Chattahoochee (Georgia), and Nantahala (North Carolina) National Forests would manage recreation uses in the upper segment of the Chattooga Wild and Scenic River (WSR) corridor. The DN established a new management direction for the corridor to coordinate management of the upper segment of the Chattooga WSR on all three national forests and preserve that segment's free-flowing condition, protect its water quality, protect and enhance its outstanding and remarkable values (ORVs), and preserve the wilderness character of the Ellicott Rock Wilderness. The DN also allowed the Forest Service to manage for whitewater boating for the first time along reaches above the Highway 28 (Hwy) Bridge.

As part of the DN, the Forest Service recognized that management would have to be adaptive to ensure the future protection of the ORVs. As part of that management strategy, regular monitoring would inform decisions; adjustments, if necessary, would be implemented; and future monitoring efforts would track their success. The Forest Service Monitoring Plan for the WSR frontcountry and backcountry was developed to monitor and characterize existing recreation resources and use, develop an understanding of the quality of the recreational experience at frontcountry sites and backcountry reaches, and identify conflicts and other capacity-related issues in the WSR.

This recreation monitoring and assessment study report analyzes data collected from September 2015 to October 2017. However, the analysis focuses on data during the peak (summer) season (from June 1 to August 31, excluding 4th of July weekend) during the summer period.

1.1 Study Description

The DN opened several reaches in the upper segment of the Chattooga WSR corridor to seasonal boating use and included several other management actions to address visitor impacts and uses in the upper segment of the Chattooga WSR corridor, including setting capacities for backcountry group size, actions to minimize encounters and conflict on backcountry trails, designating backcountry campsites, executing a monitoring plan, and applying an adaptive management program as needed in response to monitoring findings. This study report:

- quantifies the number of vehicles at primary public access areas (frontcountry sites) and compares vehicle counts to frontcountry site capacities established in the DN;
- develops a relationship between frontcountry parking utilization and backcountry reach use levels;
- uses randomized surveys to characterize recreational use to identify tolerance and issues associated with backcountry encounters; and

- describes perceptions of crowding and congestion at the frontcountry.

1.2 Purpose

The purpose of the recreation use and monitoring study is to provide baseline recreation information relevant to visitor use management of the upper segment of the Chattooga WSR corridor. The study included an inventory of existing recreational facilities and an assessment of existing recreational use and user interactions.

Goals of this study include:

- Obtain information about the change in vehicle counts over time at frontcountry access points.
- Identify the proportion of recreation use by type of visitor in frontcountry areas and backcountry reaches and how that use relates to vehicle counts.
- Answer questions about backcountry encounters: how does total daily backcountry use relate to the number of encounters? Is the number of encounters affecting opportunities for solitude in the backcountry? How do the number of encounters compare to user tolerances?
- Identify how daily frontcountry use levels are affecting perceptions of crowding, congestion, and desired experiences in the frontcountry areas.

Key objectives associated with study components include:

1. Collect data on visitation levels, activities, and trip frequencies related to recreational use) and user preferences and perceptions (e.g., adequacy of facilities, crowding) at existing frontcountry and backcountry sites.
2. Collect information (e.g., activity type, visitation levels at all study sites) on recreational use and user preferences.
3. Characterize existing and potential recreational uses by season and activity.
4. Characterize current user preferences and any identified need for management action. Interview users on perceptions of crowding, solitude, and expectations.
5. Summarize parking utilization, and identify sites that receive heavy use. Count vehicles, people, and groups, in front- and backcountry settings.
6. Summarize current recreation use.

1.3 Study Area

Recreation sites within the study area, covering lands and public river access points within the upper segment of the Chattooga WSR corridor, include trailheads, campsites, informal campsites, hiking trails and fishing access to the river, and roadside parking areas. Figure 1.3-1 shows the WSR corridor and public access points.

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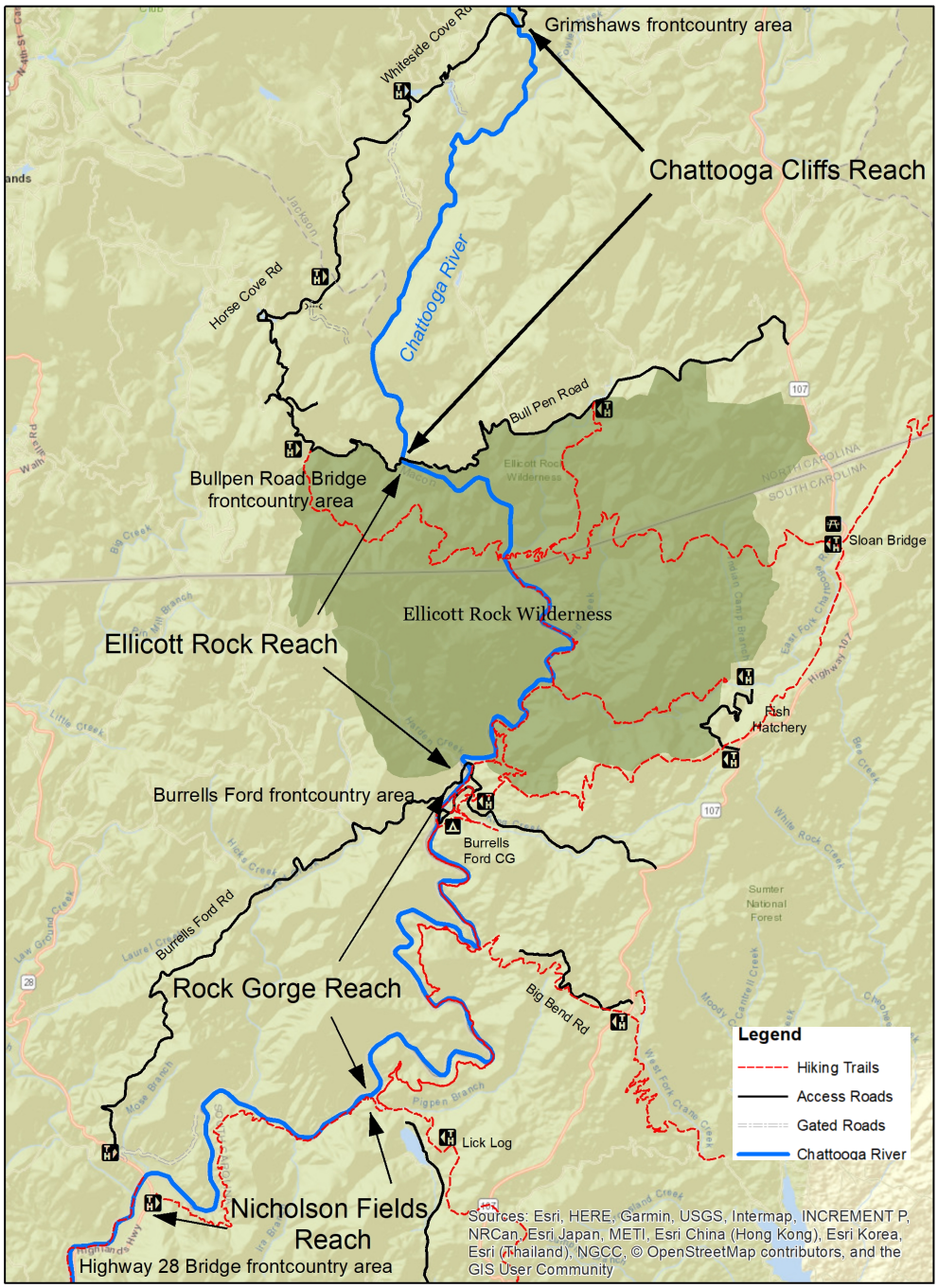


Figure 1.3-1. Upper Chattooga WSR Recreation Study Area.

The study area encompasses the lands and access points along the upper segment of the Chattooga WSR above Hwy 28. Specifically, the study area is divided into four frontcountry areas and four backcountry reaches.

- Frontcountry areas include:
    - Grimshawes/Sliding Rock,
    - Bullpen Road Bridge,
    - Burrells Ford Bridge, and
    - Hwy 28 Bridge.
- Backcountry reaches include:
    - Chattooga Cliffs (Grimshawes Bridge to Bullpen Road Bridge),
    - Ellicott Rock (Bullpen Road Bridge to Burrells Ford Bridge),
    - Rock Gorge (Burrells Ford Bridge to Lick Log Creek), and
    - Nicholson Fields (Lick Log Creek to Hwy 28 Bridge).

1.4 Area Descriptions

The 2012 DN separates the Upper Chattooga WSR into four frontcountry areas and four backcountry reaches. Frontcountry areas exist within 0.25-mile of identified roads and bridges and offer easy access to the corridor, and backcountry areas lie beyond 0.25 mile of identified roads and bridges. Each frontcountry area and backcountry reach is served by various parking areas, referred to in this report as access points. Details on the frontcountry areas, backcountry reaches, and access points are provided in the following section. Additional site photos are provided in Appendix A.

1.4.1 Frontcountry Areas

As defined for this study, frontcountry recreation occurs within 0.25 mile of roads and bridges. Three major roads that cross the Upper Chattooga within the study area offer such frontcountry recreation opportunities. Frontcountry areas listed in the 2012 DN include:

- Grimshawes/Sliding Rock Bridge
- Bullpen Road Bridge Area
- Burrells Ford Bridge Area
- Highway (Hwy) 28 Bridge Area.

These sites are generally staging areas for visitors to leave vehicles and prepare themselves and gear before heading into the backcountry. Spot counts and interviews were conducted at access points that serve these frontcountry sites.

1.4.2 Backcountry Reaches

By definition for this study, backcountry recreation occurs farther than 0.25 mile from the specified frontcountry bridge location (e.g., Grimshawes/Sliding Rock Bridge, Burrells Ford Bridge, Bullpen Bridge, and Hwy 28 Bridge). Important attributes for backcountry recreation include water quality and clarity, scenery, and a fishery with higher proportions of "wild" or "naturalized" fish (Whittaker 2007). Recreational users who fish the WSR backcountry note that it is different from frontcountry areas because of its width, depth, and variety of fishable water (including riffles, runs, pocket water, and shoals) (Whittaker 2007). Hunting occurs along user-created trails, but overall there is light hunting use (Whittaker 2007). Backcountry reaches in the study area are as follows:

- Chattooga Cliffs Reach: starting 0.25-mile upstream of Bullpen Road Bridge
- Ellicott Rock Reach: 0.25 mile from Bullpen Road to 0.25 mile from Burrells Ford Road
- Rock Gorge Reach: 0.25 mile downstream from Burrells Ford Road walk-in campground to confluence with Lick Log Creek
- Nicholson Fields Reach: Confluence of Lick Log Creek to 0.25-mile above Hwy 28 Bridge

1.4.3 Access Points

Access points are parking areas for frontcountry areas and backcountry reaches. Each of the frontcountry areas and backcountry reaches are served by multiple access points. Table 1.4-1 presents existing trailheads and recreation sites located adjacent to the study area that provide water- and land-based recreation opportunities for the general public.

Table 1.4-1: Publicly accessible study area access points.

Location	Type of Site	Popular Uses
Green Creek Access/Trailhead	Trailhead parking	Hiking, whitewater boater put-in access, angler access
Norton Mill Creek Access/Trailhead	Trailhead parking	Hiking, whitewater boater put-in access, angler access
Bullpen Bridge Area	Direct river access and trailhead parking	Hiking, angler access, whitewater boater put-in access, picnicking, swimming, single informal campsite nearby
Fowler/Bad Creek Trailhead	Trailhead parking	Hiking, backpacking, angler access
Ellicott Rock Trailhead	Trailhead parking	Hiking, backpacking, angler access
Sloan Bridge Picnic Area and Fork Mountain Trail Trailhead	Trailhead parking and picnic area	Hiking, backpacking, angler access
Fish Hatchery and East Fork Trailhead	Picnic area, fishing platform, trailhead parking	Hiking, angler access
Foothills Trail Trailhead on Fish Hatchery Road	Trailhead parking	Hiking, angler access
Burrells Ford Bridge area	Direct river access, trailhead parking, walk-in campground	Hiking, angling, whitewater boater put-in access, picnicking, swimming, dispersed camping/backpacking, walk-in campground
Big Bend Road	Forest Service dirt road	Dispersed camping, hiking, angler access
Big Bend Trailhead/Cherry Hill Campground (outside fee area)	Trailhead parking	Hiking, angler access
Lick Log Creek Access	Trailhead parking	Hiking, whitewater boater take-out
Hwy 28 Bridge Area	Direct River Access, trailhead parking	Hiking, angler access, backpacking

Green Creek Access (Trailhead)

This site provides trailhead parking and trail access to the Grimshawes/Sliding Rock Bridge frontcountry area and Chattooga Cliffs backcountry reach. The access area and trail were recently improved to accommodate whitewater boater put-in parking. Parking at this location can safely accommodate about eight vehicles.

Norton Mill Creek Access (Trailhead)

This site provides trailhead parking and trail access to Grimshawes/Sliding Rock Bridge frontcountry area and Chattooga Cliffs backcountry reach. This old roadbed provides recreation access as an alternative boater put-in and access point via the 1.2-mile trail. Anglers have historically used this trail, which was recently improved to accommodate whitewater boater access. Parking is along the shoulder of Whiteside Cove Road and can safely accommodate five to eight vehicles.

Bullpen Bridge Area

Bullpen Road Bridge is located on land within the upper segment of the Chattooga WSR corridor on Bullpen Road (also known as State Road 1178) in North Carolina and crosses the Chattooga River. There is a paved parking space on the west side of the bridge at the trailhead that can accommodate two vehicles with an additional pull-out parking area less than 0.25-mile away that can accommodate about six vehicles. Additional vehicles use the shoulder on both sides of the bridge when these spaces are occupied. Within about 0.5-mile of this area is a dispersed campsite with trail access to the river. There are several sunning/relaxation sites accessible during warm weather and swimming holes during low water periods. The rapids and cascades in this area limit frontcountry angling opportunities. Figure 1.4-1 shows the paved parking area on the west side of the bridge in use as well as shoulder parking.

Figure 1.4-1. Bullpen Bridge Road parking.

Fowler/Bad Creek Trailhead

The Fowler/Bad Creek trailhead is on Bullpen Road east of the Chattooga River. This access point serves the Ellicott Rock backcountry reach via the Ellicott Rock trail (Forest Service TR431). Parking for this trailhead is in a small pullout immediately adjacent to the road that can safely accommodate one to three vehicles.

Ellicott Rock Trailhead

The Ellicott Rock trailhead is on Bullpen Road west of the Chattooga River. This access point serves the Bullpen Road Bridge frontcountry area and the Ellicott Rock backcountry reach via the Ellicott Rock trail (Forest Service TR431). Parking for this trailhead is in a small pullout immediately adjacent to the road that can safely accommodate about five to eight vehicles.

Sloan Bridge Picnic Area and Fork Mountain Trail Trailhead

Sloan Bridge Picnic Area and Fork Mountain Trail trailhead is an unsigned parking lot and picnic area on Highway 107 near the South Carolina-North Carolina border. The access point serves the Ellicott Rock Backcountry reach via the Fork Mountain Trail (Forest Service TR322). The Fork Mountain Trail starts here and ends where it joins the Ellicott Rock Trail in the Ellicott Rock Wilderness area. From here, the trail eventually becomes the Chattooga Trail and continues southwest to Burrells Ford. The Foothills Trail also crosses through this parking area. The parking area can accommodate about 15 vehicles. This is a popular area with hikers and backpackers looking for access close to Ellicott Rock and making one-way hikes to Burrells Ford Bridge. Figure 1.4-2 shows the parking area and trailhead signage.

Figure 1.4-2. Sloan Bridge picnic area and Fork Mountain Trail trailhead parking.

Fish Hatchery and East Fork Trailhead

The state of South Carolina Department of Natural Resources operates the Walhalla fish hatchery on the East Fork Chattooga River off Fish Hatchery Road about 2 miles off South Carolina Highway 107. The site provides tours of the hatchery and ponds to the public. This access point serves the Ellicott Rock backcountry reach.

Immediately adjacent to the hatchery, the Forest Service maintains a paved public parking that can safely accommodate about 15 vehicles; a small, barrier-free fishing pier; two picnic table sites; and a picnic pavilion. This area also serves as the trailhead for the East Fork Trail that follows the East Fork Chattooga River for 2.5 miles where it connects with the main stem. This location is popular with anglers and hikers. Intercept surveys and spot counts were conducted in the vicinity of the Forest Service parking and picnic areas at the fish hatchery.

Burrells Ford Area: Campground Parking Lot (SC side)

The Burrells Ford area features an array of frontcountry recreation opportunities, including picnicking, sunning/relaxing, swimming, and short walks. Figure 1.4-3 shows the dedicated parking area for the campground. The walk-in campground parking area is on the South Carolina side of the river and houses a vault toilet. The campground parking area can accommodate 36 vehicles. This access point serves the Burrells Ford Bridge frontcountry area and the Ellicott Rock and Rock Gorge backcountry reaches.

Figure 1.4-3. Burrells Ford walk-in campground parking area.

Burrells Ford Area: Parking Lot (GA Side)

The parking area on the Georgia side of the river was improved to formalize boater put-in and take-out activities with hardened path, new parking timbers, and signage. This parking area can accommodate 10 vehicles (Figure 1.4-4). This access point serves the Burrells Ford Bridge frontcountry area and the Ellicott Rock and Rock Gorge backcountry reaches.

Figure 1.4-4. Burrells Ford parking area on Georgia side.

Burrells Ford Area: Bridge/Trailhead

Backpackers, hikers, and anglers also park along the shoulder of the road near Burrells Ford Bridge. During lighter use periods, parking frequently clusters around the trailhead; as use increases, parking can extend from the bridge back almost to the campground parking area, a distance of 0.40 mile (Figure 1.4-5). This access point can accommodate approximately 34 vehicles and serves the Burrells Ford Bridge frontcountry area as well as the Ellicott Rock and Rock Gorge backcountry reaches.

Figure 1.4-5. Vehicles parked along road near Burrells Ford trailhead.

Big Bend Road

Big Bend Road is a primitive Forest Service road (Road 709) that begins at Highway 107 across the highway from Cherry Hill Campground. There is a small, primitive campsite at the end of the road.

Big Bend Trailhead/Cherry Hill Campground (outside fee area)

Across the highway from Big Bend Road is a small pull-out parking area for hikers and other recreationists. This access point provides room for about three vehicles and serves the Rock Gorge backcountry reach. Figure 1.4-6 shows the trailhead and pull-out parking. The small pull-out connects to Cherry Hill campground via a trail. Cherry Hill campground is closed from November 1 to March 31, at which time vehicles would occasionally be spotted outside the gate and it is assumed that visitors were hiking Big Bend Road or Big Bend Trail. There is room outside the gate for an estimated one vehicle. This access point serves the Rock Gorge backcountry reach.

Figure 1.4-6. Big Bend Trail (on left) and pull-off parking (right).

Lick Log Creek Access

This site provides trailhead parking and opportunities for sightseeing, hiking, swimming, picnicking, sunning/relaxing, and backpacking, and it acts as a whitewater boating take-out location. A number of waterfalls in proximity to the trailhead make this site popular with scenic viewers out for day trips in the upstate area. Parking at the trailhead is accessed via a narrow, single-lane gravel road. The parking area can safely accommodate about eight vehicles with limited space for turning a vehicle around. This access point serves the Rock Gorge and Nicholson Field reaches. Figure 1.4-7 shows the parking area near capacity.

Figure 1.4-7. Lick Log Creek Access.

Hwy 28 Bridge Area: Ridley Fields Parking Area (SC side)

The designated parking area near the Hwy 28 Bridge on the South Carolina side of the river, known as Ridley Fields lot, is popular for frontcountry angling or as the starting point for backcountry angling and hiking (Figure 1.4-8). The site also receives a small amount of hunting. This parking area can safely accommodate about 10 vehicles. This area serves the Hwy 28 Bridge frontcountry area and the Nicholson Field backcountry reach.

Figure 1.4-8. Ridley Fields Lot near the Hwy 28 Bridge.

Hwy 28 Bridge Area: GA Side

The small parking area on the Georgia side of the Hwy 28 Bridge provides similar trailhead access; however, this parking area supports trail use both upstream and downstream of the bridge which is part of the non-study Bartram Trail. This small parking area can accommodate about eight vehicles. This access point serves the Hwy 28 Bridge frontcountry area and 25 percent of the vehicles here are assumed to use the Nicholson Field backcountry reach and the remaining 75 percent are assumed to use the non-study Bartram Trail.

Highway 28 Bridge Area: USFS Gate (GA Roadside)

Farther west on Hwy 28, there is a small informal pull-off parking area associated with a gated Forest Service road that follows the river upstream making for a relatively easy hike along the west bank of the river. Access to the river along this route strays from the river for the first mile or two arriving to the river a few miles upstream of the Hwy 28 Bridge. The parking is limited to shoulder parking and can safely accommodate about four vehicles. This access point serves the Hwy 28 Bridge frontcountry area and the Nicholson Field backcountry reach. This section of the Chattooga is stocked from May to October and regulated by delayed harvest November 1 – May 14 (artificial lure, catch and release only). Bait, spin, and fly fishing occur at these locations the rest of the year.

1.5 Methods

Data collection to answer the monitoring questions and evaluate use levels against the capacity thresholds included interviews (intercept surveys) at access points (parking areas that serve either a frontcountry area or a backcountry reach) and access areas (a combination of one or more access points), spot counts at access points and access areas, and traffic and trail counters. Monitoring began over Labor Day 2015 and extended through Labor Day 2017. Although the capacity thresholds set forth in the 2012 DN are focused on the peak (summer) recreation season, the Forest Service scoped the study to cover the non-peak season understanding that the MQ's rely on knowledge about the visitor types and uses, encounters, tolerances, crowding, congestion and desired experiences. As such, extending the monitoring through the winter would ensure the full mix of potential uses (e.g., new whitewater boater uses) would be included in the results. During the winter months of 2016 (when boating is allowed), dry conditions coupled with the random sampling schedule yielded very low number of interviews with whitewater boaters during the first season. To overcome this potential gap in user data a number of steps were taken to enhance the monitoring with the goal to provide comprehensive results to answer the monitoring questions. Specifically, boater registration information was collected and summarized; the schedule was modified to increase winter sampling days; survey clerks mobilized additional sampling dates when the forecast would result in boatable flows to increase the potential for interviews, and lastly, a focus group with boaters was convened to augment whatever intercept interviews were recorded. A complete description of the study methods are presented in Appendix B.

2.0 MONITORING QUESTIONS

Four monitoring questions presented in the 2012 EA guided the recreation use monitoring efforts. In the following section, each question is treated as an individual outcome and has key findings, introduction, methodology, and discussion sections. Data analysis and results for each question focuses on the peak (summer) season.

2.1 Monitoring Question 1

Are at-one-time vehicle counts at frontcountry and backcountry parking areas changing?

2.1.1 Key Findings

- Over the peak (summer) period, access points for frontcountry areas and backcountry reaches show increases in VAOT from 2008 levels.
- Increases in VAOT were observed for all frontcountry areas except for Grimshawes/Sliding Rock and for all backcountry reaches except Chattooga Cliffs for the entire peak (summer) season.
- Weekdays saw a net increase in VAOT from 2008 levels, while weekends exhibited slight decreases from 2008 levels for VAOT for both frontcountry areas and backcountry reaches.
- Between frontcountry areas and backcountry reaches, Ellicott Rock backcountry reach was the only site that exceeded 2012 capacity limits, for both weekdays and weekends.

2.1.2 Introduction

The quality of recreation resources along the upper segment of the Chattooga WSR corridor has attracted a number of visitors to the area. Understanding how the number of visitors has changed over time brings attention to which areas are increasing and/or decreasing in popularity. This information helps the agency understand which areas may need management attention.

Monitoring was conducted to evaluate the number of recreationists in the upper segment of the Chattooga WSR corridor. One tactic used to quantify the number of recreationists in the area was VAOT counts, which were conducted at access points feeding frontcountry areas and backcountry reaches along the Upper Chattooga River. Recreation use in frontcountry areas and backcountry reaches is measured by using VAOT counts as a proxy for the number of recreationists present.

VAOT counts at access points are compared between 2016/2017 and 2008 monitoring efforts. Although this monitoring question appears to focus on vehicle counts across time, the VAOT are also analyzed in the context of the capacities set in the 2012 DN. Because the capacities set in the 2012 DN are presented in groups-at-one-time (GAOT), VAOT were converted to GAOT using the linear relationship between VAOT and GAOT (one vehicle per group) for this part of the analysis to compare against

2012 capacities. The interview data determined that the average group size is 2.8 people. The results of this monitoring question determine how recreation levels have changed in the Upper Chattooga River over time.

2.1.3 Methods

In accordance with the 2012 DN, monitoring efforts focused on the peak times of the day during the peak (summer) season (defined as the period between June 1 and August 31), with less intensive monitoring during the remainder of the year. Results focus on the peak (summer) season (excluding 4th of July weekend) for both frontcountry areas and backcountry reaches along the Upper Chattooga River.

To assess how VAOT counts are changing at access points, data between 2008 and 2016/2017 monitoring efforts are compared. VAOT counts are derived from spot count data, which focuses on 'at-one-time' tallies of vehicles at each access point. The results section presents bar charts to show the change in VAOT between 2008 and 2016/2017 for each access point that had comparable data. It should be noted there were discrepancies in the data between the collection years, with some access points included in 2008 that weren't included in 2016/2017 and vice versa. The comparison charts only include access points that were include in both data years.

The 2012 DN set capacity limits for GAOT for each frontcountry area and backcountry reach. In order to compare VAOT to capacity limits, VAOT had to be converted to GAOT. Intercept survey data were used to calculate an average number of one group per vehicle. This revealed a one-to-one ratio of VAOT to GAOT, meaning that, on average, a group traveled to the area in one vehicle. Since capacities were presented by frontcountry area and backcountry reach, the VAOT for each access point were summed to obtain a GAOT value for each corresponding frontcountry area and backcountry reach. This method created a direct comparison between capacities set in the 2012 DN and current use levels (GAOT).

The analysis is split into two parts: (1) VAOT and GAOT changes at frontcountry areas during the peak (summer) season and (2) VAOT and GAOT changes at backcountry reaches during the peak (summer) season. The methodology for each of these parts is detailed below.

Methods Part 1: Frontcountry Areas

Each frontcountry area was evaluated to calculate the change in average VAOT and average GAOT from 2008 to 2016/2017 during the peak (summer) season using the following calculations:

- The average number of VAOT at each access point for 2008.
- The average number of VAOT at each access point for 2016/2017.
- The percent change in average VAOT from 2008 to 2016/2017 for each access point.

- The average number of GAOT for each frontcountry area for 2008. This was calculated by totaling the average number of VAOT for access points that feed each area and using the correlation of an average of one vehicle per group (Table 2.1-1 outlines which access points correspond to which frontcountry area).
- The average number of GAOT for each frontcountry area for 2016/2017 by totaling the average number of VAOT for access points that feed that area and using the correlation of an average of one vehicle per group (Table 2.1-1 outlines which access points correspond to which frontcountry area).
- Comparison in average GAOT to 2012 DN capacities.

Access point VAOT calculations are presented with their corresponding frontcountry area in three formats in the results section: (1) an average over the peak (summer) period; (2) an average on weekdays during the peak (summer) season (but not including the 4th of July so as not to influence the average); and (3) an average on weekends during the peak (summer) season (but not including the 4th of July so as not to influence the average). GAOT are presented by backcountry reach for the entire peak (summer) season, peak (summer) season weekdays, and peak (summer) season weekends. GAOT are compared against 2012 DN capacities.

Table 2.1-1 outlines which access points serve which frontcountry areas.

Table 2.1-1: Access points for each frontcountry area.

