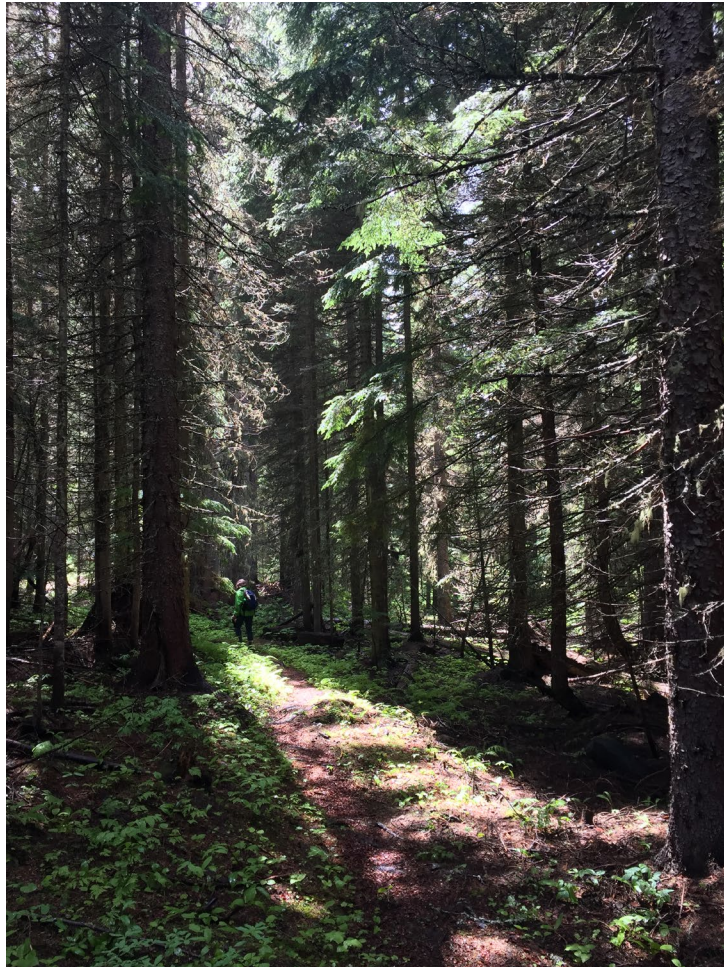


Pacific Northwest National Scenic Trail: 2020 Trail Monitoring Report



Lindsey Ellett¹
Douglas Dalenberg²
Jennifer Thomsen¹

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¹Department of Society and Conservation
W.A. Franke College of Forestry and Conservation

²Department of Economics
College of Humanities and Sciences

The University of Montana
Missoula, MT USA

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Introduction

In 2009, Congress designated the Pacific Northwest Trail as one of America's 11 National Scenic Trails. The Pacific Northwest National Scenic Trail (PNNST) offers outstanding opportunities for long-distance non-motorized recreation throughout its 1200-mile route. The PNNST crosses a diverse landscape; beginning at the Continental Divide at Chief Mountain Trailhead in Glacier National Park, Montana and finishing at the Pacific Ocean on Cape Alava in Olympic National Park, Washington. Approximately 70% of the PNNST spans throughout seven national forests and three national parks, and over 300 miles of the trail cross through six wilderness areas. Currently, 67% of the PNNST is covered via trails and 33% is on roads. One goal of the USFS is to work toward a continuous, non-motorized trail route, to meet the intent for National Scenic Trails in the National Trails System Act.

When the PNNST gained its National Scenic Trail status, Congress required the USFS to develop a comprehensive plan that would provide various land management agencies with a common vision for the long-term development and management of the trail. The required components of a comprehensive plan are 1) objectives and practices for the management of the trail, including an identified carrying capacity and a plan for its implementation, 2) an acquisition or protection plan for lands along the trail, and 3) general and site-specific development plans. The long-term monitoring of the PNNST provides critical information to inform the PNNST's carrying capacity and other management actions for the trail.

The 2020 field season data builds on previous monitoring since 2017 to identify trends and changes over time. Initially, 2020 monitoring was supposed to extend into the Idaho Panhandle, but was impacted by the COVID-19 pandemic and associated travel restrictions. Throughout the summer of 2020, the University of Montana (UM) conducted a visitor monitoring project to collect data on the number and timing of trail visits along various sections of the PNNST. These sections are located within Kootenai National Forest (KNF) in Montana. **Trail visits** included trail use by people on foot, as well as people on horses or bicycles, who may be:

- thru hikers, who are completing an end-to-end hike of the PNNST in one season (in this report, these are included in counts for overnight hikers);
- section hikers, who are traversing the length of the PNNST as a series of shorter trips usually over a longer time frame (in this report, these are included in counts for overnight hikers);
- day hikers or horse/bike riders and overnight/multi-day hikers or horse/bike riders whose visits are not part of an attempt to complete the PNNST (sometimes called "local users" to differentiate them from thru hikers or section hikers, though they may or may not be from the local area);

- trail crew members and other government employees and volunteers using trails to perform administrative duties such as maintenance, monitoring, patrols, and other work.