Frontcountry Area	Access Point
Grimshawes/Sliding Rock Bridge	Parking lot near swimming area[a]
Grimshawes/Sliding Rock Bridge	Roadside parking[a]
Grimshawes/Sliding Rock Bridge	Chattooga Trailhead (Green Creek Trailhead Parking)
	Countyline Trailhead (Norton Mill Trailhead Parking)
Bullpen Road Bridge Area	Bullpen Bridge
	Fowler/Bad Creek Trailhead
	Ellicott Rock Trailhead
Burrells Ford Bridge Area	Campground Parking Lot
	Parking Lot on GA side
	Parking at/or near bridge/trailhead
Hwy 28 Bridge Area	Hwy 28 Boater Put-in[a]
	Parking along Long Bottom Ford Camping Corridor[a]
	Ridley Fields Lot (SC side)
	Near Bridge (GA side)

Frontcountry Area	Access Point
Grimshawes/Sliding Rock Bridge	Parking lot near swimming area[a]
Grimshawes/Sliding Rock Bridge	Roadside parking[a]
	USFS Gate (GA Roadside Parking)[b]

[a] Access points not included in 2016/2017 data collection

[b] Access points not included in 2008 data collection

Although efforts were taken to recreate data collection methods between the 2008 and 2016/2017 monitoring studies to allow for a clear comparison of recreation use between the study years, access points were organized differently for two of the frontcountry areas (Grimshawes/Sliding Rock and the Hwy 28 Bridge Area), resulting in data gaps between the two sampling years at these frontcountry areas. It should be noted that only access points that were studied in both data years are included in the access point comparison analysis. More information on VAOT values for access points not included in both data years can be found in Appendix C. For GAOT, all access points were included for each frontcountry area in order to compare total use against capacity limits. Each frontcountry area, its corresponding access points, and any existing data gaps between 2008 and 2016/2017 are summarized below.

Grimshawes/Sliding Rock Bridge

The Grimshawes/Sliding Rock Bridge frontcountry area provides trailhead parking and trail access to the Chattooga Cliffs section of the Upper Chattooga River. Between 2008 and 2016/2017, this area consistently included the following access points: the Chattooga Trailhead (Green Creek Trailhead Parking) and Countyline Trailhead (Norton Mill Trailhead Parking). These access points have available room for around eight vehicles each. In addition to the two trailhead access points, the 2008 data collection included two additional access points: the parking lot near the swimming area and roadside parking. These access points were not included in the 2016/2017 data collection. Including these sites in prior data collection efforts resulted in an inflated number of GAOT for the 2008 frontcountry area data, thus creating a data gap between the two collection years. Therefore, only the Green Creek Trailhead and Norton Mill trailhead access points were included in the 2008 and 2016/2017 access point comparison. For GAOT, all data collected for each year is included.

Bullpen Road Bridge Area

The Bullpen Road Bridge frontcountry area is located along the Chattooga River in NC. It consists of three access points: Bullpen Bridge Road, Fowler/Bad Creek Trailhead, and Ellicott Rock Trailhead, with room for 10, 5, and 1 vehicle, respectively. Because no differences in data collection exist between 2008 and 2016/2017, all access points were included in the results section for this area.

Burrells Ford Bridge Area

The Burrells Ford Bridge frontcountry area has three access points: the Burrells Ford Campground Parking Lot, parking along the Georgia side of the road, and parking

at/or near the bridge/trailhead. These areas provide adequate room for 36, 10, and 34 vehicles, respectively. Because no differences in data collection exist between 2008 and 2016/2017, all access points were included in the results section for this area.

Hwy 28 Bridge Area

The 2016/2017 Hwy 28 Bridge frontcountry area consists of three access points along the state border between Georgia and South Carolina where Hwy 28 crosses the Chattooga River. The access points include the Ridley Fields lot along the SC side, a small lot on the GA side near the Hwy 28 Bridge, and an informal pull-off parking along the Forest Service road that runs along the river. These areas can safely provide parking for 10, 8, and 4 vehicles, respectively. The 2008 data collection differed from the 2016/2017 data collection effort in that it included parking along the boater put-in and the Long Bottom Ford Camping Corridor. These sites were not included in the 2016/2017 data collection effort because they serve frontcountry areas and backcountry reaches below the Hwy 28 bridge area, and this study focuses on recreation areas upstream of the Hwy 28 Bridge (the upper segment of the Chattooga River). Additionally, the 2008 data collection did not include the pull-off along the Forest Service gate before the gate on Hwy 28, which is occasionally used (primarily by anglers) to access the Upper Chattooga river. This access point was included in the 2016/2017 analysis to present the most accurate estimate of the number of users in the area. Because discrepancies exist between 2008 and 2016/2017 data collection for this frontcountry area, only the Ridley Fields lot (SC side) and near the Hwy 28 bridge (GA side) access points were included in the 2008 and 2016/2017 access point comparison. For GAOT, all data collected for each year is included.

Methods Part 2: Backcountry Reaches

Change in recreation between 2008 and 2016/2017 for backcountry reaches was evaluated in the same manner as the frontcountry areas. Methods for backcountry reaches include all of the calculations mentioned in the bulleted list in the Methods Part 1 section. However, we note the following three important differences between frontcountry areas and backcountry reaches:

1. **Access areas**: Some backcountry reaches are served by access areas rather than access points. Access areas are a combination of two or more access points so identified as to simplify the results tables and maintain consistency with interview data collection methods. For these access areas, the average number of VAOT was calculated for each access point and totaled to receive the average VAOT for the entire access area.

2. **Distribution percentage:** One access point (Lick Log) and two access areas (Burrells Ford Bridge and Hwy 28 Bridge) feed more than one backcountry reach. Therefore, assumptions were made as to how many visitors were venturing to each backcountry reach as follows:

    a. At the Burrells Ford access area, it was assumed 60 percent of visitors ventured upstream into Ellicott Rock Reach and 40 percent visited the Rock

Gorge Reach (based on observations of area users and professional opinion).

b. At the Lick Log Creek access, it was assumed 50 percent visited the Rock Gorge Reach and 50 percent visited the Nicholson Fields Reach.

c. At the Hwy 28 Bridge access area, 100 percent of the vehicles in the lot on the South Carolina side and parked by the USFS gate along the Georgia side of the road were assumed to use the Nicholson Fields Reach. Of the vehicles parked in the lot near the Hwy 28 Bridge on the Georgia side, 25 percent were assumed to visit the Nicholson Fields Reach, with 75 percent using the non-study area Bartram Trail that heads south into Georgia.

3. **2012 DN capacities:** The 2012 DN provided weekday and weekend capacities for GAOT in the backcountry reaches, as opposed to overall (weekday and weekend combined) capacities for the frontcountry areas. These capacities are included in the figures in the results section.

As for frontcountry, access point VAOT calculations are presented with corresponding backcountry reach in three formats in the results section: (1) an average over the peak (summer) period; (2) an average on weekdays during the peak (summer) season (but not including the 4th of July so as not to influence the average); and (3) an average on weekends during the peak (summer) season (but not including the 4th of July so as not to influence the average). GAOT are presented by backcountry reach for the entire peak (summer) season, peak (summer) season weekdays, and peak (summer) season weekends. GAOT are compared against 2012 DN capacities.

Table 2.1-2 outlines which access points serve which backcountry reaches.

Although efforts were taken to recreate data collection methods between the two monitoring studies (2008 and 2016/2017), the data gaps that exist in the frontcountry area analysis also are present in the backcountry analysis. It should be noted that only access points that were studied in both data years are included in the access point comparison. More information on VAOT values for access points not included in the access point comparison can be found in Appendix C. For GAOT, all access points were included for each frontcountry area in order to compare total use against capacity limits. Each backcountry reach and the data gaps that exist are described in more detail below:

Chattooga Cliffs

The Chattooga Cliffs reach starts 0.25-mile upstream of Bullpen Road Bridge and is popular for day-use activities. This reach includes three access points: Chattooga Trailhead (Green Creek Trailhead Parking), Countyline Trailhead (Norton Mill Trailhead Parking), and Bullpen Road Bridge. These access points provide room to safely park 10, 3, and 10 vehicles, respectively. Because there were no data gaps between 2008 and 2017 for this reach, all access points were included in the results section for this reach.

Ellicott Rock

The Ellicott Rock reach starts 0.25-mile from Bullpen Road and stretches to 0.25-mile from Burrells Ford Road. It contains four access points (Ellicott Rock Trailhead, Fowler/Bad Creek Trailhead, Sloan Bridge Parking Area, and the Fish Hatchery Parking Area) and one access area (Burrells Ford Parking Area). These parking locations provide room for 5, 1, 15, 20, and 80 vehicles, respectively. For this analysis, it was assumed that 60 percent of visitors travel upstream from the Burrells Ford Parking Area to the Ellicott Rock backcountry reach. Because the 2008 data collection for this reach did not include the Sloan Bridge Parking Area, the Sloan Bridge access point is not included in the 2008 and 2016/2017 access point comparison. For GAOT, all data collected for each year is included.

Table 2.1-2: Access points for each backcountry reach.

Backcountry Reach	Access Points and Access Areas
Chattooga Cliffs	Chattooga Trailhead (Green Creek Trailhead Parking)
Chattooga Cliffs	Countyline Trailhead (Norton Mill Trailhead Parking)
Chattooga Cliffs	Bullpen Road Bridge
Ellicott Rock	Fowler/Bad Creek Trailhead
Ellicott Rock	Ellicott Rock Trailhead
Ellicott Rock	Sloan Bridge[a]
Ellicott Rock	Fish Hatchery
Ellicott Rock	Burrells Ford Bridge Area[b,c]
Rock Gorge	Burrells Ford Bridge Area[b,c]
Rock Gorge	Big Bend Road
Rock Gorge	Big Bend Trailhead/Cherry Hill Campground
Rock Gorge	Lick Log Creek Access[d]
Nicholson Fields	Lick Log Creek Access[d]
Nicholson Fields	Hwy 28 Bridge Area[e,f,g]

[a] Access point not included in 2008 data collection

[b] Access area includes the access points listed in Table 2.1-1

[c] This access area was split between two backcountry reaches, with 60 percent of data in Ellicott Rock and 40 percent in Rock Gorge.

[d] This access point was split between two backcountry reaches, with 50 percent of data in Rock Gorge and 50 percent in Nicholson Fields.

[e] This access area includes all access points listed in Table 2.1-1. The boater put-in and parking along the Long Bottom Ford camping corridor were not included in the 2017 data collection.

[f] The USFS gate parking area was not included in the 2008 data collection.

[g] All vehicles on the South Carolina side were assumed to use the Nicholson Field Reach. For the lot near the Hwy 28 Bridge on the GA side, it was assumed that 25 percent of vehicles in the lot near the Hwy 28 Bridge were visiting the Nicholson Fields Reach, with 75 percent using the non-study area Bartram Trail that heads south into Georgia.

Rock Gorge

The Rock Gorge reach begins 0.25-mile downstream from Burrells Ford Road walk-in campground and ends at the confluence with Lick Log Creek. This reach includes three access points (Big Bend Road, Big Bend Trailhead/Cherry Hill Campground (parking), and Lick Log Creek access) and one FC area (Burrells Ford Bridge Area). These parking locations provide room for 3, 1, 8 and 80 vehicles, respectively. For this analysis, it was assumed that 40 percent of visitors travel downstream from the Burrells Ford Parking Area to this reach while the remaining 60 percent travel upstream to the Ellicott Rock Reach. For the Lick Log Creek access point, it was assumed that 50 percent of visitors travel upstream to the Rock Gorge backcountry reach while the other 50 percent travel downstream to the Nicholson Fields reach. Because no differences in data collection exist between 2008 and 2017 for this area, all access points were included in the results section for this reach.

Nicholson Field

The Nicholson Field backcountry reach begins at the confluence of Lick Log Creek and stretches to 0.25-mile above the Hwy 28 Bridge. This reach includes the Lick Log access point (8 available parking spaces) and the Hwy 28 Bridge access area (parking available for 18 vehicles). For this analysis, it was assumed that 50 percent of the visitors parked at Lick Log Parking Area traveled downstream to Nicholson Field. For the Hwy 28 Bridge area, it was assumed that only 25 percent of the visitors that parked at the GA-side of the reach visited the Nicholson Field reach, while 75 percent visited Bartram Trail, which is not included in the study area. Because discrepancies exist between 2008 and 2016/2017 data collection for this frontcountry area, only the Ridley Fields lot (SC side) and near the Hwy 28 bridge (GA side) access points were included in the 2008 and 2016/2017 access point comparison. For GAOT, all data collected for each year is included.

2.1.4 Results

Frontcountry Results

Findings in this section are presented in two types of figures: (1) VAOT for access points within each frontcountry area for the entire peak (summer) season, peak (summer) season weekdays, and peak (summer) season weekends for 2008 and 2016/2017, and (2) GAOT for frontcountry areas in comparison to 2012 DN capacities over the entire peak (summer) season, peak (summer) season weekdays, and peak (summer) season weekends for 2008 and 2016/2017.

Figure 2.1-1 shows the change in average VAOT from 2008 to 2016/2017 at comparable access points, organized by frontcountry area.[1]

[1] The 2008 data collection included two access points in the Grimshawes/Sliding Rock area and two access points in the Hwy 28 Bridge area not included in the 2016/2017 analysis. These access points were omitted from Figures 2.1-1 to 2.1-3. Also, 2016/2017 included an access point in the Hwy 28 Bridge area not included in the 2008 data collection. This was also omitted from Figures 2.1-1 to 2.1-3 to allow for a more accurate comparison.

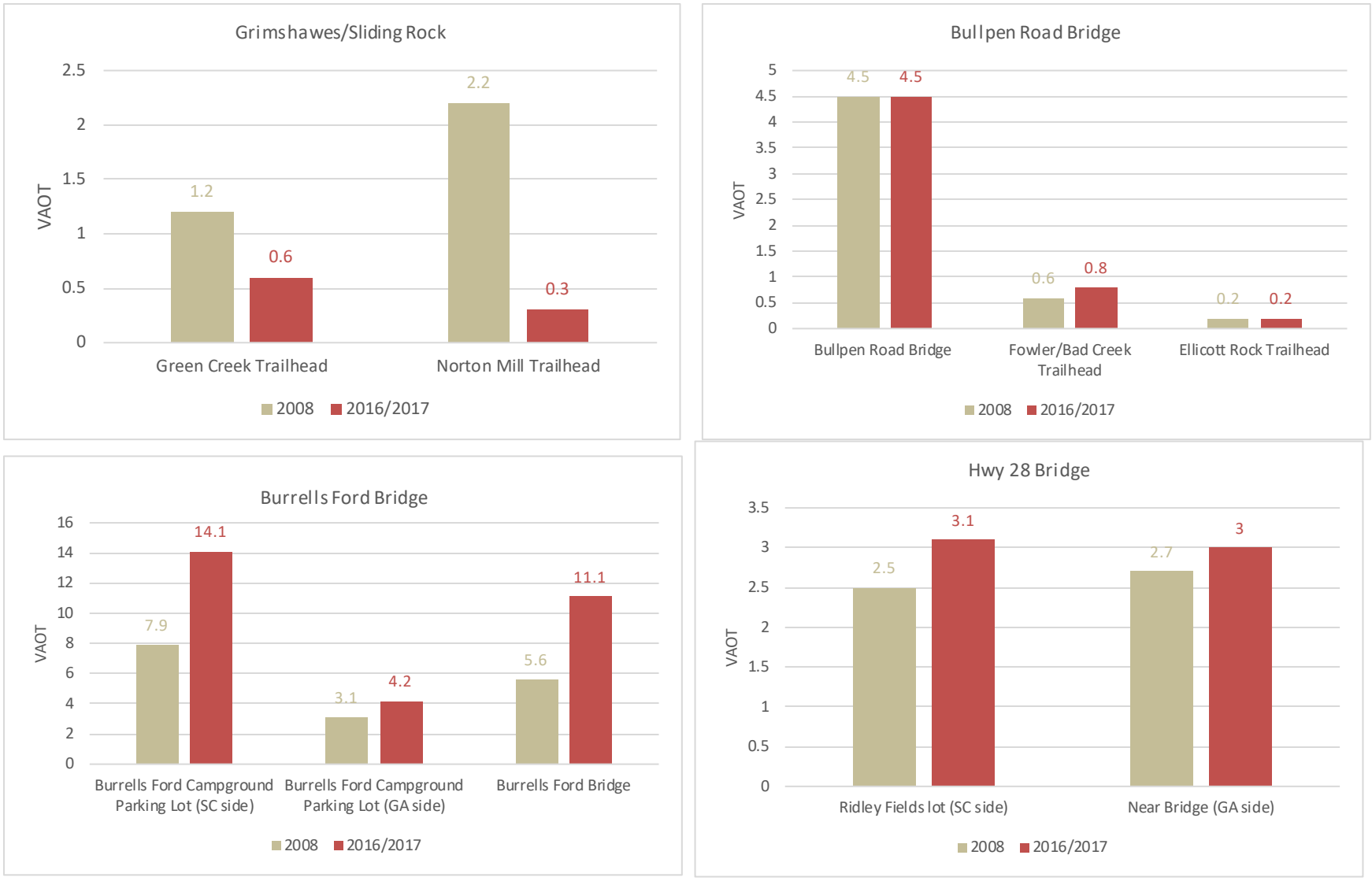


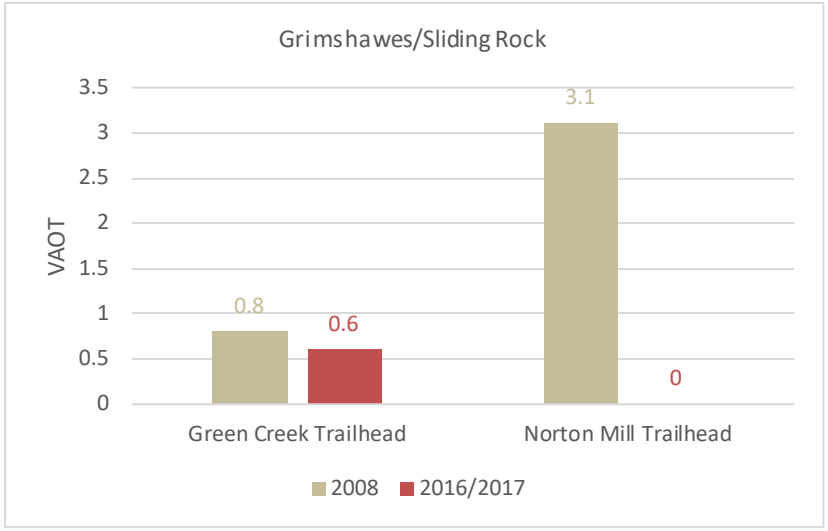
Figure 2.1-1. Average frontcountry VAOT for the 2008 and 2016/2017 peak (summer) seasons by access point.

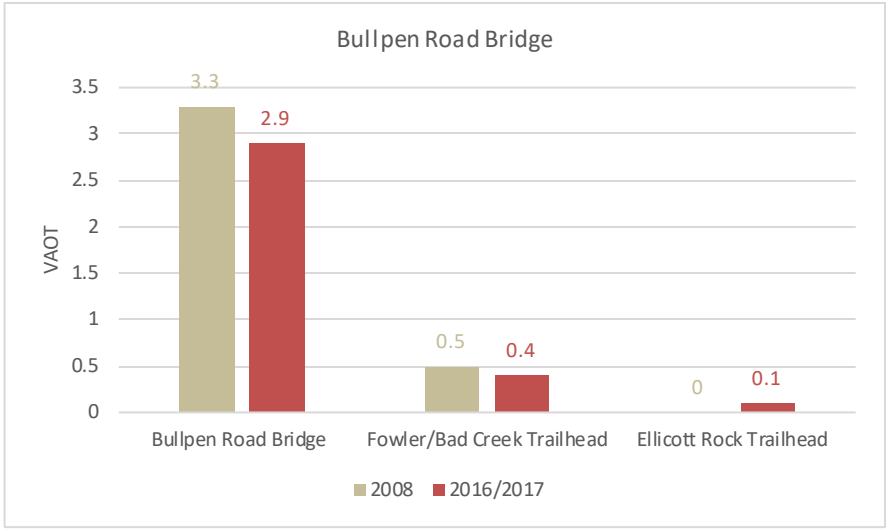
From Figure 2.1-1, we can conclude the following information for changes in VAOT for all days during the peak (summer) season:

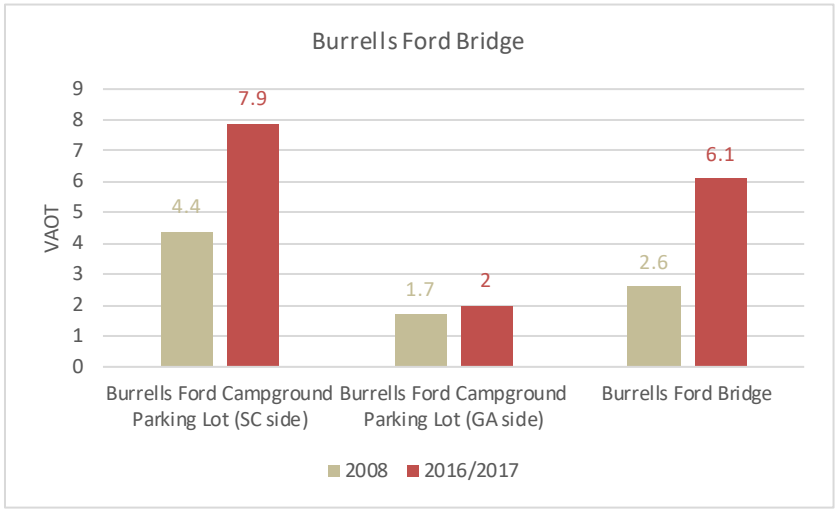
- Six access points show increases in VAOT from 2008 levels, with the Burrells Ford Campground parking lot (Burrells Ford Bridge frontcountry area) showing the largest increase at 98 percent.
- The Bullpen Road Bridge and Ellicott Rock Trailhead access points (Bullpen Road Bridge frontcountry area) showed no change in VAOT between the two data years.
- Two access points, Green Creek Trailhead and Norton Mill Trailhead (Grimshaws/Sliding Rock frontcountry area) show decreases in VAOT from 2008 levels, with Norton Mill showing the largest decrease of 86 percent.
- Overall, an increase in VAOT is seen at all frontcountry areas except for Grimshawes/Sliding Rock, where a decrease of nearly 74 percent is seen. Burrells Ford Bridge frontcountry area showed the largest increase of 77 percent.[2]

The following figures break down the VAOT frontcountry data by weekday and weekend. Figure 2.1-2 shows the average weekday VAOT by access point at the four frontcountry areas for 2008 and 2016/2017.

[2] Change proportions only include access points that had comparable metrics between 2008 and 2016/2017 levels.







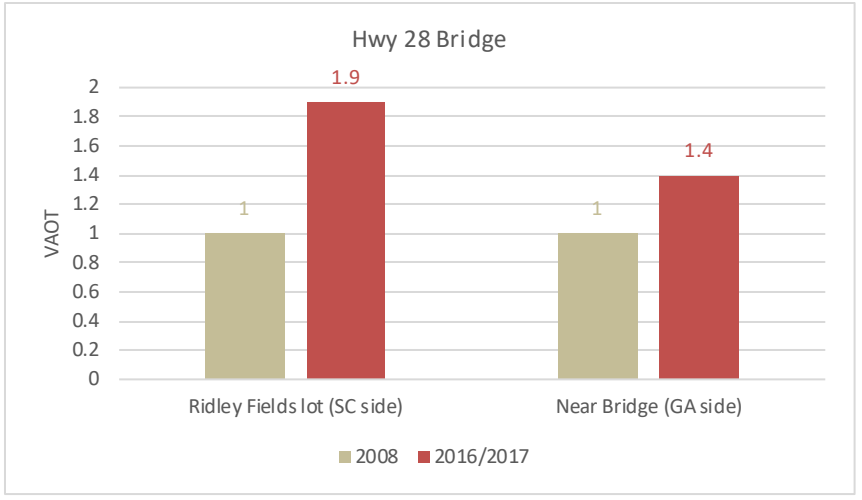


Figure 2.1-2. Average weekday frontcountry VAOT for the 2008 and 2016/2017 peak (summer) seasons by access point.

From Figure 2.1-2, we can conclude the following information for changes in VAOT for weekdays during the peak (summer) season:

- Six access points show increases in VAOT from 2008 levels, with the Burrells Ford Bridge access area (Burrells Ford Bridge frontcountry area) showing the largest increase at nearly 135 percent.
- Four access points show decreases in VAOT from 2008 levels, with Norton Mill (Grimshawes/Sliding Rock frontcountry area) showing the largest decrease of 100 percent.
- Overall, increases in VAOT are seen at Burrells Ford Bridge and Hwy 28 Bridge frontcountry areas and decreases are seen at Grimshawes/Sliding Rock and Bullpen Road Bridge. Burrells Ford Bridge frontcountry area showed the largest increase of 84 percent while Grimshawes/Sliding Rock showed the largest decrease at 85 percent.[3]

Figure 2.1-3 shows the average weekend VAOT by access point at the four frontcountry areas for 2008 and 2016/2017.

[3] Overall averages only include access points that had comparable metrics between 2008 and 2016/2017 levels.

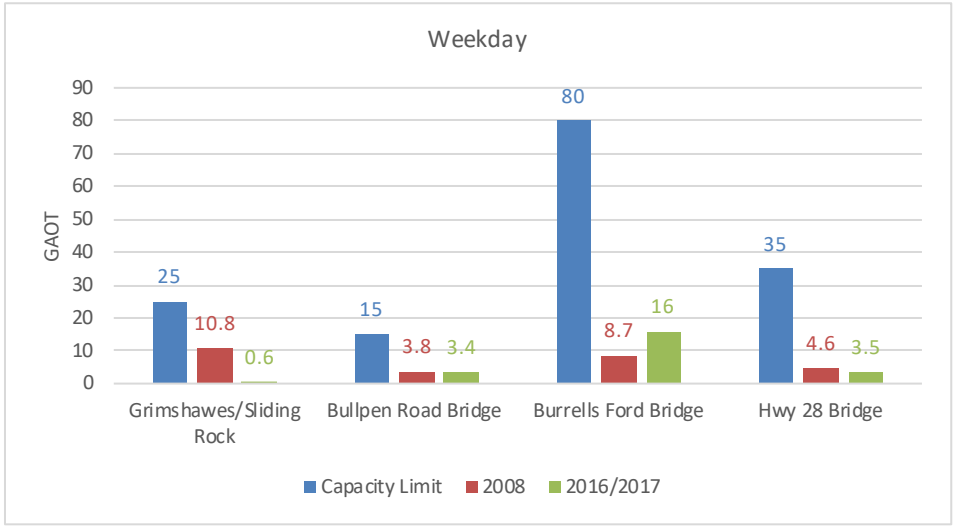
Figure 2.1-3. Average weekend frontcountry VAOT for the 2008 and 2016/2017 the peak (summer) seasons by access point.

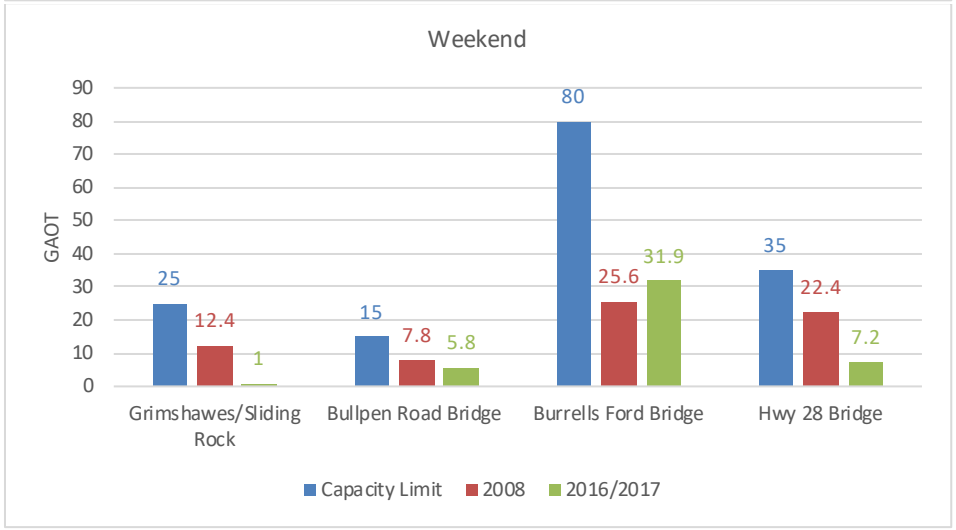
From Figure 2.1-3, we can conclude the following information for changes in VAOT for weekends during the peak (summer) season:

- Two access points show increases in VAOT from 2008 levels, with the Burrells Ford Bridge access point (Bullpen Road Bridge frontcountry area) showing the largest increase at 68 percent.
- The Fowler/Bad Creek Trailhead (Bullpen Road Bridge frontcountry area) and Burrells Ford Campground (Burrells Ford Bridge frontcountry area) access points showed no change in VAOT between the two data years.
- Six access points show decreases in weekend VAOT from 2008 levels, with Green Creek Trailhead (Grimshawes/Sliding Rock frontcountry area) showing the largest decrease of nearly 67 percent.
- Overall, increases in weekend VAOT are seen only at the Burrells Ford Bridge frontcountry area. Weekend VAOT decreases are seen at the Grimshawes/Sliding Rock, Bullpen Bridge, and Hwy 28 Bridge frontcountry areas. Grimshawes/Sliding Rock showed the largest decrease in VAOT from 2008 at nearly 66 percent.[4]

The following figures compare GAOT for 2008 and 2016/2017 for each frontcountry area to the GAOT capacity limits set by the 2012 DN. Each group is approximately equal to 2.8 people. GAOT for each frontcountry area was calculated by summing the VAOT for each access point feeding the frontcountry area and using the metric of one vehicle per group. In order to compare GAOT against 2012 capacity limits, all access points for each frontcountry area included in the 2008 and 2016/2017 data collection periods were used in this analysis. Comparisons of GAOT to 2012 capacity limits are made for the entire peak (summer) season, peak (summer) weekdays, and peak (summer) weekends.

[4] Overall averages only include access points that had comparable metrics between 2008 and 2016/2017 levels.





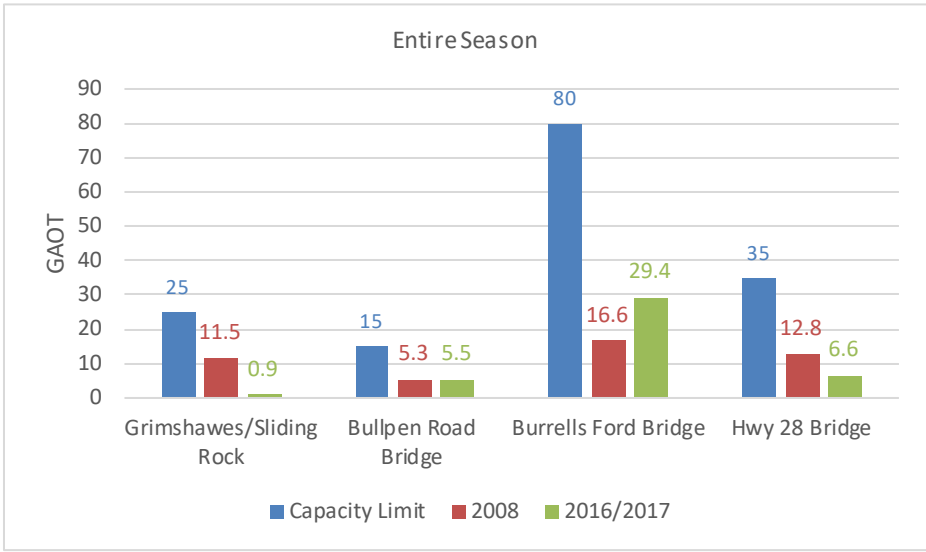


Figure 2.1-4. Entire season, weekday and weekend GAOT for 2008 and 2016/2017 frontcountry areas as compared to 2012 DN capacity limits

From Figure 2.1-4, we can see that all frontcountry areas remain well below the capacity limits set in the 2012 DN. The Burrells Ford Bridge frontcountry area has the highest proportion of GAOT to capacity on weekends at 40 percent.

By combining the VAOT across all access points for each area, the figures provide clear use trends for entire frontcountry areas for 2008 and 2016/2017. From the figure it is clear that the Burrells Ford Bridge frontcountry area gets the most use. It is also clear that while weekend use is higher than weekday, it is lower at than 2008 levels at every area except for Burrells Ford Bridge.

Overall, VAOT in the frontcountry has increased from 2008 levels at every frontcountry area except for Grimshawes/Sliding Rock, where a net decrease in average VAOT is seen. The Burrells Ford Bridge frontcountry area has the largest increase in the number of visitors from 2008 levels. While there has been an overall increase, weekend use seems to be slightly decreasing while weekday use is rising. Despite the overall increase in GAOT at frontcountry areas, use levels at all frontcountry areas remain below GAOT capacity levels, set by the 2012 DN.

Backcountry Results

For the backcountry results, figures were set up similarly to the frontcountry figures, except Figure 2.1-8 includes weekend and weekday capacity limits as set by the 2012 DN, whereas frontcountry results have one capacity limit.

Figures 2.1-5 to 2.1-7 show the change in average VAOT from 2008 to 2016/2017 at comparable access points, organized by backcountry reach.[5]

[5] The 2008 data collection included two access points in Hwy 28 access area in the Nicholson Field reach that were not included in the 2016/2017 data collection. The 2016/2017 data collection included the Sloan Bridge parking area (Ellicott Rock and Rock Gorge reaches) and the parking near the USFS gate (Nicholson Field reach), which were not included in the 2008 data collection. These access points were omitted from Figures 2.1-5 to 2.1-7 to allow for a more accurate comparison.

Figure 2.1-5. Average backcountry VAOT for the 2008 and 2016/2017 peak (summer) seasons by access point

From Figure 2.1-5, we can conclude the following information for backcountry VAOT during the peak (summer) season:

- Seven access points show increases in VAOT from 2008 levels, with the Big Bend Trailhead/Cherry Hill Campground access point (Rock Gorge backcountry reach) showing the largest increase at 200 percent.
- The Bullpen Road Bridge (Chattooga Cliffs backcountry reach) and Ellicott Rock Trailhead (Ellicott Rock backcountry reach) access points showed no change in VAOT between the two data years.
- Four access points showed decreases in VAOT from 2008 levels, with Big Bend Road (Rock Gorge backcountry reach) showing the largest decrease at 100 percent.
- Overall, an increase in VAOT is seen at all backcountry reaches except for Chattooga Cliffs, where a decrease of nearly 32 percent is seen. Rock Gorge reach had the largest increase in VAOT, with nearly 49 percent more VAOT than 2008 levels. [6]

The following data compares backcountry VAOT data between weekdays and weekends. Figure 2.1-6 shows the change in average weekday VAOT from 2008 to 2016/2017 at comparable access points, organized by backcountry reach.

[6] Overall averages only include access points that had comparable metrics between 2008 and 2016/2017 levels.

Figure 2.1-6. Average backcountry VAOT for the 2008 and 2016/2017 for peak (summer) season weekdays by access point

From Figure 2.1-6, we can conclude the following information for backcountry VAOT for weekdays during the peak (summer) season:

- Seven access points show increases in VAOT from 2008 levels, with the Lick Log Creek access (Rock Gorge and Nicholson Fields reaches) showing the largest increases at 116 percent.
- The Fish Hatchery access point (Ellicott Rock backcountry reach) showed no change in VAOT between the two data years.
- Five access points showed decreases in VAOT from 2008 levels, with Big Bend Road (Rock Gorge backcountry reach) and Norton Mill Trailhead (Chattooga Cliffs backcountry reach) showing the largest decreases at 100 percent.
- Overall, an increase in weekday VAOT is seen at all backcountry reaches except for Chattooga Cliffs where a decrease of nearly 51 percent is seen for weekday VAOT. Nicholson Field showed the largest increase in weekday VAOT with 80 percent more VAOT than 2008 levels.[7]

Figure 2.1-7 shows the change in average weekend VAOT from 2008 to 2016/2017 at comparable access points, organized by backcountry reach.

[7] Overall averages only include access points that had comparable metrics between 2008 and 2016/2017 levels.

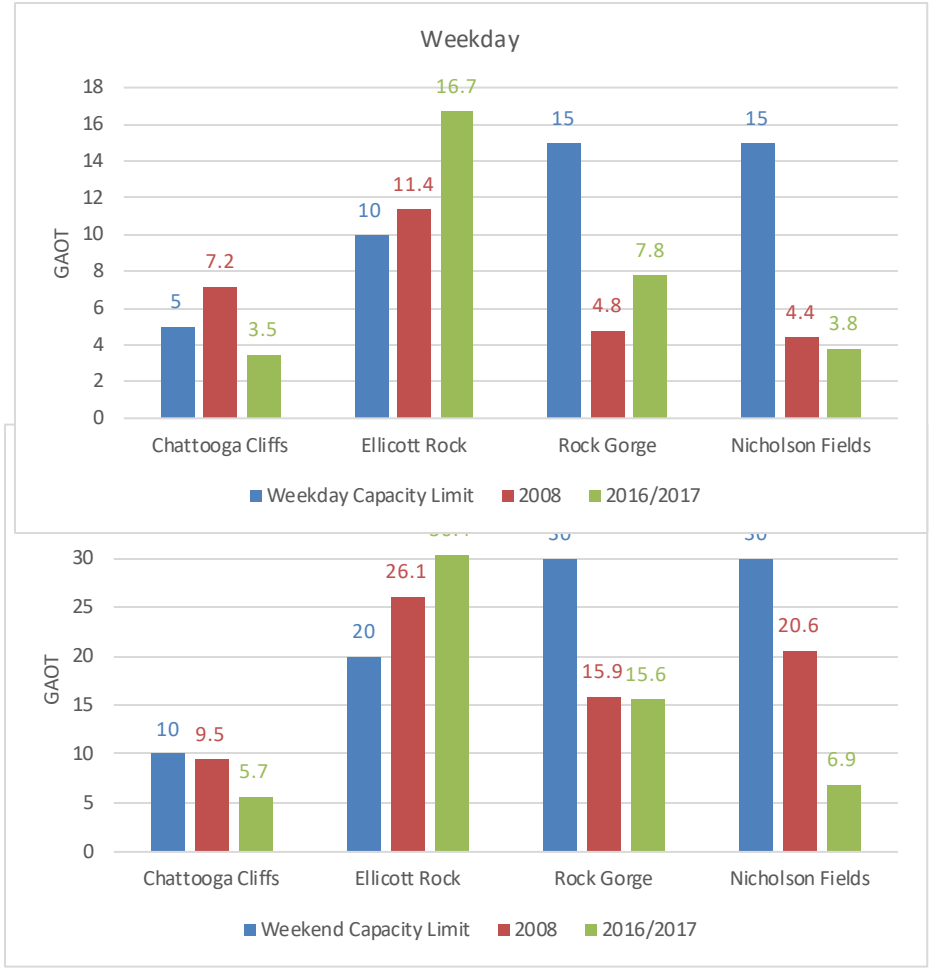
Figure 2.1-7. Average backcountry VAOT for the 2008 and 2016/2017 peak (summer) season weekends by access point

From Figure 2.1-7, we can conclude the following information for backcountry VAOT for weekends during the peak (summer) season:

- Five access points show increases in VAOT from 2008 levels, with the Big Bend Trailhead/Cherry Hill Campground access point (Rock Gorge backcountry reach) showing the largest increases in weekend VAOT at 75 percent.
- The Fowler/Bad Creek Trailhead access point (Ellicott Rock backcountry reach) showed no change in VAOT between the two data years.
- Seven access points showed decreases in VAOT from 2008 levels, with Big Bend Road (Rock Gorge backcountry reach) showing the largest decrease of 100 percent.
- Overall, an increase in weekend VAOT from 2008 levels is only seen at the Ellicott Rock backcountry reach with an increase in VAOT of 8 percent. All other backcountry access points show a decrease in weekend VAOT, with Chattooga Cliffs showing the largest decline in weekend VAOT, with a decrease of 40 percent.[8]

The following figures compare 2008 and 2016/2017 GAOT for each backcountry to the capacity limit set by the 2012 DN. GAOT for each reach was calculated by summing the VAOT for each access point within the reach and using the metric of one vehicle per group. All access points included in the 2008 and 2016/2017 data collection were included in this analysis. Comparisons of GAOT to 2012 capacity limits are made for the entire peak (summer) season, peak (summer) weekdays, and peak (summer) weekends. It should be noted that the 2012 DN provides weekday and weekend GAOT capacity limits for each backcountry reach, but it does not provide a capacity limit for all days in the peak (summer) season. Therefore, the larger capacity limits (weekends) were used as comparison metric for the 'Entire Season' graph.

[8] Overall averages only include access points that had comparable metrics between 2008 and 2016/2017 levels.



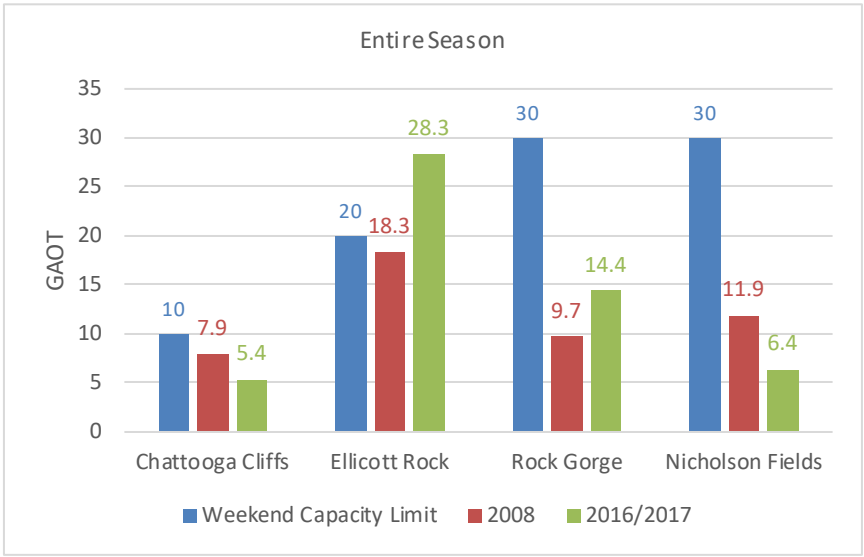


Figure 2.1-8. Average backcountry GAOT for 2008 and 2016/2017 during the peak (summer) season for the entire season, weekdays, and weekends, compared to 2012 DN Capacity Limits.

From Figure 2.1-8, we can see that the Ellicott Rock Reach exceeds 2012 DN capacity limits for the entire season, weekends, and weekdays in the most recent data year. The largest capacity exceedance occurs during peak (summer) season weekdays, where Ellicott Rock reach exceeds the capacity by 67 percent. All other backcountry reaches remain well below the capacity limits

The figures also provide clear use trends for each backcountry reach for 2008 and 2016/2017. From the figures it is clear that the Ellicott Rock reach receives the most recreation use. Additionally, recreation use has increased more significantly during weekdays than weekends in the peak (summer) season.

Overall, increases in VAOT were observed for all backcountry reaches except Chattooga Cliffs for the entire peak (summer) season. Weekdays saw a net increase in VAOT, while weekends exhibited a slight decrease for VAOT. Rock Gorge exhibited the highest average increase for VAOT, yet did not exceed 2012 DN capacity limits for GAOT. While Rock Gorge saw the largest increase in visitors, Ellicott Rock was the reach that exceeded 2012 GAOT capacity limits.

2.1.5 Discussion

The data collected during the monitoring period shows that there was a general increase in VAOT counts for all frontcountry areas except for Grimshawes/Sliding Rock and all backcountry reaches except for Chattooga Cliffs. Weekdays are exhibiting increases in use while weekend use is decreasing. It should be noted that while 2008 was used as a metric to evaluate change in VAOT, the specific methods of calculating VAOT and backcountry GAOT are not well documented for how this was calculated in the 2008 effort.

Of the frontcountry areas, the Burrells Ford Bridge Area had the largest increase in VAOT and GAOT. Of the backcountry reaches, Rock Gorge reach had the largest increase for VAOT and GAOT. While increases were observed, all sites remain below the GAOT capacities set in the 2012 DN except for the Ellicott Rock backcountry reach. This reach exceeded capacity limits on weekdays and weekends in 2008 and 2016/2017. For this reach, these findings are based on a comparable monitoring effort that does not exhibit any known data gaps.

Despite the data gaps that exist between the two monitoring efforts, it can be concluded that use in the frontcountry areas and backcountry reaches is increasing on weekdays. The Ellicott Rock reach is consistently exceeding 2102 DN capacity limits.

2.2 Monitoring Question 2

What is the Proportion of Recreation Use by Type of Visitor in Frontcountry Areas and Backcountry Reaches and how is this Use Related to Vehicle Counts?

2.2.1 Key Findings

The following findings can be determined from this monitoring question analysis:

- For the upper segment of the Chattooga WSR corridor, nearly all recreation use takes place in the backcountry.
- Across all backcountry reaches, walking/hiking make up the most popular activity category, followed by fishing then backpacking.
- Of the four user type categories (Angler, Day User, Overnight User, and Boater), angler was the largest user type category in the Ellicott Rock and Nicholson Fields reaches. Day user was the largest user type category in the Chattooga Cliffs reach. The Rock Gorge reach had a tie for user type majority between day user and angler.
- Because boating is not allowed during the summer, no interviews with boaters were conducted during the peak (summer) season.
- Nicholson Fields, Rock Gorge, and Ellicott Rock are the most popular reaches for backpackers with notably fewer overnighters visiting the Chattooga Cliffs reach.

2.2.2 Introduction

Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor Environmental Assessment (EA) (2012) discusses the need to monitor front- and backcountry use along the upper segment of the Chattooga WSR corridor. The EA states that monitoring should focus on the number of GAOT and correlate this information with the average number of vehicles-at-one-time (VAOT) in select parking areas that serve as access points to the front and backcountry. From this information, the agency can correlate vehicle counts to proportions of use associated with (1) frontcountry/backcountry recreation, (2) day/overnight recreation, and (3) hiking/backpacking/angling/boating use in backcountry reaches and frontcountry areas. While this monitoring question requests recreation use information for both frontcountry areas and backcountry reaches, nearly 99 percent of interview respondents reported recreating in the backcountry during their visit to the area. Because of this large discrepancy between frontcountry and backcountry interviews, only backcountry reaches were evaluated in this analysis to address this monitoring question.

2.2.3 Methods

Recreation use and visitor type were evaluated for each backcountry reach. Each backcountry reach was broken down by access points and access areas (access areas are a grouping of two or more access points) (Table 2.2-1).

Table 2.2-1: Access points/areas for each backcountry reach.

Backcountry Reach	Access Points and Access Areas
Chattooga Cliffs	Chattooga Trailhead (Green Creek Trailhead Parking)
Chattooga Cliffs	Countyline Trailhead (Norton Mill Trailhead Parking)
Chattooga Cliffs	Bullpen Road Bridge
Ellicott Rock	Ellicott Rock Trailhead
Ellicott Rock	Fowler/Bad Creek Trailhead
Ellicott Rock	Sloan Bridge
Ellicott Rock	Fish Hatchery
Ellicott Rock	Burrells Ford Bridge Area[a,b]
Rock Gorge	Burrells Ford Bridge Area[a,b]
Rock Gorge	Big Bend Rd.
Rock Gorge	Big Bend Trailhead/Cherry Hill Campground
Rock Gorge	Lick Log[c]
Nicholson Fields	Lick Log[c]
Nicholson Fields	Hwy 28 Bridge Area[d,e]

[a] Contains three parking areas (Burrells Ford Campground (Sc Side), GA side parking lot, and parking at/or near bridge/trailhead).

[b] This area was split between two backcountry reaches, with 60 percent of data in Ellicott Rock and 40 percent in Rock Gorge.

[c] This area was split between two backcountry reaches, with 50 percent of data in Rock Gorge and 50 percent in Nicholson Fields.

[d] Contains three parking areas (GA side parking lot, SC side parking lot, and the USFS gate).

[e] All vehicles on the South Carolina side and in front of the USFS gate on the GA roadside were assumed to use the Nicholson Field Reach. For the lot near the Hwy 28 Bridge on the GA side, it was assumed that 25 percent of the vehicles were visiting the Nicholson Fields Reach, with 75 percent using the non-study area Bartram Trail that heads south into Georgia.

There is one access point (Lick Log) and two access areas (Burrells Ford Bridge and Hwy 28 Bridge) that feed more than one backcountry reach. Therefore, assumptions were made as to how many visitors were venturing to each backcountry reach (see Appendix B, *Methods*, for explanation on how these assumptions were developed). The assumptions that were used are as follows:

a. At the Burrells Ford access area it was assumed 60 percent of visitors ventured upstream into Ellicott Rock Reach and 40 percent visited the Rock Gorge Reach.

b. At the Lick Log access point, it was assumed 50 percent of visitors visited the Rock Gorge Reach and 50 percent visited the Nicholson Fields Reach.

c. At the Hwy 28 Bridge access area, 100 percent of the vehicles in the lot on the South Carolina side and in front of the USFS gate were assumed to use the Nicholson Field Reach. Of the vehicles parked in the lot near the Hwy 28 Bridge on the GA side, 25 percent were assumed to visit the Nicholson Fields Reach, with 75 percent using the non-study area Bartram Trail that heads south into Georgia.

For each backcountry reach, the data were evaluated using a three-step process to answer the monitoring question. The first step was to use interview data to determine each visitors' primary activity to discern the main recreation activities being participated in at each reach. The second step was to place visitors into a 'user type' category (angler, boaters, day user, overnight user) to evaluate survey results relative to the activities referenced in the 2012 DN. The third step was to use the 'user type' categorization to determine the proportion of vehicles that belong to each user group at a backcountry access area. The results of this analysis area displayed in three tables, one for each step for each backcountry reach. Each step of the methodology is described in more detail below.

Methods Part One: Primary Activity Determination

Interview respondent data were used to determine each respondents' primary activity. Interview respondents reported the activities they participated in as percentages, weighting each activity they participated in out of 100 percent. From the interview results, a visitor's primary activity was identified based on the highest percent of activity participation respondents identified. The activities that were listed in the user intercept surveys are as follows:

- Backpacking
- Fishing
- Hiking/Walking
- Photography
- Sightseeing
- Swimming
- Other

Some respondents weighted some activities more heavily than others, identifying a clear primary activity, while others noted equal percentages across two or more activities. Users that noted a tie between multiple activities were placed into individual "tie" categories.

For the Burrells Ford Bridge access area, response numbers were multiplied by 60 percent for the Ellicott Rock reach and 40 percent for the Rock Gorge reach. For the Lick Log access point, response numbers were multiplied by 50 percent for the Rock Gorge reach and 50 percent for the Nicholson Fields reach. For the Hwy 28 Bridge access area in the Nicholson Fields reach, all interviews took place on the SC-side, therefore the responses were not divided up between the Nicholson Field reach and the non-study Bartram trial area that approximately 75 percent of the visitors in the GA-side lot use.

Methods Part Two: User Type Categorization

To evaluate survey results relative to the activities referenced in the 2012 DN, survey data on recreation users were grouped into four categories:

- Anglers
- Boaters
- Day users
- Overnight users

The four categories above were used to create a hierarchy of recreation user types,[9] as follows:

1. The first category, or highest in the hierarchy, was 'overnight users'; a recreationist was considered an overnight user if they reported any percentage in the backpacking activity above zero.
2. Second in the hierarchy was 'angler'; a recreationist was categorized as an angler when they identified any percent above zero for angling, unless they indicated backpacking.
3. Third was 'boaters,' with any user listing boating above zero to be considered a boater.
4. All other users were identified as 'day users.'

Following the user type categorization, user types were then evaluated by reach to determine the proportion of recreationists at each reach.

Methods Part Three: User Type Vehicle Proportion

To determine the proportion of vehicles that belong to each user type (anglers, boaters, day users and overnight users) for each backcountry reach, a combination of interview response data (results from step two) and vehicle counts were used.

[9] Because of the hierarchical methodology used for the user type categorization, a visitor is not necessarily placed in the category in which their primary activity falls. For example, a visitor could put 90% hiking/walking and 10% backpacking, and they are still considered a backpacker.

User types were tallied at each access point/area for each backcountry reach based on interview responses. The proportion of each user type at each access point/area was calculated. Spot count data were evaluated from June 1st to August 31st (excluding 4th of July weekend) to obtain the average VAOT for each access point. The proportion of each user type was multiplied by the average VAOT for the access area to obtain the average number of vehicles that belong to each user type at an access point during the peak (summer) season.

2.2.4 Results

Across all four backcountry reaches, hiking/walking was the most popular activity, with a participation rate of 30 percent. This was followed by fishing at 26 percent, and backpacking at 17 percent. The remainder of the percentages were ties between various activity types.

For user types, day users (generally non-angler hikers) represented the largest percent of recreationists (42 percent), followed by anglers (non-overnight visitors) (35 percent), and overnight users (22 percent).

While day users dominated the user type analysis when evaluating the four backcountry reaches together, there was variance in the proportion of user types for individual reaches. Day users were the dominant user type in the Chattooga Cliffs reach while anglers were the most dominant user type in the Ellicott Rock and Nicholson Fields reaches. Both of these user types were prevalent in the Rock Gorge reach (see Table 2.2-2).

Table 2.2-2: Number of interview responses by user type within each backcountry reach.

Backcountry Reach	Type of Recreation Users				Total
	Angler	Boater	Day User	Overnight User	
Chattooga Cliffs Reach	10	0	34	2	46
Ellicott Rock Reach	32.6	0	28.8	21.8	83.2
Rock Gorge Reach	25.4	0	25.2	17.2	67.8
Nicholson Field/Hwy 28	11	0	7	9	27
Total	79	0	95	50	224

The sections below characterize each reach by their associated access points/areas, popular recreation activity categories, user type, and the proportion of recreation users associated with each VAOT calculation for each parking area.

Chattooga Cliffs Reach

The Chattooga Cliffs reach is the most upstream reach in the study area. Table 2.2-3 describes the primary activities respondents took part in at this reach, relative to the access point they used, for the peak (summer) season.

Table 2.2-3: Chattooga Cliffs reach interview results by activity and access point/area for the peak (summer) season.

Activities	Count of Primary Activity (based on %)	Percent of survey responses at each access point
Bullpen Area Access	**Total No. of Interviews: 40**	
Hiking/walking	21	52.5%
Fishing	4	10.0%
Swimming	3	7.5%
Tie: Hike/Swim	3	7.5%
Tie: Sightseeing/Hiking/Walking	3	7.5%
Other	2	5.0%
Backpacking	1	2.5%
Tie: Swimming, hiking/walking, sightseeing, photography	1	2.5%
Tie: Hiking/Fishing	1	2.5%
Tie: Swimming/Fishing	1	2.5%
Green Creek TH	**Total No. of Interviews: 3**	
Hiking/walking	3	100%
Norton Mill	**Total No. of Interviews: 3**	
Hiking/walking	1	33%
Tie: Hike/Swim	1	33%
Tie: Hiking/Fishing	1	33%
Total	**Total No. of Interviews: 46**	

According to Table 2.2-3, 76 percent of total respondents for the Chattooga Cliffs reach reported hiking/walking as one of their primary activities (including all ties). Hiking was often paired with other activities, most often sightseeing and/or swimming. The proportion of visitors at this reach that listed hiking/walking as a primary activity was more than five times the proportion of users that reported fishing as their primary activity (15 percent of respondents). Of the three access points in the Chattooga Cliffs reach, the Bullpen access point had the largest number of activities participated in as well as the largest number of respondents.

Following identifying users' primary activities, respondents in the Chattooga Cliffs reach were categorized by user type and binned into one of the four recreation categories: Angler, boater, day user, and overnight user. As noted in the methods section, a user is not necessarily placed in the category of their primary activity but rather binned by a hierarchy of categorization following the order of overnight user, angler, boater, and day user. Table 2.2-4 outlines the user types in the Chattooga Cliffs reach.

Table 2.2-4: User categorization by access point at the Chattooga Cliffs reach for the peak (summer) season.