Trail visits are estimates based on a calibration of raw data as described in the methods section below. “Out-and-back” trips, wherein a trail user returns to the same trailhead from which they started using the same trail (and passing by the same trail counter twice) on either the same day or a different day, are counted as two trail visits.

Additionally, the research team was able to have cameras up at all sites throughout the 2020 season and analyze camera data for group type and type of recreational user. Camera data was also used for the first time as part of this project in a pilot effort to determine party size (operationalized for the purposes of this pilot effort as the number of people of the same user type traveling in the same direction to pass a camera within 30 seconds of each other), which can be found in Appendix A. Camera data from the 2019 field season was also analyzed for the same variables, although these cameras were only up for select times at each site.

This report details findings related to trail use during 2020 at the following locations: Blue Sky Creek, Bluebird Lake, Boulder Lake, Gypsy Meadows, Vinal Creek¹, Midge Creek, and Canuck Peak. These sites were prioritized for monitoring during this field season over other locations that had also been monitored before, including Whitefish Divide, Green Mountain, and Garver Mountain. During the original field planning stages three new sites were going to be added along sections of the PNNST in Idaho. However, COVID-19 developments and concerns about the need for out-of-state travel postponed these plans. More information about the monitored sites, including the corresponding trail name and number, appear in Appendix B.

¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Methods

This study replicated the methodology used in the University of Montana's initial monitoring project from the summer of 2017, thus allowing for the comparison of trail use data between 2017, 2018, 2019, and 2020. However, when making these comparisons it is important to note that the calibration factors for 2017, 2018, 2019, and 2020 were calculated in somewhat different ways. Calibration factors for 2019 and 2020 accounted for all trail users (including overnight hikers, day hikers, horse riders, bike riders, and trail/administrative crew members). In contrast, 2018 data was calibrated only for day and overnight hikers (thus excluding trail/administrative crew members, horse riders, and bike riders). Moreover, because no calibration factors were available from 2017, the 2018 calibration factors were also applied to 2017 data. Therefore, while the percentage of trail users that were trail/administrative crew members, horse riders and bike riders is relatively small, comparisons between 2017, 2018, 2019, and 2020 are not entirely equivalent. Trail user estimates for 2017 and 2018 would likely be at least slightly higher than the reported hiking visit estimates.

Data collection took place from June 22, 2020 to September 23, 2020. During this time, the researchers made seven trips into the field. Each trip lasted between three and four days. Seven sites (Blue Sky Creek, Bluebird Lake, Boulder Lake, Gypsy Meadows, Vinal Creek², Midge Creek, and Canuck Peak) were monitored in 2020, with all of these sites located within Kootenai National Forest. The decision to monitor fewer sites than previous years was determined due to COVID-19 restrictions and the inability to extend data collection into the Idaho Panhandle as originally planned. Thus, sites that have been previously monitored, but were not monitored in 2020 include Whitefish Divide, Green Mountain, and Garver Mountain. Data was gathered using infrared trail counters and software from the company TRAFx. The trail counters were calibrated using infrared trail cameras that took photographs when a motion was detected.

Information from these infrared counters can help determine the level of use along the trails for the selected sites; however, there are standard limitations to how these counters record data that are typical to similar kinds of studies. The trail counters have infrared detectors that register a count each time an individual or animal passes by its receptive range. A trail counter reading alone cannot distinguish between a count for an animal and a count for a hiker. The use of trail camera photos helped us to differentiate people from wildlife, and gain a sense of which trails might be frequented more by wildlife than others.

Most of the cameras and counters spent approximately thirteen weeks at each site throughout the monitoring period. However, monitoring equipment at Bluebird Lake and Canuck Peak was only present for about 10.5 weeks, due to these sites being less accessible due to snow until later in the season. Additionally, technical difficulties with the Boulder Lake camera's memory

² The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

card after the first trip allowed for only about 10.5 weeks' worth of photos to be collected for this site as well. These trail cameras ensured that the movement throughout the trail was captured from several directions, and the footage was later watched to calibrate the infrared counts. Footage did provide valuable information with which to adjust the infrared counts. For example, Canuck Peak and Gypsy Meadows are frequented by wildlife, which get counted when walking on a trail past a counter. Similarly, a hiker walking with a dog would result in both the dog and the hiker being counted. In some cases, hikers walking side by side would only be counted as one hiker.