Access Point	Type of Recreation Users				Total
	Angler	Boater	Day User	Overnight User	
Bullpen Area	9	0	29	2	40
Green Creek Trailhead	0	0	3	0	3
Norton Mill Trailhead	1	0	2	0	3
Total	10	0	34	2	46

The majority of visitors recreating within the Chattooga Cliffs backcountry reach were day users, with nearly 74 percent of visitors falling into this category. Anglers made up nearly 22 percent of visitors in this area. Only 4 percent (2 of 46 respondents) reported overnight use while recreating in the reach.

Looking at each access point in the Chattooga Cliffs reach in more detail:

- Bullpen Bridge parking area: 73 percent day users, 23 percent anglers, and 5 percent overnight users;
- Green Creek Trailhead: 100 percent day users; and
- Norton Mill Trailhead: 67 percent day users and 33 percent anglers.

Table 2.2-5 compares the percentages of user types listed above to the average VAOT for each access point to determine what proportion of peak (summer) season VAOT each user type represents. Because boating is not allowed during the summer, boaters were not included in the step three tables.

Table 2.2-5: Chattooga Cliffs recreation user type in relation to VAOT for the peak (summer) season.

User Type	Count of Day users, overnight users, anglers, boaters	Percent of Users	Average VAOT	Number of Users by Average VAOT
Bull Pen Bridge Area				
Angler	9	22.5%	4.5	1.0
Day User	29	72.5%		3.3
Overnight User	2	5.0%		0.2
Green Creek TH				
Day User	3	100.0%	0.6	0.6
Norton Mill				
Angler	1	33%	0.3	0.1
Day User	2	67 %		0.2
Total	46			

According to Table 2.2-5, day users make up the majority of vehicles at every access point in the Chattooga Cliffs reach. Looking specifically at Bull Pen Bridge, of the average 4.5 VAOT parked there, a little more than three of the vehicles would belong

to day users, one would belong to an angler and nearly none would be overnight vehicles. The Green Creek trailhead only has around one vehicle present on average during the peak (summer) season which, based on this analysis, is expected to always belong to a day user. At the Norton Mill trailhead access point, only 0.3 VAOT are observed there on average during the peak (summer) season. According to this analysis, if a vehicle is present, two thirds of the time it will belong to a day user and one third of the time it will belong to an angler.

In summary for the Chattooga Cliffs reach, the majority of users in this area are day users and their primary activity is hiking/walking. The Bullpen Bridge is the only access point that serves the reach that one would expect, on average, to see more than one vehicle at a time. When multiple vehicles are observed at this access point, it should be expected that nearly three quarters of them belong to day users and close to one quarter of them would belong to an angler. It is not expected that overnight vehicles would be parked at Chattooga Cliffs access points on a regular basis.

Ellicott Rock Reach

Ellicott Rock had the largest number of responses to intercept surveys out of any of the backcountry reaches. Thus, it had the largest variety of activities participated in by users. Table 2.2-6 describes the primary activity respondents took part in at each access point/area in the Ellicott Rock reach during the peak (summer) season.

Fishing was the most popular activity in this reach, with 35 percent of respondents in the Ellicott Rock reach reporting fishing as a primary activity during the peak (summer) season. Hiking/walking was the second most popular primary activity at 30 percent. Hiking/walking was often noted in conjunction with other activities, including swimming, fishing, sightseeing and picnicking. Backpacking was the third most popular primary activity in this reach at 23 percent. Similar to the hiking/walking responses, backpacking was also reported in combination with fishing or sightseeing.

Table 2.2-7 outlines the number of user types for each access point/area as well as the total for the entire reach.

Table 2.2-6: Ellicott Rock reach interview results by activity and access point/area for the peak (summer) season.

Recreation Activities	Count of Primary Activity (based on %)	Percent of survey responses at each access point
Ellicott Rock and Fowler/Bad Creek Trailheads and Sloan Bridge Parking Area[a]	**Total Responses: 0**	
Fish Hatchery Access Point	**Total Responses: 4**	
Backpacking	2	50.0%
Fishing	1	25.0%
Hiking/walking	1	25.0%
Burrell's Ford Bridge Access Area	**Total Responses: 79.2**	
Fishing	24.6	31.1%
Hiking/walking	19.8	25.0%
Backpacking	15	18.9%
Sightseeing	4.8	6.1%
Other	3	3.8%
Tie: Sightseeing/Hiking/Walking	3	3.8%
Tie: Fishing/backpacking	1.2	1.5%
Tie: Sightseeing/backpacking	1.2	1.5%
Tie: Sightseeing/other	1.2	1.5%
Swimming	0.6	0.8%
Tie: 3 activities (swimming, picnicking, hiking/walking)	0.6	0.8%
Tie: 4 activities (picnicking, hiking/walking, sightseeing, other)	0.6	0.8%
Tie: 4 activities(swimming, hiking/walking, fishing, photography)	0.6	0.8%
Tie: 5 activities (swimming, hiking/walking, fishing, sightseeing, other)	0.6	0.8%
Tie: 5 activities (swimming, picnicking, hiking/walking, fishing, sightseeing)	0.6	0.8%
Tie: Hiking/Fishing	0.6	0.8%
Tie: Hiking/other	0.6	0.8%
Tie: Sightseeing/Wildlife viewing	0.6	0.8%
Total	**83.2**	

[a] Interviews were not collected at this access point during the peak (summer) season.

Table 2.2-7: User categorization by access point for the Ellicott Rock reach for the peak (summer) season.

Access Point/Area	Type of Recreation Users				Total
	Angler	Boater	Day User	Overnight User	
Ellicott Rock Trailhead[a]	N/A	N/A	N/A	N/A	N/A
Fowler/Bad Creek Trailhead[a]	N/A	N/A	N/A	N/A	N/A
Sloan Bridge[a]	N/A	N/A	N/A	N/A	N/A
Burrells Ford Area	30.6	0	28.8	19.8	79.2
Fish Hatchery	2	0	0	2	4
Total	32.6		28.8	21.8	83.2

[a] Interviews were not collected at this access point during the peak (summer) season.

Based on the above analysis, most (39 percent) users in the Ellicott Rock reach are anglers, closely followed by day users (35 percent) and overnight users (26 percent).

Looking at each access area more closely:

- Burrells Ford Access Area: Approximately 39 percent anglers, approximately 36 percent day users, 25 percent overnight users.
- Fish Hatchery Access Point: 50 percent anglers and 50 percent overnight users.

Table 2.2-8 uses the above numbers to calculate the proportion of VAOT to user types at each access point/area that serves the Ellicott Rock backcountry reach.

Table 2.2-8: Ellicott Rock recreation user type in relation to VAOT for the peak (summer) season.

	Count of Day users, overnight users, anglers, boaters	Percent of Users	Average VAOT	Number of Users by Average VAOT
Ellicott Rock Trailhead, Fowler/Bad Creek Trailhead, Sloan Bridge Trailhead[a]				
Angler, Day User, Overnight User	N/A	N/A	0.2 (Ellicott Rock), 0.8 (Fowler/Bad Creek), 2.0 (Sloan Bridge)	N/A
Fish Hatchery				
Angler	2	50%	7.8	3.9
Day User	0	0%		0
Overnight User	2	50%		3.9
Burrell's Ford Area				
Angler	30.6	38.6%	17.7	6.8
Day User	28.8	36.3%		6.4
Overnight User	19.8	25.1%		4.4
Total	**83.2**			

[a] Survey clerks were unsuccessful in obtaining interviews at these access points during the peak (summer) season.

According to the table above, anglers make up the majority of vehicles at the Burrells Ford access area and half of the vehicles at the Fish Hatchery access point. Looking specifically at the Burrells Ford access area, of the average 17.5 VAOT there, nearly seven of the vehicles would belong to anglers, around six would belong to day users, and around four would belong to overnight users. The Fish Hatchery area has around 8 VAOT on average during the peak (summer) season. Based on this analysis, it is expected that four of these vehicles would belong to anglers and four would belong to overnight users.

In summary for the Ellicott Rock reach, the primary activity is fishing and the majority of users are anglers. Both the Burrells Ford and Fish Hatchery access areas serve anglers as well as overnight users, and the Burrells Ford serves day users as well. Of the vehicles at Burrells Ford, nearly 60 percent of them are expected to use the Ellicott Rock Reach. Of those, nearly 40 percent are expected to be anglers, around 36 percent are expected to be day users and a quarter are expected to be overnight users. Of the vehicles parked at the fish hatchery, half would be anglers and half would be overnight users.

Rock Gorge Reach

The Rock Gorge backcountry reach had the second largest number of responses to intercept surveys. Table 2.2-9 describes the primary activity respondents took part in at each access point in the Rock Gorge reach.

Table 2.2-9: Rock Gorge reach interview results by activity and access point for the peak (summer) season

Recreation Activities	Count of Primary Activity (based on %)	Percent of survey responses at each access point
Burrells Ford Area	**Total Responses: 52.8**	
Fishing	16.4	31.1%
Hiking/walking	13.2	25.0%
Backpacking	10	18.9%
Sightseeing	3.2	6.1%
Other	2	3.8%
Tie: Sightseeing/Hiking/Walking	2	3.8%
Tie: Fishing/backpacking	0.8	1.5%
Tie: Sightseeing/backpacking	0.8	1.5%
Tie: Sightseeing/other	0.8	1.5%
Swimming	0.4	0.8%
Tie: 3 activities (swimming, picnicking, hiking/walking)	0.4	0.8%
Tie: 4 activities (picnicking, hiking/walking, sightseeing, other)	0.4	0.8%
Tie: 4 activities(swimming, hiking/walking, fishing, photography)	0.4	0.8%
Tie: 5 activities (swimming, hiking/walking, fishing, sightseeing, other)	0.4	0.8%

Recreation Activities	Count of Primary Activity (based on %)	Percent of survey responses at each access point
Tie: 5 activities (swimming, picnicking, hiking/walking, fishing, sightseeing)	0.4	0.8%
Tie: Hiking/Fishing	0.4	0.8%
Tie: Hiking/other	0.4	0.8%
Tie: Sightseeing/Wildlife viewing	0.4	0.8%
Big Bend Road	**Total Responses: 2**	
Fishing	1	50%
Photography	1	50%
Big Bend TH/Cherry Hill Campground	**Total Responses: 0**	
Lick Log	**Total Responses: 13**	
Hiking/Walking	3.5	26.9
Backpacking	3	23.1%
Fishing	2.5	19.2%
Photography	0.5	3.8%
Sightseeing	0.5	3.8%
Swimming	0.5	3.8%
Tie: 3 activities (swimming, picnicking, photography, hiking/walking)	0.5	3.8%
Tie: 5 activities (swimming, picnicking, hiking/walking, sightseeing, wildlife viewing)	0.5	3.8%
Backpacking/photography	0.5	3.8%
Hiking/fishing	0.5	3.8%
Sightseeing/hiking	0.5	3.8%
Total	**67.8**	

The Rock Gorge reach is especially popular with hiking/walking and fishing, with 34 percent of respondents listing hiking/walking as a primary activity and 34 percent listing fishing as a primary activity. This reach is also popular with backpackers, with 22 percent listing backpacking as a primary activity. Table 2.2-10 outlines the various user types at this reach.

Table 2.2-10: User categorization by access point for the Rock Gorge reach for the peak (summer) season

Access Point/Area	Type of Recreation Users				Total
	Angler	Boater	Day User	Overnight User	
Burrells Ford	20.4	0	19.2	13.2	52.8
Big Bend Road	1	0	1	0	2
Big Bend Trailhead/Cherry Hill Campground[a]	N/A	N/A	N/A	N/A	N/A
Lick Log	4	0	5	4	13
Total	25.4	0	25.2	17.2	67.8

[a] Interviews were not collected at this access point.

Of the nearly 68 users surveyed that were recreating in the Rock Gorge backcountry reach during the peak (summer) season, 37.5 percent were anglers, 37 percent were day users, and 25 percent were overnight users.

Looking at the access point/areas individually:

- Burrells Ford access area: Approximately 39 percent anglers, approximately 36 percent day users, 25 percent overnight users.
- Big Bend Road access point: 50 percent anglers, 50 percent day users.
- Lick Log access point: Approximately 39 percent day users, approximately 31 percent anglers and approximately 31 percent overnight users.

Table 2.2-11 summarizes the relationship between activity category and average VAOT and calculates the average number of vehicles that belong to each user group.

Table 2.2-11: Rock Gorge recreation user type in relation to VAOT for the peak (summer) season

	Count of Day users, overnight users, anglers, boaters	Percent of Users	Average VAOT	Number of Users by Average VAOT
Burrells Ford Bridge Area				
Angler	20.4	38.6%	11.5	4.4
Day User	19.2	36.3%		4.2
Overnight User	13.2	25.1%		2.9
Big Bend Road				
Angler	1	50%	0.0	0.0
Day User	1	50%		0.0
Overnight User	0	N/A		N/A
Big Bend Trailhead/Cherry Hill Campground				
Angler	N/A	N/A	0.6	N/A
Day User	N/A	N/A		N/A
Overnight User	N/A	N/A		N/A
Lick Log				
Angler	4	30.8%	2.1	0.65
Day User	5	38.5%		0.8
Overnight User	4	30.8%		0.65
Total	**67.8**			

According to Table 2.2-11, anglers make up the majority of vehicles at the Burrells Ford access point, with a little more than four of the average 12 VAOT belonging to anglers. About a quarter of the vehicles at the Burrells Ford access area are overnight vehicles, which equates to three vehicles parked in the Burrells Ford access area that would be recreating in the Rock Gorge backcountry reach. The Big Bend Road access point has an average VAOT of zero. However, if a car is seen at this access point it is likely to be either a day user or angler rather than an overnight user. For the Lick Log access point, VAOT were split between the Rock Gorge and Nicholson Fields reaches. Users at this reach were close to evenly proportioned between angler, day user and overnight user. Out of the two vehicles parked at this access point that are recreating in the Rock Gorge reach, the likelihood of a vehicle belonging to a day user is only slightly higher than an angler or overnight user.

In summary for the Rock Gorge reach, anglers make up a slight majority in this reach followed closely by day users. Both Burrells Ford and Lick Log serve as access points/areas for all user types, with Burrells Ford having a higher proportion of anglers and Lick Log having a higher proportion of day users. The Big Bend access point is not a popular parking area for recreationists at this reach.

Nicholson Field Reach

Nicholson Fields Reach is the most downstream of the four reaches. According to the study results, this is the least visited reach. However, it should be noted that

this reach is most popular among anglers who prefer to fish during the spring months. Therefore, evaluating recreation use exclusively during the summer months may not be representative of the peak season for this reach.

Table 2.2-12 breaks down survey respondents by their primary activity.

Table 2.2-12: Nicholson Fields interview results by activity and access point for the peak (summer) season

Recreation Activities	Count of Primary Activity (based on %)	Percent of survey responses at each access point
Lick Log Access Point	**Total Responses: 13**	
Hiking/Walking	3.5	26.9%
Backpacking	3	23.1%
Fishing	2.5	19.2%
Photography	0.5	3.8%
Sightseeing	0.5	3.8%
Swimming	0.5	3.8%
Tie: 3 activities (swimming, picnicking, photography, hiking/walking)	0.5	3.8%
Tie: 5 activities (swimming, picnicking, hiking/walking, sightseeing, wildlife viewing)	0.5	3.8%
Backpacking/photography	0.5	3.8%
Hiking/fishing	0.5	3.8%
Sightseeing/hiking	0.5	3.8%
Hwy 28 Access Area	**Total Responses: 14**	
Fishing	7	50.0%
Backpacking	4	28.6%
Hiking/walking	2	14.3%
Sightseeing	1	7.1%
Total	**Total**	**27**

The most popular activity in this reach is fishing, 37 percent of respondents listing fishing as a primary activity. Close to 28 percent of respondents in this reach noted backpacking as a primary activity, and another 28 percent noted hiking/walking as a primary activity.

Table 2.2-13 outlines the proportion of user types at this reach by access point/area. Of the 27 users surveyed at the Nicholson Fields backcountry reach during the peak

(summer) season, 41 percent were anglers, 33 percent were overnight users, and 26 percent were day users.

Table 2.2-13: User categorization by access point for the Nicholson Fields reach

Access Point/Area	Interview Responses by Type of Recreation Users				Total
	Angler	Boater	Day User	Overnight User	
Lick Log Access Point	4	0	5	4	13
Hwy 28 Access Area	7	0	2	5	14
Total	11	0	7	9	27

Looking at the access point/areas individually:

- Lick Log access point: Approximately 39 percent day users, approximately 31 percent anglers and approximately 31 percent overnight users.
- Hwy 28 access area: 50 percent anglers, approximately 36 percent overnight users, approximately 14 percent day users.

Table 2.2-14 summarizes the relationship between user type and average VAOT to calculate the average number of vehicles that belong to each user type.

Table 2.2-14: Nicholson Fields recreation user type in relation to VAOT

	Count of Day users, overnight users, anglers, boaters	Percent of Users	Average VAOT	Number of Users by Average VAOT
Lick Log				
Angler	4	30.8%	2.1	0.65
Day User	5	38.5%		0.8
Overnight User	4	30.8%		0.65
HWY 28 Access Area				
Angler	7	50.0%	4.3	2.2
Day User	2	14.3%		0.6
Overnight User	5	35.7%		1.5
Total	**27**			

Based on the above analysis, anglers make up the majority of vehicles at the Hwy 28 access area, while day users make up the majority of vehicles at the Lick Log access point. Of the average number of vehicles at the Hwy 28 area, half of them (around two vehicles on average) are expected to belong to anglers. In addition, it is expected that there would be between one and two vehicles that belong to overnight users and one vehicle that belongs to a day user. For the Lick Log access point, VAOT were split between the Rock Gorge and Nicholson Fields reaches. Users at this reach were close

to evenly proportioned between angler, day user and overnight user. Out of the two vehicles parked at this access point that are recreating in the Nicholson Fields reach, the likelihood of a vehicle belonging to a day user is only slightly higher than an angler or overnight user.

In summary for the Nicholson Fields reach, the primary activity is fishing and most of the users are anglers. Both the Lick Log Creek Access Point and Hwy 28 access area serve all types of recreation users during the summer (except for boaters), with Lick Log having a higher proportion of overnight vehicles than the Hwy 28 access area. Nicholson Fields has the largest proportion of overnight vehicles out of any of the reaches, with nearly a third of the vehicles present belonging to backpackers.

2.2.5 Discussion

Across all backcountry reaches, hiking/walking is the most popular recreation activity, followed by fishing and then backpacking. This primary activity analysis coincides with the user type categorization, with day users making up the majority of user types, followed by anglers and overnight users.

Day users and anglers make up the majority of vehicles observed at backcountry access points/areas, however the proportion of user type vehicles varies among reaches. Angling was the largest user type category in the Ellicott Rock and Nicholson Fields reaches, therefore dominating the number of vehicles at the access points for these reaches. Day user was the largest user type category in the Chattooga Cliffs reach, thus attributing most of the vehicles at these areas to day users. For the Rock Gorge reach, day users and anglers both dominated the user types recreating in this area and these user types have an equal proportion of vehicles at the access points feeding this reach. Nicholson Fields, Rock Gorge and Ellicott Rock are the most popular reaches for backpackers with notably fewer overnighters visiting the Chattooga Cliffs reach, with Nicholson Fields having the highest proportion of backpackers. For Nicholson Fields, Rock Gorge, and Ellicott Rock, the proportion of VAOT that can be attributed to overnight users is 33, 25 and 24 percent, respectively.

It is important to note, that although attempts to understand the relationship between recreation activities occurring in the backcountry relative to the number of vehicles were made, it is clear from the interview data that visitors participate in multiple activities and isolating for a single activity has merit as long as its simplification of the situation is understood. For example, in the Ellicott Rock Reach, anglers have to hike more than a mile if they are accessing the river from all the parking areas other than Burrells Ford making them hikers and anglers. Similarly, many backpackers also enjoy fishing during their trip making them anglers and overnight users.

2.3 Monitoring Question 3

How is Total Daily Backcountry Use Related to the Number of Encounters?

Is the Number of Encounters Affecting Opportunities for Solitude in the Backcountry?

How do the Number of Encounters Compare to User Tolerances?

2.3.1 Key Findings

Overall

- In general, the data show that the number of encounters increases with the number of people visiting the backcountry. The following list summarizes the findings as they relate to backcountry use, the number of encounters, perceptions of solitude, and user tolerances:
    - Backcountry reaches with more access points result in higher levels of use; however study results show a smaller proportion of people encountered compared to the average people-at-one-time (PAOT) recreating at the reach, while reaches with lower levels of use show a larger proportion of people encountered. This may be due to "bottlenecking" as not every backcountry area has the same trail networks with the most popular backcountry areas (highest estimated use at one time) also have the most access points. For example, Ellicott Rock Reach has numerous trails into and out of the backcountry, while Nicholson Fields Reach has two.
    - Across all reaches, solitude expectations are generally being met. However, solitude is indeed impacted by the number of encounters. Ellicott Rock had the highest proportion of users who experience an encounter as well as one of the lowest average solitude experience ratings.
    - Backcountry tolerances show a weak correlation to encounters. Rather, exceedances of tolerance are a result of a lack of solitude, most likely from crowding in frontcountry areas rather than backcountry reaches.
    - Conflicts are deemed a non-issue for visitors to the Upper Chattooga Backcountry. Of the conflicts that did occur in the backcountry, 75 percent of them involved off-leash dogs.

Reach Specific

- The **Chattooga Cliffs** reach has the lowest proportion of users who experienced an encounter out of the four backcountry reaches. This low number is correlated to the weak relationship that is observed between the average people-at-one-time and the average number of people encountered at this reach. While Chattooga Cliffs showed a low number of encounters, the average people encountered make up nearly 48 percent of the average number

of people present at any given time, which is the second highest proportion of all of the reaches. Chattooga Cliffs also had one of the highest solitude satisfaction scores as well as the highest average tolerance rating.

- The **Ellicott Rock** reach had the highest average number of people-at-one-time out of the four reaches. This reach also had the highest proportion of users who experienced an encounter as well one of the lowest solitude satisfaction scores. Additionally, half of the conflicts that occurred in the backcountry during the peak (summer) season occurred in this reach. While Ellicott Rock showed the highest use and encounter levels, this reach had the lowest proportion of average people encountered to average people-at-one-time recreating, with the average people encountered only making up 15 percent of the average people-at-one-time. This may be due to the larger area available for recreation at this reach and/or the ample parking availability.
- The **Rock Gorge** reach had the second highest average number of people at-one-time as well as the second highest proportion of users who experienced an encounter. This reach also showed the strongest linear relationship between the two variables, meaning that of all the reaches, this reach maintains the strongest likelihood of increased encounters with increased visitors. The Rock Gorge reach had one of the higher solitude satisfaction scores. One of the four conflicts reported occurred at this reach.
- The **Nicholson Field** reach has the second lowest average number of people at-one-time, as well as the second lowest average number of encounters. However, this reach showed the highest proportion of average people encountered to average people-at-one-time at 62.5 percent, meaning that at this reach, the number of people you encounter makes up approximately 62.5 percent of the population visiting the area on any given day. This reach had one of the lowest solitude satisfaction and tolerance rating scores. One of the four conflicts reported occurred at this reach.

2.3.2 Introduction

Wilderness and backcountry areas provide the opportunity for solitude, which is often a primary reason recreationists visit these types of areas. The *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor Environmental Assessment* (EA) (2012) discusses the need to maintain or increase opportunities for solitude along the upper segment of the Chattooga WSR corridor. The EA states that creating "per day" or "at-one-time" use capacities may be necessary to ensure that recreation users receive opportunities for solitude and the backcountry reaches do not become overcrowded. To assess the specific monitoring questions of this memo, estimates on the amount of backcountry use was compared with information from the intercept survey questions that directly asked visitors about their trip (the intercept survey is located in Appendix D of this report). Four of the interview questions (and their subparts) inquired about user experiences in the backcountry. The responses to these questions were analyzed to answer this monitoring question. The questions include: (1) whether or not solitude was a factor

in trip planning and if so, how the amount of solitude compared to their expectation; (2) the number of encounters they had if they were hiking, fishing, or boating; (3) the level of crowding they experienced at frontcountry facilities and backcountry areas, and (4) if visitors experienced any conflicts with other users. Unlike Monitoring Question 1 which was designed to measure changes in VAOT between this study and 2008 results; this monitoring question does not have the luxury of visitor perceptions of solitude, encounters or crowding from 2008. As such, the information used to answer MQ3should be considered 'baseline' which future monitoring results can be measured against.

2.3.3 Methods

The overarching monitoring question has three parts (or sub-questions) that were each evaluated separately in this memo:

- Part 1. How is Total Daily Backcountry Use Related to the Number of Encounters?
- Part 2. Is the Number of Encounters Affecting Opportunities for Solitude in the Backcountry?
- Part 3. How do the Number of Encounters Compare to User Tolerances?

Interview response elements were considered in the examination of the relationships between the amount of use and users' encounters, perceptions of solitude, and tolerances. The responses were scored to convert the qualitative interview data to quantitative to analyze the interview with the spot count data. These metrics were given specific names, which are introduced and defined here and described in more detail in the following sections:

- **Average Groups at One Time (average GAOT)** – The **average GAOT** is a measurement of the average number of people recreating in a backcountry reach on a single day. The average GAOT was created using two variables; (1) the average vehicle-at-one-time (VAOT) counts for each day at each access point and (2) an estimate of one group per vehicle, which was calculated using intercept survey responses to find the average number of vehicles per group. For the VAOT at the access points/areas that serve the reaches, it was assumed that all visitors were recreating in the backcountry. While visitors do use the frontcountry for recreation, by default they have to park there and pass through the frontcountry to access the backcountry, 99 percent of respondents noted recreating in the backcountry in the intercept survey responses. Average VAOT was converted to average GAOT using the one vehicle per group estimate. Average GAOT was then summed across access points to get a value for each backcountry reach for each day (Table 2.3-1).

Table 2.3-1: Access points/areas as for backcountry reaches.

Backcountry Reach	Access Points/Areas
Chattooga Cliffs	Chattooga Trailhead (Green Creek Trailhead Parking)
	Countyline Trailhead (Norton Mill Trailhead Parking)
	Bullpen Road Bridge
Ellicott Rock	Ellicott Rock Trailhead
	Fowler/Bad Creek Trailhead
	Sloan Bridge
	Fish Hatchery
	Burrells Ford Area[a,b]
Rock Gorge	Burrells Ford Area[a,b]
	Big Bend Road
	Big Bend Trailhead/Cherry Hill Campground
	Lick Log Parking[c]
Nicholson Fields	Lick Log Parking Area[c]
	Hwy 28 Bridge[d,e]

[a] Contains three parking areas (Burrells Ford Campground (Sc Side), GA side parking lot, and parking at/or near bridge/trailhead).

[b] This area was split between two backcountry reaches, with 60 percent of data in Ellicott Rock and 40 percent in Rock Gorge.

[c] This area was split between two backcountry reaches, with 50 percent of data in Rock Gorge and 50 percent in Nicholson Fields.

[d] Contains three parking areas (GA side parking lot, SC side parking lot, and the USFS gate).

[e] All vehicles on the South Carolina side and in front of the USFS gate on the GA roadside were assumed to use the Nicholson Field Reach. For the lot near the Hwy 28 Bridge on the GA side, it was assumed that 25 percent of vehicles in the lot near the Hwy 28 Bridge were visiting the Nicholson Fields Reach, with 75 percent using the non-study area Bartram Trail that heads south into Georgia.

- **Average People at One Time (average PAOT)** – This metric was calculated using the average GAOT and an average value of 2.8 people per group, determined by the intercept survey data. To calculate the average PAOT, the average GAOT was multiplied by the 2.8 factor to obtain the average number of people in a backcountry reach at one time on any given day.
- **Users who Reported an Encounter (URE)** – The **URE** is the proportion of respondents who reported an encounter. It was calculated by scoring respondents' answers of whether or not they encountered another visitor while hiking, fishing, or boating. Responses were scored with a '1' for yes and '0' for

no. 'Yes' values were divided by the total number of responses to calculate the proportion of encounters versus the number of respondents (URE). For example, if there were 10 interview responses and eight of the respondents noted an encounter, the URE would be 80 percent. URE was calculated for each backcountry reach.

- **Average People Encountered (APE)** – The **APE** is the average number of people one would expect to encounter in the backcountry on any given day. APE is based on whether or not respondents encountered other visitors while they were hiking, fishing, or boating. If they encountered anyone, an estimate of how many people they encountered was recorded for each activity. The estimated number of people encountered was summed across the three recreation activities and then averaged for each day. For example, if a respondent saw an estimated four people while they were fishing and zero while they were hiking, and on the same day another respondent saw 1 person while they were fishing and one person while they were hiking, the APE for that day would be totaled for each visitor (four for the first and two for the second) and averaged for the day, resulting in an APE of three people.

- **Crowding Satisfaction Score (CSS)** – Responses to "How crowded did you feel when using the following facilities on this trip" for backcountry facilities, including backcountry fishing, backcountry camping and hiking, were converted from qualitative answers to quantitative answers. Specifically, "very crowded" was converted to '-1' to denote negative experience, "average crowding" was converted to '0' to denote no impact on overall experience; and "not crowded" was converted to '+1' to denote a positive experience. Scores were averaged across the three recreation use categories to obtain an overall CSS.

- **Solitude Satisfaction Score (SSS)** – Responses to "How was the amount of solitude you experienced compared to your expectation?" were converted from qualitative answers to quantitative scores. Specifically "more solitude than I expected" was converted to '1' to note a positive experience, 'about what I expected" was converted to '0' to denote no difference in solitude experienced versus the expectation, and "less solitude than I expected" was scored a '-1' to denote a negative experience. Scores were averaged across the three recreation use categories to obtain an overall CSS.

- **Average Tolerance Rating (ATR) –** A composite score comprised of interview responses taken from crowding, solitude, and conflict questions.

  1. Crowding in the backcountry was measured as CSS.

  2. Solitude in the backcountry was measured as SSS.

  3. Conflicts were assigned a value of '0' was given to each 'no' conflict response and a value of '-1' was given to every conflict reported.

The three scores were summed to calculate daily ATR throughout the study period. The ATR was scored on a scale of -3 to 2, with -3 being the worst score and 2 being a perfect score.

Each part of the monitoring question was evaluated by backcountry reach. Each backcountry reach was broken down by access points and access areas (access areas are a grouping of two or more access points). There is one access point (Lick Log) and two access areas (Burrells Ford Bridge and Hwy 28 Bridge) that feed more than one backcountry reach. Therefore, assumptions were made as to how many visitors were venturing to each backcountry reach. The assumptions that were used are as follows:

a. At Burrells Ford it was assumed 60 percent of visitors ventured upstream into Ellicott Rock Reach and 40 percent visited the Rock Gorge Reach.

b. At Lick Log, it was assumed 50 percent visited the Rock Gorge Reach and 50 percent visited the Nicholson Fields Reach.

c. At Hwy 28 Bridge access area, 100 percent of the vehicles on the SC-side and parked in front of the USFS gate were assumed to use the Nicholson Field Reach. Of vehicles parked near the Hwy 28 bridge on the GA-side, 25 percent were assumed to visit the Nicholson Fields Reach and 75 percent were assumed to visit the non-study area Bartram Trail that heads south into Georgia. While this method is used to calculate spot count data, all of the interviews took place in the SC lot (within the study area). Thus we can assume that all interview respondents at the Hwy 28 access area were recreating within the study area.

In order to score reaches for solitude, crowding, and conflict, a different approach had to be used from the ones outlined above. Using a proportion for scores that range from -1 to 1 would only lower the average score, rather than distribute it correctly. As such, the following assumptions were made:

a. The Burrells Ford Area interview data were broken down into responses from those that noted visiting the Burrells Ford campground and those that did not. The responses from the campground were assumed to have recreated downstream at the Rock Gorge reach,[10] while the remainder of respondents were grouped with the upstream, Ellicott Rock reach.

b. Due to the decided distribution of the Lick Log data (50 percent to Rock Gorge and 50 percent to Nicholson Field), the full score was counted for both reaches.

In order to calculate the SSS and CSS for backcountry reaches, scores from each access point were combined into a single score for the reach. However, different access points had different numbers of survey responses. Thus, a weighted average

[10] The Burrells Ford Campground was considered a backcountry reach due to the fact that it is more than 0.25-mile from an access road or bridge.

was created for each access point before combining the scores into a single score for the reach.

Methods Part 1. How is Total Daily Backcountry Use Related to the Number of Encounters?

To answer this part of Monitoring Question 3, the relationship between backcountry use and encounters was analyzed. Answering this question required three steps: (1) estimating the amount of use in the backcountry, (2) estimating the proportion of people encountering others during that same day (URE); and (3) the average number of people a visitor encountered (APE).

The average PAOT and APE were combined based on matching dates for each backcountry reach. Scatter plots were created to evaluate (1) the relationship between encounters and average PAOT within each reach on a daily basis and (2) how representative the APE is of the PAOT at each reach. Average PAOT and APE were also compared on a daily basis to see if APE exceeded average PAOT on any occasions.

A correlation coefficient 'R' was calculated to determine if a linear relationship exists and to evaluate the strength of it (1 being a perfectly positive linear relationship, 0 being a non-linear relationship, and -1 being a perfectly negative linear relationship). Also, a large sample size was required to discern the relationship between backcountry use and the number of encounters. Therefore, the entirety of the datasets (spot counts and interviews, including the winter season) were used in the Part 1 analysis.

Methods Part 2. Is the Number of Encounters Affecting Opportunities for Solitude in the Backcountry?

User solitude importance and perception were evaluated for the peak (summer) season. Solitude Satisfaction Scores (SSS) were evaluated in conjunction with the estimated number of encounters. For this analysis, the value of '0' was used as an indicator for solitude satisfaction. Values above zero meant solitude was satisfactory and values below meant it was not. The SSS was compared to the URE for each reach to investigate the relationship between the proportion of visitors who experienced an encounter and solitude satisfaction.

Solitude was then evaluated by user type among the four reaches to evaluate if different user groups value the importance of solitude differently and how this factors into the overall perception of solitude within each reach.

Survey data were used to group recreationists into four user type categories:

- Anglers
- Boaters
- Day users
- Overnight users.

Using these four categories, a hierarchy was established, as follows:

1. The first category, or highest in the hierarchy, was 'overnight users'; a recreationist was considered an overnight user if they reported any percentage in the backpacking activity above zero.
2. Second in the hierarchy was angler; a recreationist was categorized as an angler when they identified any percent above zero for angling, unless they indicated backpacking.
3. Third was 'boaters,' with any user listing boating above zero to be considered a boater.
4. All other users were identified as 'day users'.

It should be noted that solitude was not measured in the 2008 data collection effort, thus an accurate comparison metric to evaluate the change in solitude over time is not available. Additionally, it should be noted that solitude perceptions are subjective and vary from user to user.

Methods Part 3. How do the Number of Encounters Compare to User Tolerances?

This part of the monitoring question investigates the relationship between encounters and visitor tolerances. In this part, encounters are reported directly in the interviews; however user tolerances are less well defined. For the purposes of answering this part of the monitoring question, user tolerances are measured by positive and negative feedback in the interviews. Information available to address visitor tolerances were derived from (1) feeling crowded in the backcountry; (2), less solitude experienced than expected in backcountry; and (3) the nature of negative encounters reported as conflicts. The composite of these scores results in the ATR.

ATR scores were compared to the APE using a linear regression analysis. To calculate the strongest possible relationship between the two variables, data from the entire study period were used.

2.3.4 Results

Results Part 1: How is Total Daily Backcountry Use Related to the Number of Encounters?

During the peak (summer) season, of all the visitors who reported recreating in the backcountry, 86 percent (189 out of 221 respondents who answered the question) reported an encounter with another visitor.

Table 2.3-2 compares the PAOT to the users who reported an encounter (URE) and the average people encountered (APE). The table also calculates the proportion of APE to PAOT, meaning what proportion the average number of people seen represents of the average number of people visiting the reach on any given day.

Table 2.3-2: Average PAOT versus encounters by backcountry reach in the peak (summer) season

Backcountry Reach	Average PAOT (in number of people/day)	URE	APE	Proportion of APE to PAOT
Chattooga Cliffs	15.1	71.7%	7.6	50.3%
Ellicott Rock	79.6	90.1%	12.0	15.1%
Rock Gorge	40.4	89.8%	9.1	22.5%
Nicholson Field	17.9	81.1%	11.2	62.6%

From Table 2.3-2 we can conclude the following information for all days during the peak (summer) season:

- For the most popular and least popular reaches (highest and lowest PAOT, respectively), the percent of backcountry encounters reported follows the trend of the average number of PAOT for each area, meaning that areas with lower average PAOT had lower proportions of visitors that reported an encounter. Ellicott Rock had the highest percentage of encounters with 90 percent of respondents encountering another visitor, while Chattooga Cliffs (72 percent) had the lowest.
- The APE showed relatively little variation among the reaches even though the average PAOT varied significantly.
- The least popular reach (smallest average PAOT; Chattooga Cliffs) had larger proportions of visitors encountered than the more popular reaches (reaches with higher average PAOT; Ellicott Rock and Rock Gorge). This may be due to "bottlenecking" as not every backcountry area has the same trail networks with the most popular backcountry areas (highest estimated use at one time) also have the most access points.
- Ellicott Rock had the highest average PAOT and the smallest proportion of APE (15 percent). This smaller proportion may be explained by the analysis in the above bullet.

From Tables 2.3-3 and 2.3-4 we can conclude the following information for peak (summer) season weekdays and weekends:

- The average PAOT and the APE is lower during weekdays than weekends for each reach.
- The URE is lower during weekdays than weekends for each reach except for Nicholson Fields. However, when we look at the data this reach only had two responses during peak (summer) season weekdays.

- The proportion of APE to PAOT is lower during weekdays than weekends for each reach, meaning that on weekends a visitor is more likely to encounter a higher proportion of the entire population visiting the reach that day. This may be due to crowding at parking areas on weekends.

Table 2.3-3: Average PAOT versus encounters by backcountry reach for weekdays during the peak (summer) season

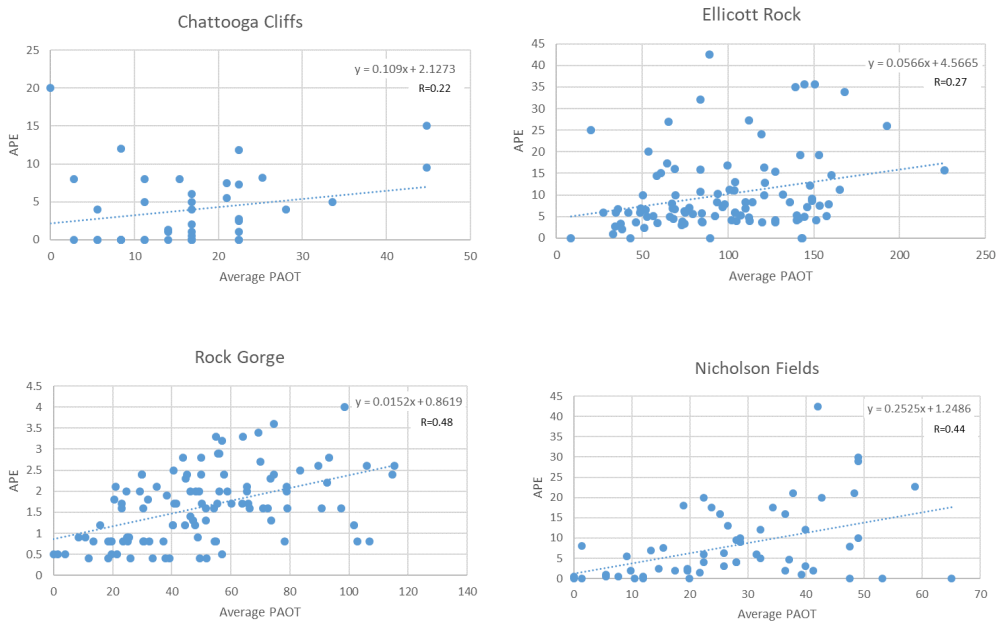
Backcountry Reach	Average PAOT (in number of people/day)	URE	APE	Proportion of APE to PAOT
Chattooga Cliffs	9.8	71.4%	4.0	42.1%
Ellicott Rock	47.6	20.0%	1.9	4.0%
Rock Gorge	22.1	46.7%	3.5	17.3%
Nicholson Field	10.6	100.0%	5.3	50.0%

Table 2.3-4: Average PAOT versus encounters by backcountry reach for weekends during the peak (summer) season

Backcountry Reach	Average PAOT (in number of people/day)	URE	APE	Proportion of APE to PAOT
Chattooga Cliffs	16.0	71.8%	7.9	49.4%
Ellicott Rock	85.1	95.6%	12.4	14.6%
Rock Gorge	43.7	90.4%	9.7	22.2%
Nicholson Field	19.3	79.6%	11.9	61.7%

Scatterplots were created to present data trends for each backcountry reach and evaluate the linearity between APE and average PAOT (Figure 2.3-1). A correlation coefficient (R-value) was calculated to assess the strength of the linear relationship between the two variables at each reach.

Figure 2.3-1. Linear correlation between APE and average PAOT by reach



From the scatterplots above we can conclude the following information:

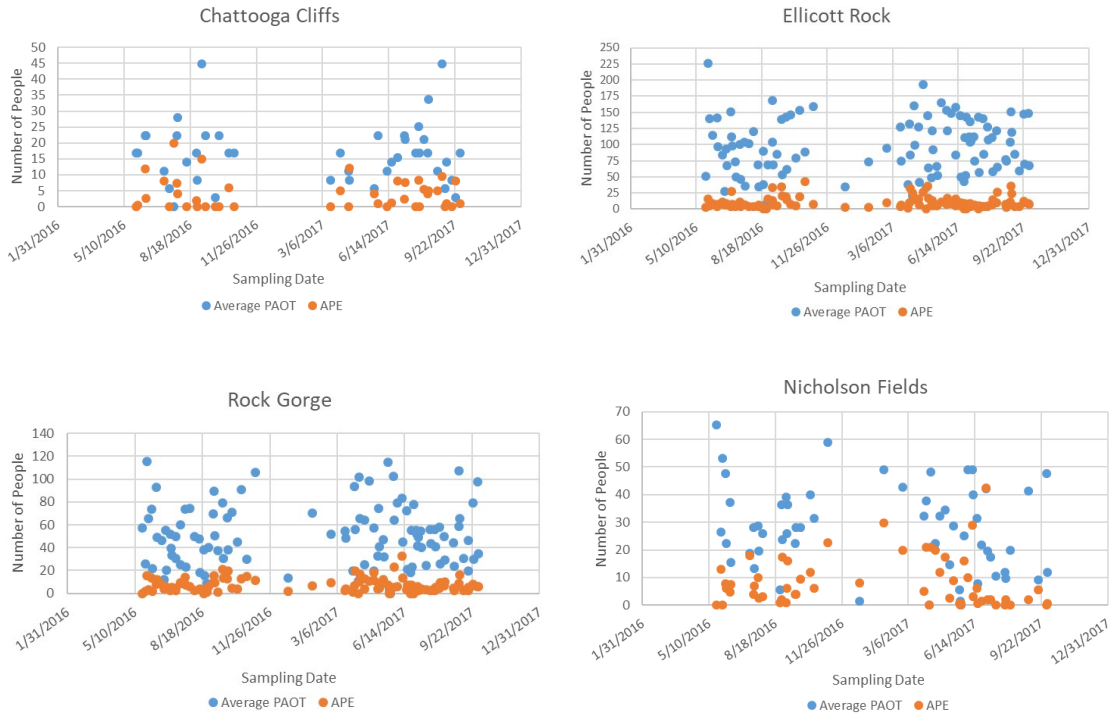
- A positive linear relationship exists between APE and average PAOT at each reach.
- Chattooga Cliffs, the reach with the lowest average PAOT, has the weakest correlation between the two variables, with an R-value of 0.22 (on a scale of -1 to 1 with 1 meaning a perfectly positive linear relationship). This means that a user would be expected to encounter less people at this reach as a result of PAOT increase as compared to other reaches.
- Ellicott Rock, which has the highest average number of PAOT, showed the second weakest correlation between APE and average PAOT, with an R-value of 0.27. This could be a result of the large wilderness area available at this reach as well as the available parking spaces, resulting in a lower number of encounters in the backcountry and at the access points/areas.
- Rock Gorge had the strongest linear relationship between APE and average PAOT, with an R-value of 0.48, meaning that out of all the reaches, one would be most likely to see more people as a result of an increase of PAOT at the Rock Gorge reach.
- Nicholson Field closely follows Rock Gorge with an R-value of 0.44, thus giving this reach the second strongest linear relationship between the two variables.

A second set of scatterplots (Figure 2.3-2) was created to show how representative the APE is of the average PAOT. For example, while encounters at Rock Gorge may increase with the number of people present, the number of people encountered will

only make up around 22 percent of the entire population (Table 2.3-4) at the reach on any given day.

In addition to the representative proportion, the plots below also show on which dates the APE exceeds the average PAOT (where the orange dot goes above the corresponding blue dot). These exceedances can represent crowding on that specific day, meaning that the visitor thought they saw more people than were actually present.

Figure 2.3-2. APE daily representation of average PAOT by reach



From the above scatterplots we can infer the following information for each backcountry reach:

- Ellicott Rock, the most visited reach, demonstrates an APE that is least representative of average PAOT (with a proportion of 15 percent during the peak (summer) season).
- Rock Gorge has the second lowest representative APE (23 percent during the peak (summer) season).
- Nicholson Fields has the highest representative APE (nearly 63 percent during the peak summer season) and demonstrates a few instances of exceedance (or crowding).
- Nicholson Fields is followed by Chattooga Cliffs, with a proportion of 50 percent during the peak (summer) season. Chattooga Cliffs also demonstrates a few instances of exceedance on the scatterplot.

From the analysis above we can conclude that while visiting the Chattooga Cliffs and Nicholson Fields reaches, a visitor would encounter a larger percentage of the total number of people recreating in the area on a single day during the peak (summer) season than at other, larger reaches. This may be due to a smaller amount of available access points/areas at the less visited reaches, resulting in bottlenecking along trailheads and parking areas, resulting in increased encounters. When looking at the scatterplots for these less visited reaches, there are obvious instances where APE exceeds PAOT. The obvious exceedances of APE to PAOT may mean that there was crowding at these reaches on those dates, likely due to bottlenecking at access points/areas.

The Part 1 analysis can be summarized into four important points, as follows:

- The more PAOT in a reach the more likely a visitor is to experience an encounter.
- The reaches with the largest average PAOT show a smaller proportion of people encountered (APE) while reaches with lower PAOT show a larger proportion of people encountered.
- Nicholson Field demonstrates the strongest linear relationship between APE and average PAOT. Meaning that encounters will increase as a result of an increase in PAOT, more so than any other reach. The second strongest correlation belongs to Rock Gorge, then Ellicott Rock, and finally Chattooga Cliffs has the weakest linear correlation.

Overall, the data show that the average number of people encountered is less than the average PAOT for each reach, therefore visitors are finding areas with fewer (to no) users. However, on a few particular dates encounters are higher than the average PAOT. This suggests that there is a potential for crowding on those specific dates. Major APE to PAOT exceedances only occur at the less popular (lower PAOT) reaches. This may be due to "bottlenecking" as not every backcountry area has the same trail networks with the most popular backcountry areas (highest estimated use at one time) also have the most access points. The perception of crowding at these reaches may ultimately impact a user's perception of solitude during their visit. This is investigated further in part 2.

Results Part 2: Is the Number of Encounters Affecting Opportunities for Solitude in the Backcountry?

For the respondents interviewed during the peak (summer) season who were recreating in the backcountry, 77 percent (167 of the 217 respondents who answered the question) identified solitude as an important factor in their decision to visit. Of these visitors, 85 percent had an encounter with other users. Of the visitors that reported an encounter, 75 percent of them noted that the amount of solitude still met their expectation, while 18 percent reported that the solitude they experienced was more than they expected and only 8 percent experienced less solitude than expected.

Of the users that listed solitude as an important factor in their decision to visit the backcountry who did not experience an encounter, 56 percent noted that the amount of solitude met their expectations, 39 percent reported that the amount of solitude exceeded their expectations, and only 4 percent experienced less solitude than expected.

The amount of solitude experienced by visitors varied by reach. Figure 2.3-3 shows solitude perception by visitors who noted solitude as a primary reason for visiting the backcountry and also experienced an encounter. The following figure shows the proportion of solitude experience by reach.

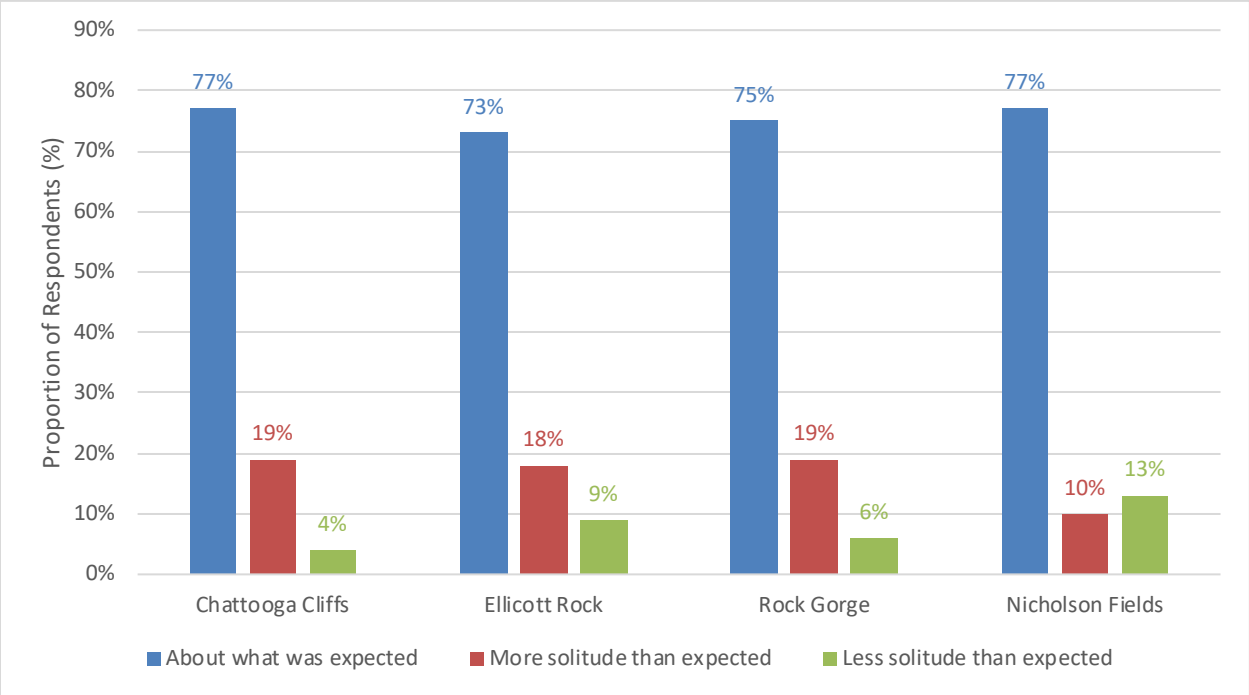


Figure 2.3-3. Solitude experiences between backcountry reaches for users who had encounters during the peak (summer) season

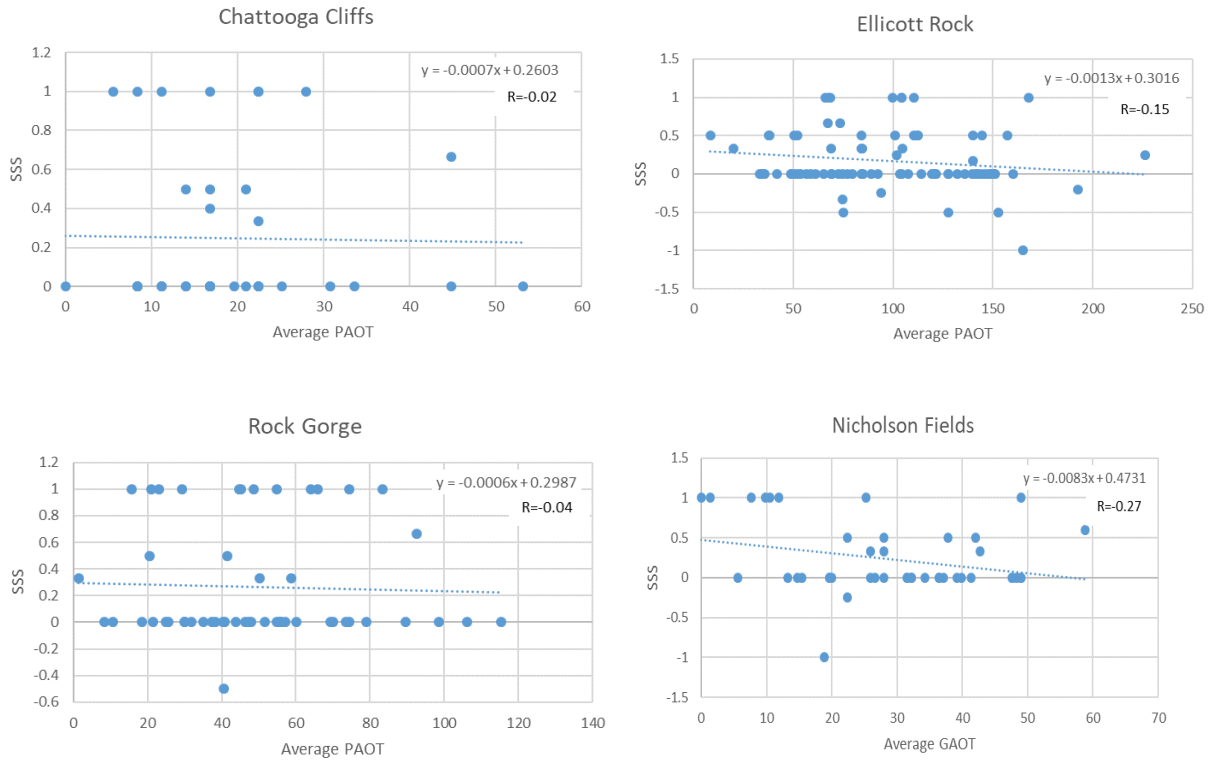
Figure 2.3-3 reveals the following information for the peak (summer) season:

- Most of the users in the Upper Chattooga backcountry reaches are experiencing the amount of solitude they expected or more.
- The 'less than expected' category respondents made up for only around 8 percent of the total number of respondents.
- The level of satisfaction with solitude varied by reach. Nicholson Field, one of the lesser used reaches, showed the highest negative solitude experience and had the lowest proportion of 'more than expected', with the other reaches nearly doubling their proportion in this category.

- Chattooga Cliffs had one of the highest proportion of users that experienced 'more than expected' and the lowest proportion of users that experienced 'less than expected'.

According to the 2015 Resource Capacity Analysis of the Beaverhead-Deerlodge National Forest, users are more impacted by the presence of others in areas that are low use as compared to more popular reaches (USDA 2015). To understand the impact GAOT had on the perception of solitude at each reach, scatterplots were created to conduct a linear regression analysis between a SSS and average PAOT (Figure 2.3-4). For this analysis, a large data set was needed, therefore results from the entirety of the study period were used.

Figure 2.3-4. SSS compared to Average PAOT by reach



One would expect a negative relationship between average SSS and average PAOT, meaning as PAOT increases, solitude satisfaction should decrease. All reaches exemplified this trend, with Nicholson Fields demonstrating the strongest R-value of -0.27, followed by Ellicott Rock with a value of -0.15. Chattooga Cliffs showed the weakest correlation between the two variables with an R-value of -0.02.