All available footage from cameras were used this year to determine calibration factors. While going through the camera data, researchers noted whether it was an animal, a hiker, bike rider, a horse rider, trail crew, or phantom count that was registered by the counter as a count. The observed count of hikers was then divided by all infrared counts in the calibration period to yield a calibration factor. If the calibration factor remains constant over time, then multiplying the calibration factor by the infrared counts yields the observed count of trail visits. This use of the calibration factors allows us to remove approximate erroneous measures of counts due to the infrared counters capturing movement from wind, wild animals, cattle, etc. These measures excluded dogs that may have been accompanying users and adjusted for how horses can often trigger two counts. This year, new cameras were used at three sites. These cameras had a shorter interval of 0 seconds, which may have been able to better capture hikers that were moving quickly than old cameras used at other sites and in past years. Older infrared cameras had a 5-second minimum interval, which might be too long to capture fast-moving hikers, bike riders, horse riders, and animals. This might have resulted in some counts being missed on the camera data and reduced accuracy for calibration factors.

The calibration factors in this study ranged from approximately 0.23 to 0.74 as shown in Table 1. Low hiker traffic and frequent wildlife on the trails could be factors contributing to lower calibration factors. Because the calibration factors are generated from a sample, we should formally refer to trail visits as estimated trail visits, but for brevity we will use the term trail visits in most places.

Table 1 Calibration Dates and Calculated Calibration Factors

Site	Calibration Dates	Calibration Factor
Blue Sky	6/25-9/22	0.367983
Bluebird Lake	7/11-9/22	0.459169
Boulder Lake	7/10-8/4; 8/6-8/7; 8/10-9/21	0.608924
Gypsy Meadows	6/24-9/21	0.471698
Vinal Creek ³	6/24-9/21	0.737834
Midge Creek	6/23-9/21	0.503401
Canuck Peak	7/10-8/8; 8/21-9/4; 9/6-9/20	0.228137

It is important to note that the infrared counters are not distinguishing between thru hikers, section hikers, day users, overnight/multi-day users, and trail crew/administrative users. Rather, the infrared counters are providing counts for overall use on the trail sections that are being monitored. Therefore, a trail user on an out-and-back hike who passes the infrared camera on the way in and then again on the way out is counted as two trail visits. No information about direction of travel can be gleaned from the infrared counts. Thus, camera data was used by researchers to determine trail user types through observed differences in gear (such as the size and type of backpack) and party composition (such as families with young children) that were suggestive of day-use versus overnight use. Qualitative data, like an electronic survey, or chronologically mapping hiker registrations, might help increase the accuracy in determining the number of thru hikers and section hikers versus other users, as well as westbound versus eastbound PNNST thru hikers.

This year, the research study also addressed the distribution of party sizes, group type, and user type for each location. Party sizes were counted as the numerical value of individuals that appeared to be traveling together, determined as the number in a group passing by the camera within 30 seconds of each other and moving in the same direction. Group types were categorizations of parties, which included solo trail users, pairs of two trail users, groups of three or more trail users, groups with at least one adult and one child (families with kids), and one or more trail crew workers. Trail users were also categorized into overnight hikers, day hikers, horse riders, bike riders, and trail crew members. Camera data helped researchers to distinguish between overnight hikers, which could often be seen with larger backpacks and overnight equipment like sleeping pads (Image 1), compared to day hikers (Image 2). In these

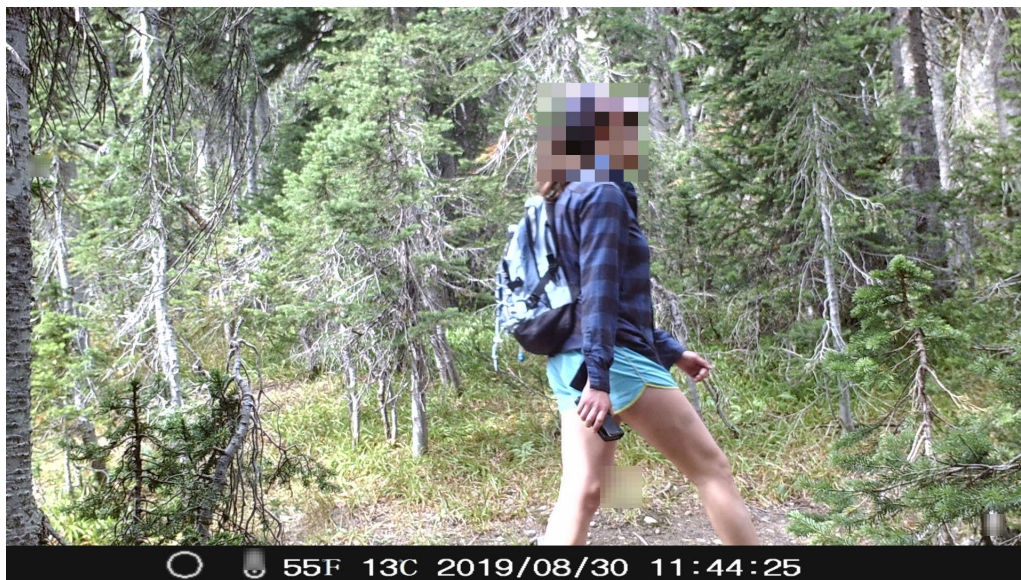
³ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