To evaluate the difference in linearity strength further, and to attempt to account for user subjectivity of solitude, solitude was evaluated by user type. The user type solitude analysis returned the following results:

- Anglers represented the highest number of respondents who noted solitude as one of their primary reasons for recreating in the backcountry at 77 percent.
- Overnight users were close behind anglers, with 75 percent of overnight reason for their visit.
- Day users had the least amount of respondents report solitude as important, at 59 percent.

Figure 2.3-5 summarizes the amount of solitude that was experienced by respondents during the peak (summer) season who listed solitude as a primary reason for their visit. The figure breaks the total number of respondents down by user type and reports the proportion of each user type that experienced each level of solitude.

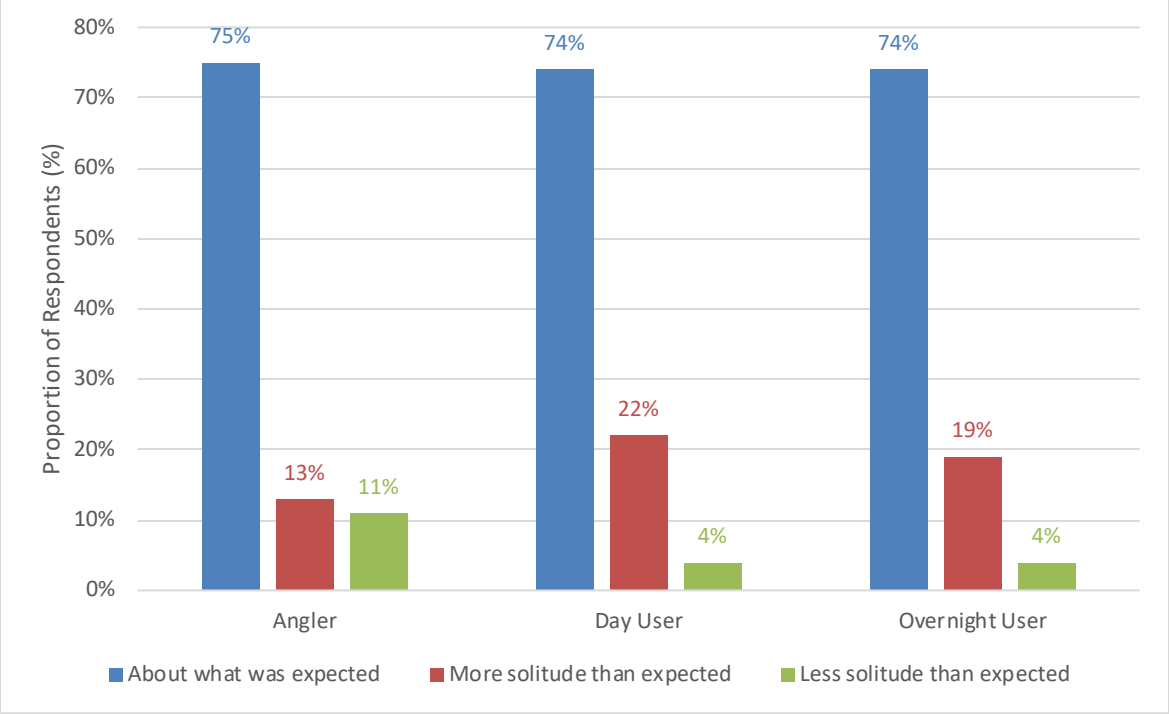


Figure 2.3-5. Solitude Perception by different use types who experienced encounters during the peak (summer) season

From Figure 2.3-5, we can draw the following conclusions:

- The majority of all anglers, day users and overnight users reported experiencing the amount of solitude they expected, with values of 74 and 75 percent.
- Anglers had the highest proportion of 'less than expected' experiences, followed by overnight users.
- Day users had the highest proportion of 'more than expected' experiences and one of the lowest proportions of 'less than expected' solitude experiences.

Following the user type analysis, the next step was to evaluate how the solitude satisfaction score (SSS) is impacted by the proportion of users at each reach. Table 2.3-5 summarizes the proportion of user types in each reach and compares it to average PAOT and average SSS for the peak (summer) season.

Table 2.3-5: Average PAOT and SSS compared to user type by reach for the peak (summer) season

Backcountry Reach	Average PAOT	Average SSS	Proportion of Anglers	Proportion of Day Users	Proportion of Overnight users
Chattooga Cliffs	15.1	0.2	21.7%	73.9%	4.3%
Ellicott Rock	79.6	0.1	39.2%	34.6%	26.2%
Rock Gorge	40.4	0.2	37.5%	37.2%	25.4%
Nicholson Field	17.9	0.1	40.7%	25.9%	33.3%

Table 2.3-5 shows the following information for each reach in regards to PAOT, SSS, and user types:

- Chattooga Cliffs and Rock Gorge have the highest average SSS. Chattooga Cliffs has the lowest average PAOT, the highest percentage of day users, the lowest percentage of backpackers, and second lowest percentage of anglers. Rock Gorge had the second highest PAOT and relatively even user types
- Ellicott Rock and Nicholson Fields, have matching SSS scores of 0.1. Both areas varied from one another in their PAOT, with Nicholson Fields having a much lower PAOT than Ellicott Rock. However, both reaches had a similar proportion of anglers.

From Figure 2.3-5 and Table 2.3-5, we cannot determine a discernable trend that drives SSS. This may be a result of the majority of visitors noting they experienced 'about the solitude they expected', which has a quantitative value of zero, keeping averages across reaches in similar ranges. Thus, in the Upper Chattooga WSR, solitude may heavily depend on personal subjectivity. Knowing the user types in the

area may help decision makers understand personal subjectivity and categorize solitude perception by user type.

The Part 2 analysis can be summarized into three important points, as follows:

- Users are having positive experiences related to solitude across all reaches, with most users experiencing the solitude they expected.
- Solitude and PAOT have a negatively linear relationship at all reaches.
- Understanding the proportion of user types at backcountry reaches can help mitigate for solitude subjectivity. Areas that have more anglers and backpackers may be more sensitive to PAOT than areas that are dominated by day users.

Overall, there continues to be opportunities for solitude in the backcountry. While solitude satisfaction generally decreases with the number of people present, the overwhelming majority of visitors still note a positive or neutral solitude experience. The reaches that contain the largest potential for solitude include Chattooga Cliffs and Rock Gorge, which have the highest solitude satisfaction scores.

While solitude was quantified and measured in this section, it is important to note that it is a subjective experience, with some visitors valuing it more than others. Typically, when visitors value solitude more they become more sensitive to disruptions to it. Thus, it may be more beneficial to evaluate solitude with an objective metric, such as encounters. In the next section we evaluate how the number of encounters impact a users' tolerance.

Results Part 3: How do the Number of Encounters Compare to User Tolerances?

To answer this question, the term 'tolerance' had to be defined. For this analysis, we created an average tolerance rating or ATR. The ATR was created by combining three scores, a crowding satisfaction score (CSS), solitude satisfaction score (SSS) and conflict score. CSS and SSS were both individually evaluated on a scale of -1 to 1, with one being a perfect score. Conflict was evaluated on a scale of 0 to -1, with zero being no conflict and -1 having experienced a conflict. As such, Average Tolerance Rating (ATR) was scored on a range of -3 to positive 2, with 2 being the highest and -3 being the lowest. Tolerance was considered to be exceeded for values lower than zero.

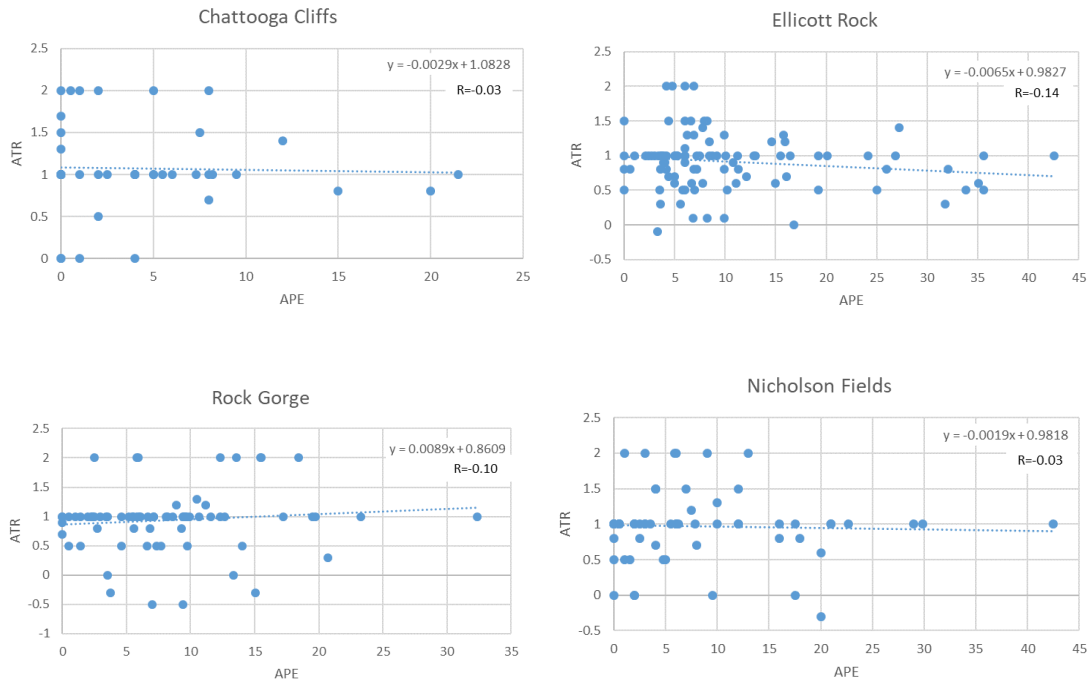
During the peak (summer) season the overall ATR across all the backcountry reaches was 0.9 (out of a maximum of 2.0). Chattooga Cliffs demonstrated the highest average tolerance rating with an ATR of 1.3. The remaining reaches had matching tolerance scores of 0.9 (Table 2.3-6). Thus, none of these reaches exhibited a tolerance exceedance (value less than zero) over the course of the study period.

Table 2.3-6: ATR compared with APE and average PAOT by reach for the peak (summer) season

Backcountry Reach	ATR	APE	Average PAOT
Chattooga Cliffs	1.3	7.6	15.1
Ellicott Rock	0.9	12.0	79.2
Rock Gorge	0.9	9.1	39.8
Nicholson Fields	0.9	11.2	17.9

To evaluate how the number of people encountered affected a users' tolerance, scatter plots were created with the variables APE and ATR (Figure 2.3-6). It was expected that these two variables would have a negative relationship, with tolerance ratings declining as APE increased. To establish the strongest relationship between the two variables, the largest sample size was needed. Therefore, the entire study period was used in the creation of these plots.

Figure 2.3-6. ATR compared to APE by reach



From the above scatterplots we can conclude the following information:

- Chattooga Cliffs, Ellicott Rock and Nicholson Fields demonstrated negative relationships between APE and ATR while Rock Gorge had a slightly positive linear relationship.
- All of the R-values shown are relatively weak and hover close to zero, demonstrating a lack of a strong linear relationship between encounters and tolerance.

- Chattooga Cliffs showed the weakest linear relationship with an R-value of -0.03 while Ellicott Rock had the strongest value of -0.14.

From these trends we can discern that generally, user tolerance slightly decreases with the increase of encounters at every reach with the exception of Rock Gorge. Additionally, users at Ellicott Rock have tolerances that are more sensitive (steeper) to encounters than other reaches. This may be due to the types of users at these reaches or the types of encounters (crowding, solitude disruption, or conflicts) that are experienced.

To further evaluate how ATR is driven at each reach, it is broken down into its three parts (crowding, solitude, and conflict) in the tables that follow (Tables 2.3-7, 2.3-8, and 2.3-9).

1. Crowding in the Backcountry

The most prominent factor that negatively impacts tolerance is crowding, which accounts for around 57 percent of the total score. The CSS was calculated by averaging the satisfaction scores of three backcountry categories:

- Backcountry fishing
- Backcountry camping
- Hiking

This backcountry crowding analysis differs from frontcountry crowding analysis because it does not include frontcountry fishing, frontcountry camping, parking, or crowding along roads.

Table 2.3-7: Average crowding score compared with URE and average PAOT by reach for the peak (summer) season

Backcountry Reach	CSS	URE	Average PAOT
Chattooga Cliffs	1.0	71.7%	15.1
Ellicott Rock	0.8	90.1%	79.2
Rock Gorge	0.8	87.8%	39.8
Nicholson Fields	0.9	79.6%	17.9

From the crowding tolerance analysis we can draw the following conclusions:

- Chattooga Cliffs had the highest average crowding score of 1.0, followed by Nicholson Fields, at 0.9 and Ellicott Rock and Rock Gorge at 0.8.
- The CSS scores seem to follow the average PAOT and URE, with higher scores following low PAOT and low URE. Higher CSS scores follow higher PAOT and higher URE. This follows the trend found in recreation studies that as the number of encounters increase, the perception of crowding increases along with it (Vaske & Donnelly 2002).

- Both Ellicott Rock and Nicholson Field have values that exceed the tolerance threshold (Figure 2.3-6), meaning lower than the median value of zero. The exceedances are due to negative crowding experiences, demonstrating that crowding can negatively impact tolerance.

2. Solitude in the Backcountry Reaches

Solitude is a primary reason many recreationists venture into the backcountry. Solitude makes up around 42 percent of the ATR. Solitude differs from crowding in that it is a goal a visitor is looking to achieve rather than a happenstance of their visit. Some visitors value solitude more than others, and travel to low use areas to achieve it. While crowding and solitude are different metrics, they are not mutually exclusive, as crowding can negatively impact a visitor's solitude experience.

Table 2.3-8 outlines the solitude satisfaction scores at each reach, as well as the URE and average PAOT.

Table 2.3-8: Average solitude satisfaction score compared with APE and average PAOT by reach

Row Labels	Average Solitude Satisfaction Score (SSS)	URE	Average PAOT
Chattooga Cliffs Reach	0.2	71.7%	15.1
Ellicott Rock Reach	0.1	90.1%	79.2
Rock Gorge Reach	0.2	87.8%	39.8
Nicholson Fields	0.1	79.6%	17.9

From the solitude tolerance analysis we can infer the following information:

- SSS's hover closer to zero (Table 2.3-8) than CSS's. This likely due to the large majority of respondents who listed 'about what I expected' for their solitude response, which, when quantified, has a value of zero.
- The SSS scores don't seem to follow a discernable trend in regards to encounters or PAOT. Thus, user subjectivity may be at play when determining solitude satisfaction.

3. Conflicts in Backcountry Reaches

Conflicts had a minimal impact on the ATR, with only two percent (4 of 224 intercept surveys completed in the backcountry reaches) of interview respondents experiencing a conflict. User tolerances can be related to conflicts in that conflict results from low tolerance between one or more user and another. Conflicts and encounters are directly related, in that one cannot have a conflict without first having an encounter.

In the Upper Chattooga backcountry reaches during the peak summer season, according to the interview respondents, when each visitor experienced encountering

an average of 9 people per day, only 2 percent (less than two people) of these encounters were reported as conflicts, or 'exceedance of user tolerances'. Three out of four of the conflicts in the backcountry related to off-leash dogs and one relating to music after dark in the Burrell's Ford campground. These four conflicts are out of a total of 189 encounters during the peak (summer) season, meaning that 98 percent of encounters in Ellicott Rock are non-problematic and/or positive (Table 2.3-9).

The specific conflicts in the backcountry during the peak (summer) season were described as:

- "An unleashed dog jumped into the hole that I was fishing."
- "Dogs off-leash made me nervous; I did not know what they might do."
- "A dog off-lease, growled at me."
- "A boom box playing a Burrell's Ford Walk-in Campground after dark."

Table 2.3-9: Proportion of users who reported an encounter and proportion of conflicts by reach during the peak (summer) season

Backcountry Reach	URE	Did you experience any conflicts?			
		No		Yes	
		Number of Respondents	Percent of Total	Number of Respondents	Percent of Total
Chattooga Cliffs	71.7%	33	100.0%	0	0%
Ellicott Rock	90.1%	71	97.2%	2	2.8%
Rock Gorge	89.8%	59	98.3%	1	1.7%
Nicholson Field	81.1%	21	95.5%	1	4.5%

The Part 3 analysis has the following important conclusions:

- On average, during the peak (summer) season, tolerance values are above zero for all of the backcountry reaches.
- Crowding has the most impact on tolerance (57 percent), with Ellicott Rock and Nicholson Field demonstrating lower crowding scores (CSS) and tolerance exceedances directly related to crowding.
- Solitude (SSS) in the backcountry has a smaller influence on tolerance than crowding, making up 42 percent of the ATR.
- Conflict in the backcountry makes up for approximately two percent of the tolerance score. With the low proportion of conflicts to encounters, it is safe to say that the encounters in the area are not drastically increasing conflicts.
- Of the small amount of conflicts that occurred in the backcountry during the peak (summer) season, 75 percent of them relate to off-leash dogs.

3.3.5 Discussion

Based on the results of the interview responses and the relationship with the concurrent amount of use during the respondents' trip, the majority of visitors do encounter other people during their trip. Generally, and not surprisingly, the number of encounters increases as the number of PAOT increases. Interestingly, some reaches, due to the configuration of access points and trails, concentrate users in a manner that increases the likelihood of encounters, while some reaches can accommodate much higher PAOT and not result in proportionally increasing amounts of encounters.

The majority of recreationists consider solitude a significant factor when planning their trip; however even though they experience encounters, the amount of solitude they experienced met or exceeded their expectation. Overall, solitude satisfaction scores are positive at each reach. Given that Chattooga Cliffs has one of the highest solitude satisfaction scores, the lowest average PAOT, and the lowest proportion of visitors who experienced an encounter, it can be determined that this reach offers the highest probability for solitude.

Visitor tolerances, although not directly measured in the survey, are not being exceeded in any of the four reaches as measured by the composite scores of crowding, solitude and conflict responses. Crowding scores in the backcountry remain high while solitude scores hover close to zero. This is a result of most visitors experiencing the solitude they expected while recreating in the backcountry. While user tolerances decrease with increased encounters, 99 percent of encounters that occur in the backcountry reaches are a non-issue.

2.4 Monitoring Question 4

How are Daily Frontcountry Use Levels Affecting Perceptions of Crowding, Congestion, and Desired Experiences in the Frontcountry Areas?

2.4.1 Key Findings

- The majority of frontcountry crowding perceptions remain in the category of 'not crowded'.
- Overall crowding satisfaction scores remain between the 'average crowding' and 'less crowded than expected' scores.
- Parking has the largest impact on crowding satisfaction.
- Frontcountry areas with higher proportions of VAOT to available parking spaces scored lower parking satisfaction scores.
- The Lick Log Parking Area has the lowest parking satisfaction score over the peak (summer) season with a score of 0.0, meaning crowding at this parking area remains in the 'average crowding' perception.
- Over the entire study period, frontcountry conflicts made up less than one percent of the encounters reported. All of these conflicts were related to music after dark in the Burrells Ford Campground area.

2.4.2 Introduction

Perceptions of crowding and congestion can negatively impact users' experiences when recreating outdoors. Frontcountry areas are the most likely area for crowding and congestion because they are used for recreation purposes in addition to functioning as staging areas for backcountry trips. The *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor Environmental Assessment (EA)* (2012) notes that in frontcountry areas along the Upper Chattooga, the primary capacity-related impact concerns include: (1) congestion from too many people or vehicles at the site, (2) competition for facilities or parking spaces; and (3) general crowding from too many people in view. The EA states that monitoring should focus on correlating the number of visitors in frontcountry areas to a metric that is comparable to users' perceptions of crowding and congestion. This memo relies on frontcountry use metrics, including VAOT and GAOT counts in addition to interview responses to assess visitors' perceptions of crowding in frontcountry areas.

2.4.3 Methods

To evaluate how use levels are affecting perceptions of crowding, congestion, and desired experiences in the frontcountry, an average GAOT variable was created for each frontcountry area. The average GAOT was created using two variables; (1) the average VAOT counts for each day at each access point and (2) an estimate of one group per vehicle, which was calculated using intercept survey responses to find the average number of vehicles per group. Average VAOT was summed across access points to obtain a value for each frontcountry area (Table 2.4-1 shows which access

points feed each frontcountry area). The average VAOT was converted to average GAOT using the one vehicle per group estimate determined from the intercept survey results. All frontcountry areas, including those that were not mentioned in the 2012 DN, were included in this analysis (as noted in Table 2.4-1).

Table 2.4-1: Frontcountry areas and access points

Frontcountry Area	Access Point
Grimshawes/Sliding Rock	Chattooga Trailhead (Green Creek Trailhead Parking)
	Countyline Trailhead (Norton Mill Trailhead Parking)
Bullpen Road Bridge Area	Bullpen Bridge Road
	Fowler/Bad Creek Trailhead
	Ellicott Rock Trailhead
Burrells Ford Bridge Area	Campground Parking Lot
	Parking Lot on GA side
	Parking at/or near bridge/trailhead
Hwy 28 Bridge Area	Ridley Fields Lot (SC side)
	Near Bridge (GA side)
	USFS Gate (GA Roadside Parking)
Frontcountry parking areas not addressed in 2012 DN[a]	
Big Bend Road[b]	USFS access road and terminus
Lick Log Creek Access	Lick Log Parking Area
Fish Hatchery Parking Area[c]	Fish Hatchery Parking Area

[a] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[b] Only two interviews were recorded at this site during the peak (summer) season.

[c] Only four interviews were recorded at this site during the peak (summer) season.

Three interview response elements were considered in the examination of the relationship between the amount of use occurring and users perceptions of crowding, congestion, and experience in the frontcountry areas. Interview responses include:

1. Users perception of crowding (for parking, roads, frontcountry fishing, and frontcountry camping);
2. Users problems finding parking; and
3. Users reporting conflicts.

Interview questions relied on Likert-type[11] scale data collection in the responses. The responses were scored to allow for examination of use levels with the interview data in charts and graphs. These scores were given specific names, which are defined here:

Crowding Satisfaction Score (CSS) – responses to "How crowded did you feel when using the following facilities on this trip" for parking, roads, frontcountry fishing and frontcountry camping, were converted from qualitative answers to quantitative answers. Specifically, "very crowded" was converted to '-1' to denote negative experience, "average crowding" was converted to '0' to denote no impact on overall experience; and "not crowded" was converted to '+1' to denote a positive experience. Scores were averaged across the four recreation use categories to obtain an overall CSS.

Parking Satisfaction Score (PSS) –responses to "How crowded did you feel when using the parking facilities on this trip" were scored between -1 and 1. Because driving to the area and parking is common to the overwhelming majority of visitors, the parking facility category was also evaluated separately from the CSS score to assess which parking facilities received the most 'very crowded' scores.

Methods Part 1. User Perception of Crowding

CSS were generated for four recreation facility categories:

- Parking
- Roads
- Frontcountry camping sites
- Frontcountry fishing areas

Hiking, although recorded as a recreation facility category on the interviews, was not included in the analysis because the majority of the overall hiking experience occurs in the backcountry and this monitoring question focuses exclusively on frontcountry. Parking at trailheads is included which captures hikers utilizing frontcountry areas such as the Fowler/Bad Creek Trailhead access point (Bulllpen Road Bridge frontcountry area), Chattooga Trailhead (Grimshawes/Sliding Rock Bridge frontcountry area), etc.

Satisfaction scores were created for each of the four recreation facilities (parking, roads, frontcountry fishing and frontcountry camping) for each day interviews were

[11] Widely used approach to scaling responses in survey research to measure opinions, perceptions, and behaviors. The scale is named after its inventor, psychologist Rensis Likert.

recorded. These scores were averaged to obtain the overall CSS for each frontcountry area.[12]

Daily CSS values were compared with the amount of use estimated to be occurring in the frontcountry area (average GAOT). A linear regression was used to measure the strength of the relationship between CSS and GAOT and to determine which areas showed the strongest relationship between the two variables. A correlation coefficient (R) value was calculated to determine the strength of the linear relationship, where an R-value of 1 represents a perfectly positive linear relationship, while an R-value of -1 represents a perfectly negative linear relationship. To determine the viability of the relationship between frontcountry use and CSS, a large sample size was needed. Therefore, the entirety of the datasets (spot counts and interviews, including the winter season) were used in this analysis.

Following individual frontcountry area CSS analysis, CSS were further investigated by recreation category and compared to peak (summer) season average GAOT for each access area to determine which sites provided the highest and lowest CSS relative to average GAOT. CSS were compared across recreation facilities to evaluate which recreation facility categories received the highest and lowest scores of perceived crowding.

Methods Part 2. User problems finding parking

PSS were calculated when creating the CSSs by scoring users' responses to parking satisfaction and creating average scores for each frontcountry area[12]. PSSs were compared against average vehicle-at-one-time (VAOT) counts for that area across weekdays and weekends. Scatterplots were created to conduct a linear regression to understand the nature of the relationship between the two values. A correlation coefficient (R) was calculated to evaluate the strength of the relationship between VAOT and PSS.

In addition to PSS, a frequency analysis of responses to Interview Question 21, "Did you have trouble finding a parking space?" was conducted. Responses where visitors reported trouble finding a parking space were compared with the overall number of responses for each area.

Methods Part 3. Conflicts

Conflict results from a negative encounter between two or more users and can adversely impact a user's recreation experience. Intercept survey results were investigated to determine whether or not visitors reported conflicts in a frontcountry area. These occurrences were then compared against the average GAOT estimated at the time of the reported conflict. Because there were a very limited number of conflicts reported, the entire interview and spot count datasets were used (including all shoulder, winter, and summer seasons) for the analysis. Each conflict that was

[12] The Grimshawes/Sliding Rock frontcountry area had more than one access point in the interview response data. Thus, for this area, a weighted average was calculated based on the number of respondents at each access points. Weighted averages were combined to obtain CSS and PSS values for this area.

reported was evaluated in the context of the dataset as a whole to obtain a percentage of conflicts out of the all of the responses recorded. Each conflict in the frontcountry was evaluated and reported.

2.4.4 Results

User Perceptions of Crowding

Table 2.4-2 shows the proportion of crowding perceptions for each frontcountry facility (parking areas, roads, frontcountry fishing, and frontcountry camping). There were three crowding levels evaluated: Not crowded, average crowding, and very crowded. The N/A category refers to respondents who did not answer that question, whether they skipped the question or did not use that particular facility.

Table 2.4-2: Crowding response percentages for the peak (summer) season

Facility	Not crowded	Average crowding	Very crowded	N/A
Parking areas	**55.0%**	**31.0%**	**10.8%**	**3.2%**
Roads	**78.4%**	**9.9 %**	**0.9%**	**10.8%**
Frontcountry fishing	**8.1%**	**2.7%**	**2.7%**	**86.4%**
Frontcountry campsites	**5.9%**	**3.2%**	**0.4%**	**90.5%**

From Table 2.4-2 we can draw the following conclusions regarding crowding perceptions in the Upper Chattooga frontcountry areas for the peak (summer) season:

- In general, visitors reported low levels of crowding ('not crowded') at frontcountry facilities.
- The highest percentage of 'very crowded' responses were reported at parking areas. Parking areas also received the highest proportion of participation (lowest N/A proportion).
- Roads are the least crowded of the four facilities, meaning they had the highest 'not crowded' proportion.
- Frontcountry camping had the lowest levels of 'very crowded' as well as the lowest participation rates (highest N/A proportions).

Following the overall facility crowdedness analysis, the CSS methodology (described in the Methods section above) was used to create a score for each frontcountry area.

Scores were evaluated on a scale of -1 to 1, with 1 being a perfect score and -1 being the worst score. Scores below zero were considered as a negative crowding experience.

Table 2.4-3 shows CSS by reach and compares the scores to the average GAOT as well as the available number of parking spaces at each frontcountry area.

Table 2.4-3: Average CSS and Average GAOT for each frontcountry reach during the peak (summer) season

Frontcountry Area	Average CSS	Average GAOT	Available Parking Spaces
Grimshawes/Sliding Rock	0.7	0.9	13
Bullpen Road Bridge Area	0.8	5.5	16
Burrells Ford Bridge Area	0.6	29.4	80
Hwy 28 Bridge Area	0.6	6.6	18
Frontcountry parking areas not addressed in 2012 DN[a]			
Big Bend Road[b]	1.0	0.0	3
Lick Log Parking Area	0.4	4.2	8
Fish Hatchery Parking Area[c]	0.4	7.8	20

[a] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[b] Only two interviews were recorded at this site during the peak (summer) season.

[c] Only four interviews were recorded at this site during the peak (summer) season.

The table above shows the following important information:

- None of the frontcountry areas exhibited CSS below the median score of 0.0 (score corresponding to 'average crowding') during the peak (summer) season, meaning that visitor's perception of use levels in frontcountry areas are better than average.
- Big Bend Road had the highest CSS score of 1.0, however it should be noted that only two interviews were recorded at this area during the peak (summer) season.
- The Lick Log Parking Area and Fish Hatchery Parking Area had the lowest CSS's (0.4). The low CSS's correspond with the highest proportion of GAOT to available parking spaces, meaning that frontcountry areas with more crowded access points scored lower CSS's.

Average GAOT and CSS were evaluated further by creating scatterplots to assess the linear relationship between the two variables. Figure 2.4-1 below shows a series of

scatterplots that demonstrate the linearity between CSS and GAOT at each frontcountry area.[13] It was expected that the two variables would have a negative linear relationship, meaning that as GAOT increased, crowding responses would also increase, which would be expressed in lower CSS.

Note: For this analysis a large sample size was needed. Therefore, the entire data set was used to create these plots.

Figure 2.4-1. CSS vs. Average GAOT linear regression

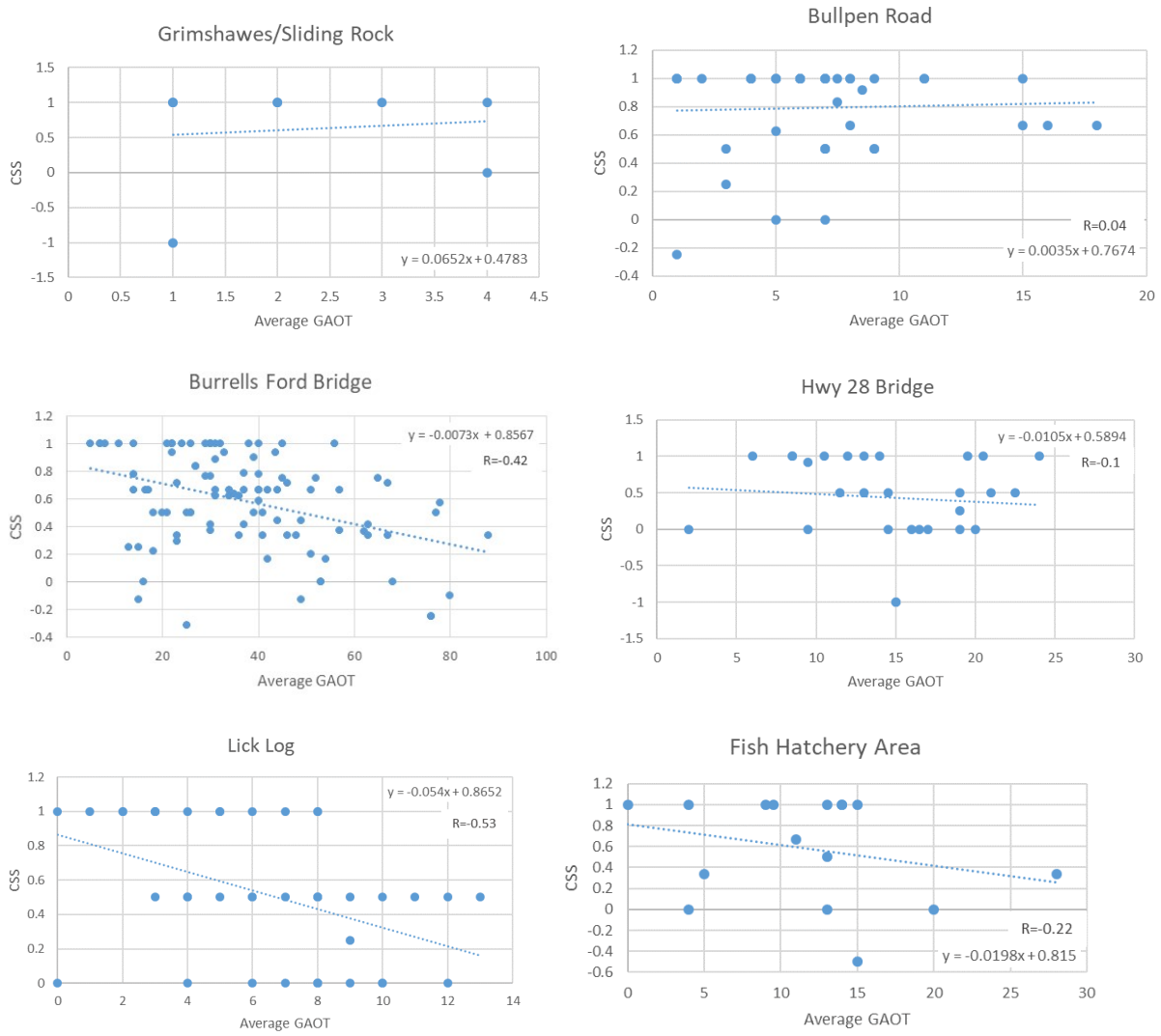


Figure 2.4-1 demonstrated the following conclusions:

[13] A scatterplot was not created for the Big Bend Road area due to its small sample size of three respondents over the entire study period.

- A negative linear relationship was observed at the Burrells Ford Bridge, Hwy 28 Bridge, Lick Log, and Fish Hatchery frontcountry areas, while Grimshawes/Sliding Rock and Bullpen Road Bridge exhibited very slight positive linear trends.
- Lick Log showed the strongest negative linear relationship with an R-value of -0.53 (with -1 and 1 showing perfectly linear relationships). However, despite having the strongest linear relationship between CSS and average GAOT, as well as one of the lowest CSS scores, Lick Log is the only frontcountry area that did not exhibit any CSS values below 0.0.
- All frontcountry areas, except for Lick Log, had at least one CSS below 0.0, with Burrells Ford having the most.
- Burrells Ford had the second strongest R-value (-0.42) followed by Hwy 28 Bridge (-0.25). The R-values show that visitors at these areas (Lick Log, Burrells Ford, and Hwy 28 Bridge) reported more crowding with increasing use than the other areas. All other R-values ranged between -0.1 and 0.11, showing a weak relationship between the two variables.

Following the regression analysis, peak (summer) CSS was further evaluated, this time breaking the score down by each of its facilities (or components). Table 2.4-4 details the individual scores for each facility at each frontcountry area for the entire peak (summer) season.

Table 2.4-4: CSS estimates for each recreation category for the peak (summer) season

Frontcountry Area	CSS			
	Parking	Roads	Frontcountry Camping	Frontcountry Fishing
Grimshawes/Sliding Rock Bridge	0.7	1.0	N/A	N/A
Bullpen Road Bridge Area	0.7	0.9	0.3	0.8
Burrells Ford Bridge Area	0.4	0.8	0.6	0.4
Hwy 28 Bridge Area	0.6	1.0	N/A	0.0
Frontcountry parking areas not addressed in 2012 DN[a]				
Big Bend Road[b]	1.0	1.0	N/A	N/A
Lick Log Parking Area	0.0	0.9	N/A	N/A
Fish Hatchery Parking Area[c]	0.3	1.0	N/A	-1.0

[a] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[b] Only two interviews were recorded at this site during the peak (summer) season.

[c] Only four interviews were recorded at this site during the peak (summer) season.

- For the frontcountry areas, the CSS median score (0 – 'average crowding') was crossed at the Fish Hatchery area, which had an average fishing facility CSS of -1.0. However, it should be noted that this is based on a small sample size of only two respondents.
- CSS for roads were all above 0.8, meaning that users did not feel crowded while driving in the general areas.
- Parking had the most number of responses and the largest percentage of 'very crowded' responses of the four facilities. Parking demonstrated CSS that ranged from 0.0 to 1.0. The Lick Log frontcountry area exhibited the lowest CSS for parking of all the areas ('very crowded').
- Frontcountry camping, limited to one area that received interview responses (Burrells Ford campground) exhibited CSS values of 0.6, above the 'average crowding' and 'very crowded' median values.

To understand how crowding perceptions for each facility varied between weekends and weekdays during the peak (summer) season, Table 2.4-4 above was broken down by day type (week days and weekends) in the tables below (Tables 2.4-5 and 2.4-6).

Table 2.4-5: CSS estimates for each recreation facility category for the peak (summer) season weekdays.

Frontcountry Area	CSS			
	Parking	Roads	Front country Camping	Front country Fishing
Grimshawe/Sliding Rock[1]	N/A	N/A	N/A	N/A
Bullpen Bridge Area	0.7	1.0	N/A	N/A
Burrells Ford Bridge Area	1.0	0.8	1.0	1.0
Hwy 28 Bridge Area[2]	0.0	1.0	N/A	-1.0
Frontcountry parking areas not addressed in 2012 DN[a]				
Big Bend Road[b]	N/A	N/A	N/A	N/A
Lick Log	0.5	1.0	N/A	N/A
Fish Hatchery Area[b]	N/A	N/A	N/A	N/A
Average	0.7	0.9	1.0	0.0

[a] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[b] No interviews were recorded at this site during the peak (summer) season weekdays.

Table 2.4-6: CSS estimates for each recreation facility category for the peak (summer) season weekends

Frontcountry Area	CSS			
	Parking	Roads	Frontcountry Camping	Frontcountry Fishing
Grimshaw/Sliding Rock	0.7	1.0	N/A	N/A
Bullpen Bridge Area	0.7	0.9	0.3	0.8
Burrells Ford Bridge Area	0.4	0.8	0.6	0.3
Hwy 28 Bridge Area	0.7	1.0	N/A	1.0
Frontcountry parking areas not addressed in 2012 DN[a]				
Big Bend Road[b]	1.0	1.0	N/A	N/A
Lick Log	0.0	0.9	N/A	N/A
Fish Hatchery Area[c]	0.3	1.0	N/A	-1.0
Average	0.5	0.9	0.5	0.3

[a] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[b] Only two interviews were recorded at this site during the peak (summer) season.

[c] Only four interviews were recorded at this site during the peak (summer) season.

The weekday and weekend tables above show the following information:

- Parking and frontcountry camping CSS were higher on weekdays than weekends
- There was no difference in CSS between weekdays and weekends for roads.
- Frontcountry fishing CSS values were lower on weekdays than weekends, indicating anglers felt more crowded than they expected during the week; however, it should be noted that this category had a sample size of three interviews on weekdays during the peak (summer) season.
- Across all the facilities, the only CSS below zero ('average crowding') was frontcountry fishing at the Fish Hatchery area during peak (summer) season weekends and at the Hwy 28 Bridge area during peak (summer) season weekdays.
- The Hwy 28 Bridge area was the only area that had an overall (across all facilities) lower score on the weekdays than the on the weekends. During weekdays parking at this area exhibited a low score of 0.0 and fishing had a score of -1.0, yet on the weekends, this area has parking and fishing scores of 0.7 and 1.0 (out of 1.0), respectively. It should be noted there was only one respondent for peak (summer) weekdays for this facility. Thus, the disparity

in weekday/weekend scores at the Hwy 28 is strongly influenced by the small data set.

The Part 1 crowding analysis demonstrates that overall, crowding perception remains above average at all the frontcountry areas. Every frontcountry area, with the exception of Grimshawes/Sliding Rock Bridge and Bullpen Road Bridge, demonstrated a trend of decreased crowding satisfaction with the increase in number of groups in the area (Figure 2.4-1). When broken down by facility, parking demonstrated the lowest satisfaction scores, especially on the weekends. Other average CSS values that fell below zero can be attributed to the very low number of responses for that facility during the peak (summer) season.

Because parking plays such a large role in crowding satisfaction for visitors to frontcountry areas, the next section separates out parking by itself and analyzes parking satisfaction scores for each frontcountry area.

Users problems finding parking

The parking facility category received the highest number of 'very crowded' responses of all the recreation facilities (Table 2.4-2). As such, parking was evaluated separately from the CSS to understand the relationship between VAOT and crowding perception at each frontcountry area. Table 2.4-7 below breaks down Parking Satisfaction Scores (PSS) by weekdays and weekends for the peak (summer) season. Table 2.4-7 compares these scores to the available parking spaces at each frontcountry area. The weekend VAOT values are then used to create a proportion of average weekend VAOT the available parking spaces for each frontcountry area.

Table 2.4-7: Weekend vs. Weekday PSS and VAOT estimates for each area compared to available VAOT capacity during the peak (summer) season

Frontcountry Area	Weekday PSS	Weekday Average VAOT	Weekend PSS	Weekend Average VAOT	Available Parking Spaces	Proportion of Average Weekend VAOT to Available Parking Spaces
Grimshaw/Sliding Rock[a]	N/A	0.6	0.7	1.0	13	7.7%
Bullpen Bridge Area	0.7	3.4	0.7	5.8	16	36.3%
Burrells Ford Area	1.0	16.0	0.4	31.9	80	39.8%
Hwy 28 Bridge Area	0.0	3.5	0.7	7.2	18	40.0%
Frontcountry parking areas not addressed in 2012 DN[b]						
Big Bend Road[c]	N/A	0.0	1.0	0.0	3	0%
Lick Log Creek Access	0.5	2.6	0.0	4.5	8	57.5%
Fish Hatchery Area[d]	N/A	5.6	0.3	8.2	20	41.0%
Average	0.7	4.2	0.4	8.3		

[a] No interviews were recorded at this site during peak (summer) season weekdays.

[b] No interviews were recorded at the Big Bend Trailhead/Cherry Hill Campground area, therefore this access point was not included in this analysis.

[c] No interviews were recorded at this site during peak (summer) season weekdays and only two interviews were recorded at this site during the peak (summer) season.

[d] No interviews were recorded at this site during peak (summer) season weekdays and only four interviews were recorded on peak (summer) season weekends.

From Table 2.4-7, we can draw the following conclusions regarding parking satisfaction during the peak (summer) season:

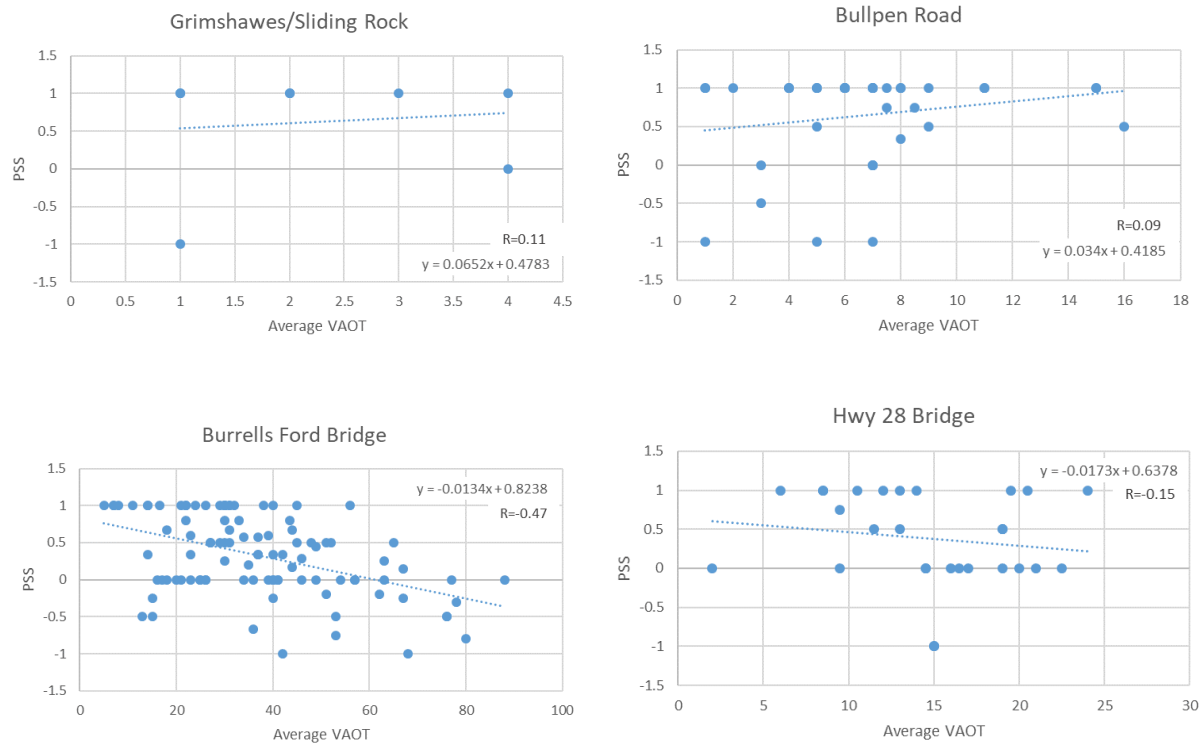
- Weekends have a lower PSS than weekdays at every frontcountry site (that had an available comparison), except for the Hwy 28 Bridge Area (this disparity is evaluated above).
- Lick Log Creek Access has the lowest weekend PSS, with a score equal to 'average crowding' of 0.0. This site also had the highest proportion of average number of VAOT on the weekends to available parking spaces at 56 percent.
- While the Burrells Ford area has the highest average VAOT at close to 32 cars on the weekends, crowding is not an issue in the parking area due to the large amount of available parking space.

- Big Bend Road has the highest weekend PSS score of 1.0 as well as the lowest proportion of VAOT to available parking space at 0 percent. However it should be noted that only two interviews were recorded at this location during peak (summer) season weekends.

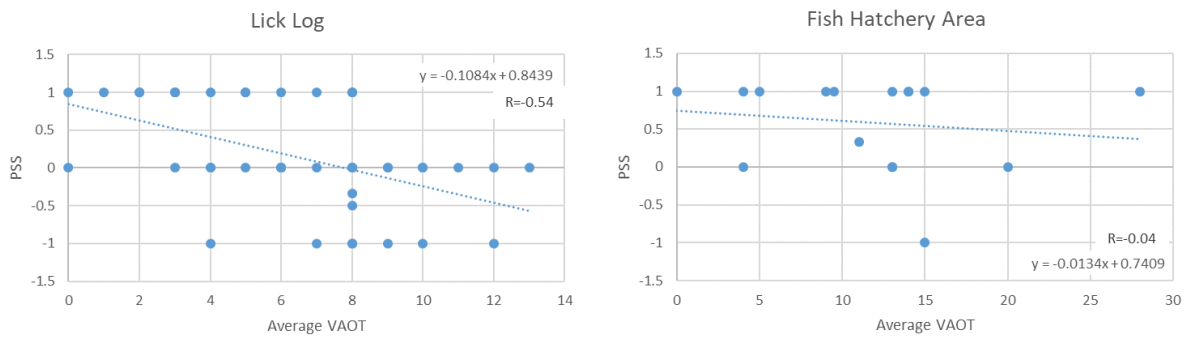
Scatterplots were created to assess the linear relationship between PSS and VAOT for each frontcountry area.[14] Figure 2.4-2 demonstrates the linearity between PSS and Average VAOT as well as the correlation coefficient (R-value) of each relationship.

Note: For this analysis a large sample size was needed. Therefore, the entire data set was used to create these plots.

Figure 2.4-2. PSS vs. Average GAOT linear regression



[14] A scatterplot was not created for the Big Bend Road, Big Bend Trailhead/Cherry Hill Campground area due to its small sample size of three respondents over the entire study period.

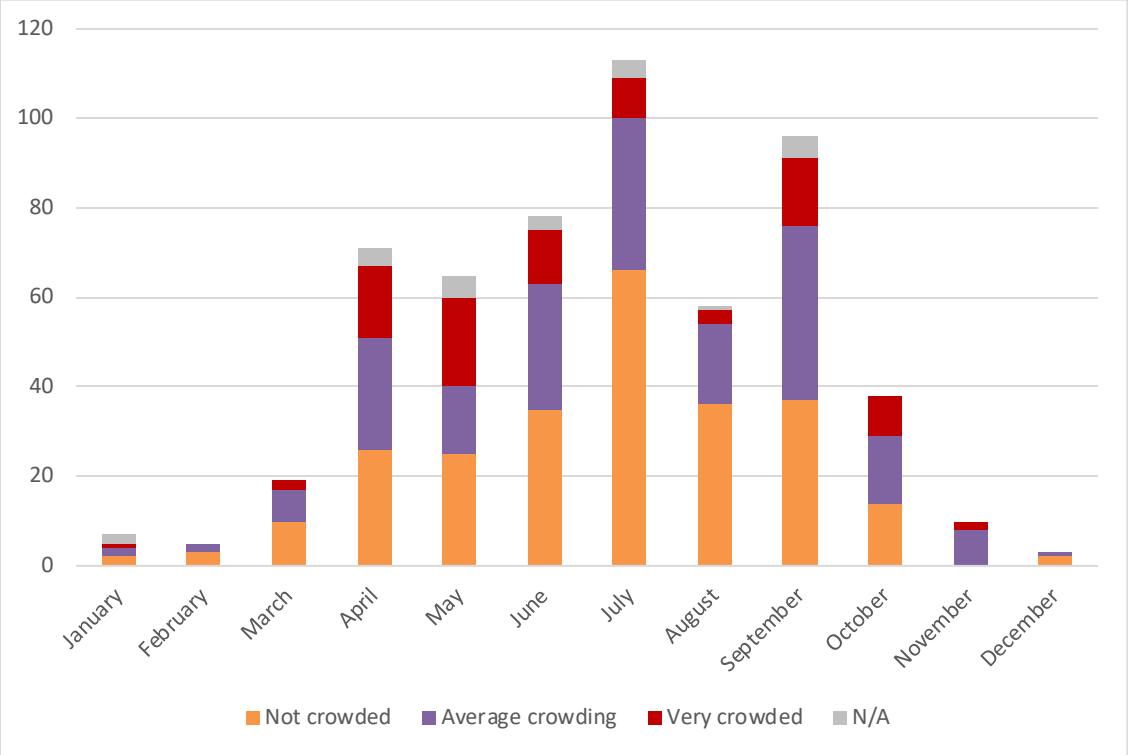


From the figure above we can draw the following conclusions:

- All scatterplots between PSS and VAOT showed values nearly identical to the CSS and GAOT plots, with the exceptions of the Lick Log and the Fish Hatchery areas. For the CSS plots, Lick Log did not have values below the 'average crowding' score (values below 0.0). However, in the PSS plots, Lick Log had six instances of 'very crowded' scores. This tells us that while the rest of the facilities in the Lick Log area may not seem crowded, parking was congested on multiple occasions.
- On the contrary, at the Fish Hatchery area, the R-value decreased from -0.25 to -0.04 from the CSS plots to the PSS plots. The decrease in R-value can be attributed to the removal of the 'very crowded' fishing experience two users had at this site, which was influencing the CSS score. This graph also shows that although the fishing area was crowded, the parking facility did not receive 'very crowded' scores.

If we take a broader view of respondents' answers to parking facility crowding, 'less crowded than expected' occurred as a greater percentage of the monthly responses in the shoulder season months of April, May, and September than in the peak summer season. Similarly, as the number of interviews peaked over the summer season so too did the number of responses for 'not crowded'. Figure 2.4-3 shows the number of responses across the entire study period by month and crowding response scores for parking facilities (question 22 of the interview).

Figure 2.4-3. Monthly parking facility crowding scores for entire study period.



In addition to respondents' perceptions of crowding, the survey asked a follow up question related to problems finding parking spaces and how the visitor responded to any parking problem. Of all the 565 respondents during the entire study period, only 20 (3.5 percent) identified having an issue finding parking. Of those respondents, ten waited for a spot to open up, eight parked further away, one went to an alternate destination, and one did not specify what they did. Burrells Ford Bridge frontcountry area had the highest proportion of users who identified having an issue with parking, with nine of the parking issues (or 45 percent) occurring at this location. Sixty-five percent of all issues were reported in April and May (outside the peak (summer) season as defined by the 2012 DN).

Conflict

During the peak (summer) season, there were approximately 189 encounters reported. Of these encounters, four resulted in conflicts (two percent of the total encounters). Given this small number of conflicts during the peak (summer) season, we broadened our lens to evaluate conflicts throughout the entire year.

Out of the 502 encounters recorded across the entire intercept survey dataset, only 17 (or 3.4 percent) reported conflicts. Most conflicts occurred either on the trails or fishing areas in the backcountry. There were four conflicts recorded in frontcountry areas throughout the study period, three at the Burrells Ford campground (one mentioned above) and one at one of the Hwy 28 access points. All of the complaints at the Burrell's Ford campground were related to music playing after quiet hours. With the exception of the peak (summer) conflict, the rest of the conflicts occurred

on separate occasions during the fall season. These conflicts were not related to the number of users or crowding in any way. The user at the Hwy 28 area noted dissatisfaction with the number of cars left at the access point by hikers for days at a time during the peak summer season.

At the times of all of the conflicts at the Burrells Ford campground, VAOT was between 13 and 14, which is below the mean VAOT for this area (29.4 for the entire study period); however the nature of the conflict was not related to the overall number of other users or vehicles present, but rather the behavior the other visitors were displaying. At the time of the Hwy 28 access point incident during the peak (summer) season, the VAOT was at 9.3, which is above the mean for this area (8.6 during the summer season). Thus, it can be inferred that the conflicts reported at Burrells Ford are not related to the number of visitors in the area, but rather the type of problems the visitors that are there are creating (playing music after hours). The one compliant received at Hwy 28 can be attributed to the number of visitors in the area given the type of complaint and VAOT on that given day. However, given the very low number of reported conflicts, conflict as a measure of negative experiences is insufficient to build strong findings for the frontcountry areas.

2.4.5 Discussion

Based on the findings above, current frontcountry use levels (GAOT or VAOT) are not yet resulting in negative perceptions of crowding or congestion at the frontcountry areas. Currently, average visitor crowding scores are on the 'less than expected' side of the score, meaning experiences have been less crowded or better than they expected. All the sites have CSS scores of 0.4 and above. Lick Log Creek Access and Hwy 28 Bridge exhibited low individual facility CSS scores at or below the median score of 0.0. The data analysis resulted in the following findings for these two sites:

- The low CSS score at Lick Log is strongly influenced by responses to parking facility crowding. The site has eight available parking spaces in a very tight area. This area also had the lowest PSS (0.3) for peak (summer) season weekends.
- The low weekday CSS score for the Hwy 28 area is a result of a lack of peak (summer) season weekday data, with only one respondent providing data for weekdays. On the weekends, this area has CSS scores ranging from 0.7 to 1.0 (out of 1.0). Therefore, a single data point resulting in a low CSS is not considered proof of crowding at this area.

Over the entire study period, less than four percent of visitors that reported encounters reported a conflict as well. Of the conflicts in the frontcountry areas, two thirds were a result of loud behavior by nearby visitors. This type of conflict is considered independent of crowds in the area. As such, conflict is not considered an issue in the frontcountry areas resulting from crowding.

Based on visitors' responses to questions related to crowding, congestion and conflicts, the current use levels are not an issue in in the Upper Chattooga frontcountry areas. Areas that are sensitive to crowding are areas where users are

concentrated into small geographic areas such as fishing at the Fish Hatchery, or parking in the relatively small lot at Lick Log. Yet, overall, users are still enjoying the area and having a good experience in the Upper Chattooga frontcountry areas.

A word about the data: Development of policies to manage use levels to alleviate crowding can draw from the data within this research; however it is important to recognize that although we can summarize the frequency of responses for how 'very crowded' or 'not crowded' a specific site or frontcountry area is, we do not know the respondents expectation to measure the difference, or sensitivity, to the amount of crowding experienced during their trip to understand the severity of the crowding reported. For example, a respondent may have expected large crowds on summer weekends and reported 'not crowded' because the use levels were less than expected; while an angler looking for long stretches of river to fish alone made their trip decision for a weekday and expected no other users and reported 'very crowded' when there were less than average number of vehicles in the parking area. The investigation of users tolerances for crowds or expectations for how many VAOT or GAOT are considered 'average crowding' or 'very crowded' is outside the scope of this study as the interview questions were not designed to answer that level of detail.

Similarly, the investigation into parking facility crowding responses suggests that although the summer is the peak use season, the greatest crowding scores occur during the shoulder season. This could be due to the demand for the river by anglers by this time and their sensitivity to other users; however this is speculative without further investigation and is beyond the scope of this monitoring question.

3.0 SUMMARY OF MONITORING QUESTION OBJECTIVES

The monitoring questions evaluated in this report were originally proposed in the 2012 EA (*Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor, Sumter, Chattahoochee, and Nantahala National Forests*, January 2012). The goal of the questions is to guide the collection of information to ensure that management objectives are being fulfilled and the data can be used to understand recreation use in the WSR. With effective monitoring, data collection, and analysis, the Forest Service would be able to implement effective adaptive management strategies for the Upper Chattooga WSR.

The monitoring questions have the following summarized objectives, as listed in the 2012 EA:

1. Determine if recreation use is changing.

2. Determine the proportion of use by type of visitor in the frontcountry and backcountry and how the use is related to vehicle counts.

3. Determine how total daily backcountry use is related to the number of encounters, whether the number of encounters has affected opportunities for solitude in the backcountry and how the total number of encounters compare to user tolerances.

The 2012 DN that was issued following the 2012 EA used the proposed monitoring questions to build a monitoring plan that not only sets capacity limits on front and backcountry use to preserve users' solitude as well as the quality of their experience, but also stipulates future monitoring to evaluate use trends over time. The 2012 DN set capacity limits (for groups at one time in the frontcountry and average groups per weekday/weekend day in the backcountry) as a way to protect from overuse in the Upper Chattooga WSR. Thus, these capacity limits were also considered when answering the monitoring questions and addressing the objectives (where applicable).

The following content uses the results of the report to address each objective of the monitoring questions.

1. Are at-one-time vehicle counts at frontcountry and backcountry parking areas changing?

The findings show that overall, recreation use is increasing in frontcountry areas and backcountry reaches during the peak (summer) season. Appendix E contains the summary tables from 2007 and the data collected for this report. Surprisingly, most areas and reaches are seeing increases in VAOT on weekdays and decreases on weekends. The largest increases are found at the Burrells Ford Bridge frontcountry area and Rock Gorge backcountry reach. Use levels are lower at the Grimshawes/Sliding Rock frontcountry area and Chattooga Cliffs backcountry reach.

While overall use is increasing, all frontcountry areas are below capacity limits. Yet this is not true for the backcountry reaches; the Ellicott Rock backcountry reach consistently exceeded capacity limits set in the 2012 DN, for weekdays and weekends. Despite the exceedance of capacity limits, interview results from access points that feed Ellicott Rock did not exhibit negative crowding or solitude scores.

The data show that total use on weekdays, weekends, and monthly averages is increasing at Bullpen Bridge and Burrells Ford. The number of vehicles, the number of visitors, and the total peak use is higher at these locations as compared to 2007. Use appears lower than 2007 estimates at Hwy 28 Bridge but this is due to that area recording two additional parking areas downstream, inflating the 2007 numbers. Efforts were taken to normalize differences between data collection methods of the two studies to allow better comparisons of visitor use between years; however, because the locations and the organization of how the data were organized differs between the studies, some caution should be used in comparing the data sets. Locations and organization of the data were similar ('apples to apples') for Bullpen Road Bridge and Bullpen Road frontcountry and Burrells Ford Area. Data collection at the Hwy 28 Bridge area differed between the 2007 summary report and current effort in the following ways: (1) the previous effort included two downstream areas and grouped them into the thresholds and (2) the current effort included a different site not monitored in the previous effort (Forest Service gate in Georgia). Overall, the increase ranges between 25 and 40 percent on average annual basis with some months much higher.

2. Determine the proportion of use by type of visitor in the frontcountry and backcountry and how the use is related to vehicle counts.

The results to this objective are presented in Section 2.2.4. From intercept survey results, 38 percent of visitors participate in more than one activity when visiting the WSR. The most common activities are hiking/sightseeing, fishing and camping, all of which are conducive to incorporating other activities during a trip (e.g., anglers hike to their preferred spot, backpackers sightsee and fish). For user types, day users (generally non-angler hikers) represented the largest percent of recreationists (42 percent), followed by anglers (non-overnight visitors) (35 percent), and overnight users (22 percent).

Knowing the proportion of vehicles by user type is useful when developing permitting systems for backcountry reaches. For example, knowing how many vehicles belong to overnight users on any given day could influence the number of permits distributed. Thus, the user type proportions provided for each reach will be useful for the Forest Service in the future.

In addition to VAOT proportions, the monitoring study revealed another value for understanding the proportion of user types at each backcountry reach: solitude perception. The study found that different user types value solitude differently; some user types (anglers) expect more solitude than others (day users). Thus, reaches with large proportions of anglers (Nicholson Fields) are going to have more sensitive solitude satisfaction scores than reaches with lower proportions of anglers (Chattooga

Cliffs). This information is useful when managing recreation use and evaluating capacity limits at backcountry reaches.

3. **How is total daily backcountry use related to the number of encounters? Is the number of encounters affecting opportunities for solitude in the backcountry? How does the number of encounters compare to user tolerances?**

During the peak (summer) season, of all the visitors who reported recreating in the backcountry, 86 percent (189 out of 221 respondents who answered the question) reported an encounter with another visitor. Although there was a high number of encounters in the backcountry, visitors indicate that the solitude they experienced was consistent with what they were expecting (see Appendix B Section B.2.1, *Solitude*). About 70 percent of visitors reported that the amount of solitude they experienced met their expectation, and 21 percent of visitors experienced more solitude than they were expecting. Taken in combination, the high satisfaction for the level of solitude in the WSR, with the lack of reported conflicts between user's groups, and the extremely low rates of negative experiences during visitor trips, the number of encounters does not appear to be having negative effects on visitors' experiences.

Backcountry reaches that have higher use levels also have a higher proportion of visitors who experienced an encounter. While the monitoring question analysis shows that solitude has a negative linear relationship with encounters (an increase in number of encounters results in decreased solitude satisfaction), 95% of users who reported an encounter still experienced the amount of solitude they were expecting or more. Chattooga Cliffs had one of the highest solitude satisfaction scores as well as the lowest average GAOT and proportion of users who reported an encounter. Thus, it can be determined that while most visitors are still experiencing the desired amount of solitude, encounters are negatively impacting solitude and increase use in the future may result in negative solitude experiences across all reaches.

Tolerance scores were the lowest where the number of average people encountered was the highest, meaning that encounters negatively impact tolerances. When we dig deeper into the tolerance scores, we see that solitude has the biggest negative influence on tolerance. Given that increased encounters are directly related to deplete solitude perception, it can be determined that increased encounters lower user tolerances. However, tolerance scores for backcountry reaches in the Upper Chattooga WSR hover between 0.9 and 1.4 on a scale of -3 to 2. Thus, while increased encounters can lower user tolerance, many more encounters would need to occur for users to have negative experiences in the Upper Chattooga WSR.

While measuring solitude and user tolerance, it is important to note that these metrics are subjective. A study was done in 1995 by William Marshall Rutlin of Clemson University that measured encounters with groups in the Ellicott Rock wilderness and visitor's solitude perception. Respondents in this study were asked about the number of groups they encountered at the trailhead, on the trail, and at the destination/campsite. The study asked the respondents to identify a maximum number of groups encountered before their solitude experience was negatively

impacted. Visitors had different maximum number of groups for each of the three sites listed (trailhead, trail, and destination/campsite). Visitors had the largest number of tolerable groups at the trailhead, trails had the second largest maximum, while destination/campsite had the lowest maximum. As such, it should be noted that tolerances are not only a function of encounters, but a function of where the users are located and how much they value solitude.

4. How are daily frontcountry use levels affecting perceived crowding, congestion, or desired experiences in frontcountry areas?

In general, visitors in frontcountry areas report low crowding scores (see Table 3.1-1 and Appendix B, B.2.6, *Crowding*) at most facilities; however, the scores for 'Parking Areas' did show notably higher sensitivity to crowding than other facilities. Double digit 'very crowded' responses were received in April, May, and June from Burrells Ford Area and Lick Log Trailhead parking area. It is important to note that visitors' crowding scores differed from actual parking problems with less than 4 percent of visitors reporting having a problem finding a parking space (see Appendix B.2.5, *Parking Spaces*), and the solution is typically to park farther away. When considering parking problems, parking along the road is possible, but Burrells Ford Road is much wider than Bullpen Road and offers more and safer parking options along the shoulder.

Table 3.1-1: Summer crowding ratings by frontcountry area.

Facility	Not crowded	Average crowding	Very crowded	N/A
Parking Areas	55%	32%	10%	3%
Roads	78%	10%	1%	11%
Front Country Campsites	6%	3%	0%	90%
Frontcountry fishing	8%	2%	2%	87%

4.0 EVALUATION OF CAPACITY AND BOATING RESOURCE

Visitor use has increased in the Upper Chattooga WSR since 2008, yet capacities are still being met at all frontcountry areas and backcountry reaches except Ellicott Rock. The increase in use has led to increased encounters in frontcountry areas and backcountry reaches. In addition, monitoring uncovered new information related to whitewater boating since the resource was opened to this activity. The following sections discuss the amount of use investigated for the MQ's relative to the capacity thresholds and the new findings related to whitewater boating.

4.1 Frontcountry Capacity Threshold Evaluations

The metric GAOT was developed from vehicle counts because, on average, respondents reported their group arrived in a single car (one car per group or, said another way, the number of vehicles equals the number of groups). The metric people-at-one-time for frontcountry areas is a capacity based on vehicle counts multiplied by the average group size. There are a couple of drawbacks to this approach for estimating people in the frontcountry. The first drawback is that it can overestimate the number of people in the frontcountry because the amount of frontcountry use relative to backcountry use is low. Additionally, alternative methods such as using the number of people visible from the bridge or parking area would have the opposite effect and underestimate frontcountry visitors because, due to vegetation and topography, spot counts cannot see the entire 0.25-mile distance encompassing frontcountry areas. The second drawback is that, once people leave their vehicles and hike on the trails, the parking spaces remain occupied, presenting crowded conditions for future visitors while people recreating report no crowding or conflict with people. For these reasons, the utility of people-at-one-time in frontcountry areas as a capacity threshold is confusing and is worth revisiting.

While this report focuses on the peak (summer) season, many frontcountry areas see increased use during shoulder seasons and holiday weekends as well. These periods should also be evaluated in relation to 2012 DN capacities as exceedances may occur during these times. Appendix G summarizes the average vehicles (or groups) at-one-time counts for shoulder season weekends (weekends in April, May, September, and October but not including holiday weekends) and summer season weekends (June 1 to August 31, excluding 4th of July weekend) and holiday weekends. These calculations are then grouped together to measure the average at-one-time counts against the capacities. On average, frontcountry parking utilization is below capacity during the shoulder and summer seasons indicating there is space for more visitors. There are observations when use does exceed the capacity, however, and most often this occurs for example during a single day of a holiday weekend. Interestingly, shoulder season use levels at the Burrells Ford and Hwy 28 Bridge areas are similar to peak holiday weekend use levels.

Appendix G provides complete summaries of the spot counts by frontcountry areas and backcountry reaches.

4.2 Backcountry Capacity Threshold Evaluations

In addition to addressing frontcountry areas, the DN set capacities for backcountry reaches. Backcountry visitors stage their visits from one of the three primary frontcountry areas, or from nearby trailheads that provide trail access to the Chattooga River (see Figure 1.3-1). Access points into each reach are summarized above in Table 1.4-1.

From the above monitoring question analysis, it is clear that backcountry use is popular in the upper segment of the Chattooga WSR corridor. However, some reaches are more popular during shoulder seasons than during the peak (summer) season. This popularity usually depends on the proportion of user types at each reach. For example, reaches with a higher proportion of anglers may see increased use during the spring (migration) season. In addition to shoulder seasons, holiday weekends that occur outside the peak (summer) season (such as Memorial Day and Labor Day) can exceed capacity limits as well. As such, evaluations of shoulder season weekend use levels and holiday weekend use levels are presented with peak (summer) season use levels in Appendix G.

4.3 Relationship between Capacities and Conflicts

Encounters refer to contacts between groups, and can be distinguished by type of groups (e.g., anglers and boaters, hikers and anglers), timing (e.g., season, weekend/weekdays), and location (e.g., on the river, on trails, in camps, or at access areas). Encounters may cause positive, negative or neutral experiences and are a common indicator for front- and backcountry settings.

While encounters involve some form of engagement with another group, conflict results from a negative encounter. Conflict between recreational users implies an incompatibility between two recreation activities, with one group generally showing low tolerance for another group's activity or behavior. For conflict to exist, encounters and competition for resources among recreation users must be present. Conflict can refer to the effect users have on each other's experiences, including general encounters, perceived level of crowding, recreation type competition, or other disturbances. In many cases encounters between recreation user types can affect experiences in either a positive or negative way. Different user groups may have different concerns or tolerances for impacts in different settings within a recreation area.

Information obtained by intercept surveys was used to compare visitor interactions based on the recreation users' requirement for solitude and their perceived conflict with other visitors in frontcountry and backcountry recreation areas.

Frontcountry sites are the most likely area for encounters because they are the staging areas for backcountry trips. Simultaneously, this fact also increases the likelihood that visitor tolerances for encounters are much higher in frontcountry areas. Based on intercept survey responses related to parking (Appendix B B.6.1, *Parking Crowdedness Ratings*), its clear visitors acknowledge there are a lot of vehicles in the limited areas to park during high use periods. From spot counts, it is clear the parking areas are often at or above capacity multiple times throughout the

year. Based on these conditions, one could expect conflicts to be highest at the beginning of a trip, regardless of the activity. Intercept survey questions did not differentiate between frontcountry or backcountry locations of where conflict occurred; however, reviewing the individual responses indicates frontcountry conflict was reported most often at Burrells Ford campground related to noise (Appendix B.2.2, *Conflict between Activity Groups*).

Encounters between hikers, anglers, and overnight backpackers on trails are common in the WSR, and we looked at the potential of these encounters to lead to conflicts. Hikers represent one of the largest recreation user groups in the WSR, and backpackers and anglers use the same trails and parking areas to access the WSR. Results show that encounters and conflicts between hikers and anglers are low (Appendix B.1.4.2, *Fishing*, and B.2.6.2, *Hiking Trails Crowdedness Ratings*). The only mention of a negative conflict were recorded in frontcountry sites related to other users occupying the same fishing hole (innertubers and dogs). Similarly, hikers reported high encounter rates with one negative encounter reported. Conflicts reported by hikers focused on their interactions with other people's dogs.

Encounters in the backcountry can deplete a users' solitude perception. While many visitors reported encounters in the backcountry, most users noted that solitude still either met or exceeded their expectation. Taken in combination, the high satisfaction for the level of solitude in the WSR, the lack of reported conflicts between user groups, and the extremely low rates of negative experiences during visitor trips, the number of encounters does not yet appear to be negatively impacting visitors' experiences. However, given the negative linear trend between solitude and encounters (as presented in Section 2.3.4), increased use in the area may eventually result in negative experiences for visitors across all reaches.

4.4 Whitewater Boating

4.4.1 Summary of the Resource

Boaters have been allowed to boat/kayak the upper segment of the Chattooga River since December 2012[15] from December 1 to April 30, when flows at the USGS Burrells Ford gage are above 350 cfs. The Forest Service relies on a self-reporting permit system during the boating season to track use and, in the case of an emergency, to help emergency responders with the rescue efforts. Table 4.4-1 summarizes the number of permits filed with the Forest Service since boating was allowed in 2012, and Tables 4.4-2 and 4.4-3 summarize the percent of permits filed for primary put-in and take-out locations.

[15] These are the two most frequently cited thresholds for boating; however, in addition to these, the other rules include: boating is only permitted during daylight hours, rafts and inner tubes are prohibited, a minimum of two craft are required per group, boating in the tributaries is illegal, boaters must wear coast guard approved helmet and life vest, boaters must use the designated put-in and take-out areas (Green Creek Trail, Norton Mill Creek, Bull Pen Bridge, Burrell's Ford Bridge, and Lick Log Access Trail), cutting and removing logs more than 4 feet long and 4 inches wide is prohibited, and commercial boating is prohibited.

Table 4.4-1: Boater self-registration permits for WSR since 2012.

Year	Permits
2012	9
2013	49
2014	3
2015	20
2016	15
2017	5
Total	101

Table 4.4-2: Boater self-registration permit put-in summary.

Put-in	Percent of permits (%)
Bullpen	50.5
Green Creek	20.8
Burrells Ford	15.8
Other[a]	12.9

[a] Respondents cited various names for places or reaches such as 'section 00,' 'section 0,' 'Chattooga Trail,' 'Ellicott.'

Table 4.4-3: Boater self-registration permit take-out summary.

Take-out	Percent of permits (%)
Burrells Ford	62.6
Lick Log	20.2
Bullpen	10.1
Hwy 28/Nicholson Fields[a]	5.1
Section 0	2.0

[a] Although the permit does not list Hwy 28 (Nicholson Fields) as a designated take-out, boaters reported it as such.

Given that the potential amount of boating that can occur is dependent on the season and the availability of sufficient flows in the river, the relatively dry conditions experienced throughout the region during the 2016 and 2017 boating season influenced the number of boatable days and the number of boaters using the WSR.

Due to the low number of boatable days and subsequent low number of boater permits, the intercept survey schedule did not capture very many responses from whitewater boaters. To overcome this lack of information related to a new and important user group, the Forest Service approved the implementation of a whitewater boater focus group to further investigate this new opportunity in the context of the change in land management.

4.4.2 Focus Group Findings

The 12 participants in the focus group confirmed characteristics about the whitewater boating opportunities in the WSR. Upper Chattooga River is more than 57 miles of class II, III, and IV+ whitewater boating resources.

The multi-year environmental review that concluded with the DN to allow boating was a public process, relying on a range of data sources including professional river managers, literature review, a trial run, angler intercept surveys, and public comments. The allowed boating seasons and minimum flows were set into regulation by the Forest Service as a response to the findings of these efforts and balancing the interests expressed in a wide range of public opinion. The final DN was based on expectations of use for modeled flow scenarios because boating had not been allowed for many decades prior to 2012.

With more than 5 years of whitewater boating in the WSR since the DN, boater feedback can augment context and understanding missing due to the low number of intercept interviews. It is important to recognize this feedback is not directly relatable to intercept interviews and accompanying statistical analysis; however, the feedback has merits worth exploring for the sake of improving the overall understanding of a new, seasonal recreation opportunity. During the focus group, boaters reported the following characteristics and observations for inclusion in this study report:

- Comparable rivers (useful in understanding the participants' collective experience and framework from which their responses are based) include: Horsepasture River for its challenge and Overflow Creek (section of the West Fork Chattooga) for its rapids and similar ecological setting. Other rivers boaters consider when not visiting the Upper Chattooga include North and West Forks of the French Broad River, Green River, Toxaway River, Chauga Gorge, Chattooga River Sections III and IV, west fork Tuckaseegee River, Cullasaja River, Headwaters of the Pigeon River, Gragg Prong (Wilson Creek) and Tallulah River. It was also noted by the majority of the focus group that these nearby rivers are only somewhat comparable in that they offer similar difficulty of whitewater but the overall experience of each is quite different and no other river compares to the Upper Chattooga due to the combinations of rapids and scenery over such a long, continuous stretch of river within the region. The focus group also noted that whitewater on the Chattooga River is more spread out than similar runs, allowing opportunities for intermediate kayakers.

- Safety: none of the boaters experienced any issues that would be considered emergencies, required emergency personal, or had heard of stories of other boaters having emergencies.

- Woody debris: boaters described the ability of the river to clear itself and move large woody debris through the system. The focus group noted that the river is dynamic and what may have been in place during past runs may no longer be there due to high flow events. Participants noted that this dynamic is typical of whitewater boating opportunities in the region and the focus group did not see any reason woody debris would be of more concern in the Chattooga River as compared to nearby runs.

- Social interactions: boaters discussed the number of people (non-boaters) they observed during their trips and the majority of trips witnessed no other visitors in the WSR. The discussion included several observations by section:

    - Chattooga Cliffs Reach (Section 00) – It is very uncommon to see other people in or next to this reach. If other visitors are observed, it is always within 0.5-mile of Bullpen Bridge. No negative interactions.

    - Ellicott Rock Reach (Section 0) – It is very uncommon to see other people in or next to this reach, similar to section 00. Sightings most likely to occur at the float out section just upstream of Burrells Ford Bridge, which is popular with walk-in campers. On occasion, a boater may see a hiker near Ellicott Rock, but that is atypical.

    - Burrells Ford Bridge (Rock Gorge Reach) – The most common observation was along the reach adjacent to the walk-in campground immediately downstream of the put-in at the bridge. No one had seen other people near Big Bend Falls (where Big Bend trail meets up with the river).

    - Lick Log Access – Boater's reported that interactions with other users at Lick Log did not occur on the river; rather, interactions typically took place as boaters were hiking out. Lick Log has limited parking and boaters must leave vehicles as part of their shuttle, taking up space that could be used by others that have shorter duration parking requirements, such as hikers exploring the Lick Log area.

Boaters did not report any negative interactions with other user groups

5.0 CONCLUSIONS

Findings in this monitoring study report are based on data collected during the study, including: direct field observations, vehicle counts, people at-one-time observations, intercept survey responses, hydrology information from the USGS Burrells Ford gage, focus group discussion, and patterns in traffic count information (Appendix F). Based on these sources and analysis of the data, we find the following:

Overall

- Visitor use, as measured by spot counts at parking lots, has increased since 2008.
- Visitor use has increased across all seasons and all areas of the WSR.
- Visitors' expectations of solitude is met or exceeded.
- The majority of visitors venture into the backcountry.
- There is little evidence of conflicts among different user groups in the Upper Chattooga WSR.
- Conflicts that do exist are primarily associated with frontcountry parking areas and often involve visitors not respecting other visitors' experiences, such as letting dogs run without a leash.
- Aside from the parking areas during peak use periods, the majority of crowding responses for hiking trails, roads, front- and backcountry campsites, and front- and backcountry fishing areas were 'not crowded'.
- The intercept survey asked about visitor encounters with other user groups, crowding of resources, and any experiences of conflict with other activities or users. Anglers did not report any negative encounters with other groups. Less than 5 percent of backcountry angler crowding responses were reported as 'very crowded' (77 percent 'not crowded'). For specific conflicts, response rates were very low: anglers reported innertubers and dogs in the river.

Capacities

- Capacities in the WSR were developed to address social impacts. The data suggest that there are no material conflicts between visitors and that the backcountry ORVs are generally realized. Parking facilities at Bullpen Bridge, Burrells Ford, and Lick Log are at times congested, but they are also serving to limit total use in the backcountry and create a natural constraint on total use.
- Average use levels are above capacities at the Ellicott Rock backcountry reach. Observations of counts greater than set capacities did occasionally occur during peak, holiday weekends or other peak season dates but were not a regular occurrence.

6.0 GLOSSARY

Access Point – Parking area that serves either a frontcountry area or a backcountry reach.

Access Area – The combination of one or more access points.

Average Groups at-one-time (average GAOT) – Average GAOT is a measurement of the average number of people recreating in a backcountry reach on a single day (a daily average). The average GAOT was created using two variables: (1) the average vehicle-at-one-time (VAOT) counts for each day at each access point and (2) an estimate of one group per vehicle, which was calculated using interview responses to find the average number of vehicles per group.

Users who Reported an Encounter (URE) – The URE is the proportion of respondents who reported an encounter. For example, if four people were interviewed at a frontcountry area or backcountry reach on a given day, and two reported an encounter, the URE would be 50 percent.

Average People at One Time (average PAOT) – A metric calculated using the average GAOT and an average value of 2.8 people per group, determined by the interview data. To calculate the average PAOT, the average GAOT was multiplied by the 2.8 factor to obtain a daily average of the number of people.

Average People Encountered (APE) – The APE is the average number of people one would expect to encounter in the backcountry on any given day based on the average number of people encountered reported in interviews.

Angler – Any survey respondent who did not list backpacking as a recreational activity but did list fishing.

Average Tolerance Rating (ATR) – A composite score comprising interview responses taken from crowding, solitude, and conflict questions. The ATR is evaluated on a scale of -3 to 2, with values below zero denoting tolerance exceedance and values above zero denoting a positive experience.

Backcountry Reach - Areas 0.25-mile away from access roads and/or bridges.

Backpacker - A user who reported backpacking as one of their recreational activities in the survey response data. If someone reported backpacking among multiple activities, they were considered a backpacker.

Boater - Any survey respondent who did not list backpacking or fishing as a recreational activity but did list boating.

Conflict – Conflict between recreational users implies an incompatibility between two recreation activities, with one group generally showing low tolerance for another group's activity or behavior. For conflict to exist, encounters and competition for resources among recreation users must be present. Conflict can refer to the effect

users have on each other's experiences, including general encounters, perceived level of crowding, recreation type competition, or other disturbances. In many cases encounters between recreation user types can affect experiences in either a positive or negative way. Interviewers inquired if the respondent experienced any conflict during their visit and, if so, asked for a description of the conflict.

Crowding Satisfaction Score (CSS) – Responses to "How crowded did you feel when using the following facilities on this trip" for backcountry areas, including backcountry fishing, backcountry camping and hiking, were converted from qualitative answers to quantitative answers. Specifically, "very crowded" was converted to '-1' to denote negative experience, "average crowding" was converted to '0' to denote no impact on overall experience; and "not crowded" was converted to '+1' to denote a positive experience. Scores were averaged across the three recreation use categories to obtain an overall CSS.

Day User – Any interview respondent who did not list backpacking, fishing, or boating as one of their primary activities.

Encounter – Contacts between visitors or groups of visitors as reported by interviews.

Frontcountry Area – Wilderness areas within 0.25-mile of access roads and/or bridges.

Groups at-one-time (GAOT) – A metric to evaluate recreation use. Groups-at-one-time was developed from vehicle counts because, on average, respondents reported their group arrived in a single car (one car per group or, said another way, the number of vehicles equals the number of groups).

Overnight User - Any survey respondent who listed backpacking or camping as a recreational activity.

Outstandingly Remarkable Values (ORV) – A designation by the Wild and Scenic Rivers Act that classifies waters for protection. ORVs for the Upper Chattooga include biology, history, scenery, recreation, and geology.

Parking Satisfaction Score (PSS) – Responses to "How crowded did you feel when using the parking facilities on this trip" were scored between "-1" and "1." Because driving to the area and parking is common to the overwhelming majority of visitors, the parking facility category was also evaluated separately from the CSS score to assess which parking facilities received the most 'very crowded' scores.

Solitude – The state of being alone and uninterrupted by other visitors in the backcountry. Responses to the interviewers asking about a visitors' experience of solitude are subjective and personal to each respondent.

Solitude Satisfaction Score (SSS) – Responses to "How was the amount of solitude you experienced compared to your expectation?" were converted from qualitative answers to quantitative scores. Specifically "more solitude than I

expected" was converted to '1' to note a positive experience, 'about what I expected" was converted to '0' to denote no difference in solitude experienced versus the expectation, and "less solitude than I expected" was scored a '-1' to denote a negative experience. Scores were averaged across the three recreation use categories to obtain an overall SSS.

Upper Chattooga Corridor – The segment of the upper Chattooga River above the Highway 28 Bridge to Grimshawes Bridge/Sliding Rock area. This upper segment encompasses approximately one-third of the 57-mile Chattooga Wild and Scenic River.

Vehicles-at-one-time (VAOT) – A count of the number of vehicles at an access point at any given time.

Wild and Scenic River (WSR) – A river that is protected under the Wild and Scenic Rivers Act to preserve waters with outstanding natural, cultural, and recreational values.

Wilderness (Designation) – The National Wilderness Preservation System of the United States protects federally managed wilderness areas designated for preservation in their natural condition. An area of wilderness is further defined to mean an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of human's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

7.0 REFERENCES

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