observations the overnight hikers category included overnight/multi-day backpackers as well as any PNNST thru hikers and/or section hikers, as it was not possible to reliably distinguish between these users from the camera data alone. Trail crew members were also determined via camera data, and were often seen wearing hardhats and carrying equipment such as shovels.

Image 1: Overnight hiker



Image 2: Day use hiker



Impacts of the COVID-19 Pandemic on Trail Use

The COVID-19 pandemic affected the country significantly during 2020, especially after March 11th, when the World Health Organization officially declared a global pandemic. COVID-19 has had a variety of influences on individuals both domestically and around the world. For example, the pandemic has affected the economy, caused job losses and creation, increased rates of remote work and learning, and led to various travel restrictions and quarantine policies. These influences, and many more, are likely to have impacted recreational activity trends. For example, a nationwide survey conducted in late July assessed rates of outdoor recreation pre- and post-COVID-19 and showed a 26% reduction in trips per participant to public outdoor recreation sites post-COVID-19 compared to prior to the pandemic (Landry et al., 2020; Rice et al., 2020a). Similarly, the distance traveled to engage in outdoor recreation and levels of backcountry recreation decreased as well (Rice et al., 2020). Individuals from urban areas were significantly more impacted by these trends than those from rural or urban clusters (Rice et al., 2020). These impacts may have been influenced by a variety of restrictions, including stay at home orders, as well as closing or limiting the capacity of some campgrounds and day use areas, hotels and lodging options, visitor centers, hiking trails, and attractions like National Parks (Landry et al., 2020).

However, research has shown walking, running, and hiking are considered the safest COVID-19 recreational activities, and that during April, May, and June of 2020, participation rates for day hiking rose by 8.4% compared to 2019 (Outdoor Industry Association, 2020). Additionally, within the region, including Kootenai National Forest and Idaho Panhandle National Forest, 2020 recreation use appeared to increase significantly. For example, based on Forest Service information, campground collections in Kootenai National Forest increased in 2020 by 20-100%. Observations from recreation personnel also noted that trail use increased among more accessible trails, likely due to an increase in visitors from North Idaho and Washington. This may have been influenced by factors such as Washington having closed most recreation trails and services during 2020, which may have resulted in an increase in Washington residents traveling to Montana for recreation opportunities.

Within a national US survey conducted in April 2020, about 61.5% of individuals responded that they were extremely likely to return to their preferred recreation patterns once COVID-19 threats seemed minimal to them (Rice et al., 2020b). Moreover, this study showed that the COVID-19 pandemic has also led to some potential long-term impacts on recreational behavior. The research found that 37.7% of individuals thought their outdoor behavior would change in the future, with the most highly rated changes including utilizing local public lands more often, participating in more types of outdoor recreation, and participating in more fitness-based outdoor recreation activities (2020b).

According to the USFS PNNST program, long-distance hiking on the PNNST was impacted by the closure of some areas along the trail for all or part of the 2020 hiking season. For example, the

east side of Glacier National Park, where most PNNST thru-hikers begin their trip, was closed all season. Evidence from trail register data for the PNNST on the Kootenai National Forest as well as hikers' contacts to the Pacific Northwest Trail Association and social media activity showed that the number of PNNST long-distance hikers was roughly 15-25% lower than in recent years. A true end-to-end thru-hike of the PNNST was not possible in 2020 due to the closures in Glacier National Park and elsewhere. USFS PNNST program managers observed social media activity on the PNT Hikers facebook group and elsewhere that appeared to show that uncertainty associated with fast-changing federal, state, and local health and safety guidelines and the status of areas along the trail may have led some social media users planning long-distance trips on the PNNST in 2020 to delay the start date of their trip (perhaps hoping that the east side of Glacier National Park would reopen later in the summer) or to cancel until a future year.

References:

- Landry, C.E., Bergstrom, J., Salazar, J. & Turner, D. (2020). How has the COVID-19 pandemic affected outdoor recreation in the U.S.? A revealed preference approach. *Applied Economic Perspectives and Policy*, 43(1), 443-457. <https://doi-org.weblib.lib.umt.edu:2443/10.1002/aapp.13119>
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Comparison Across Sites

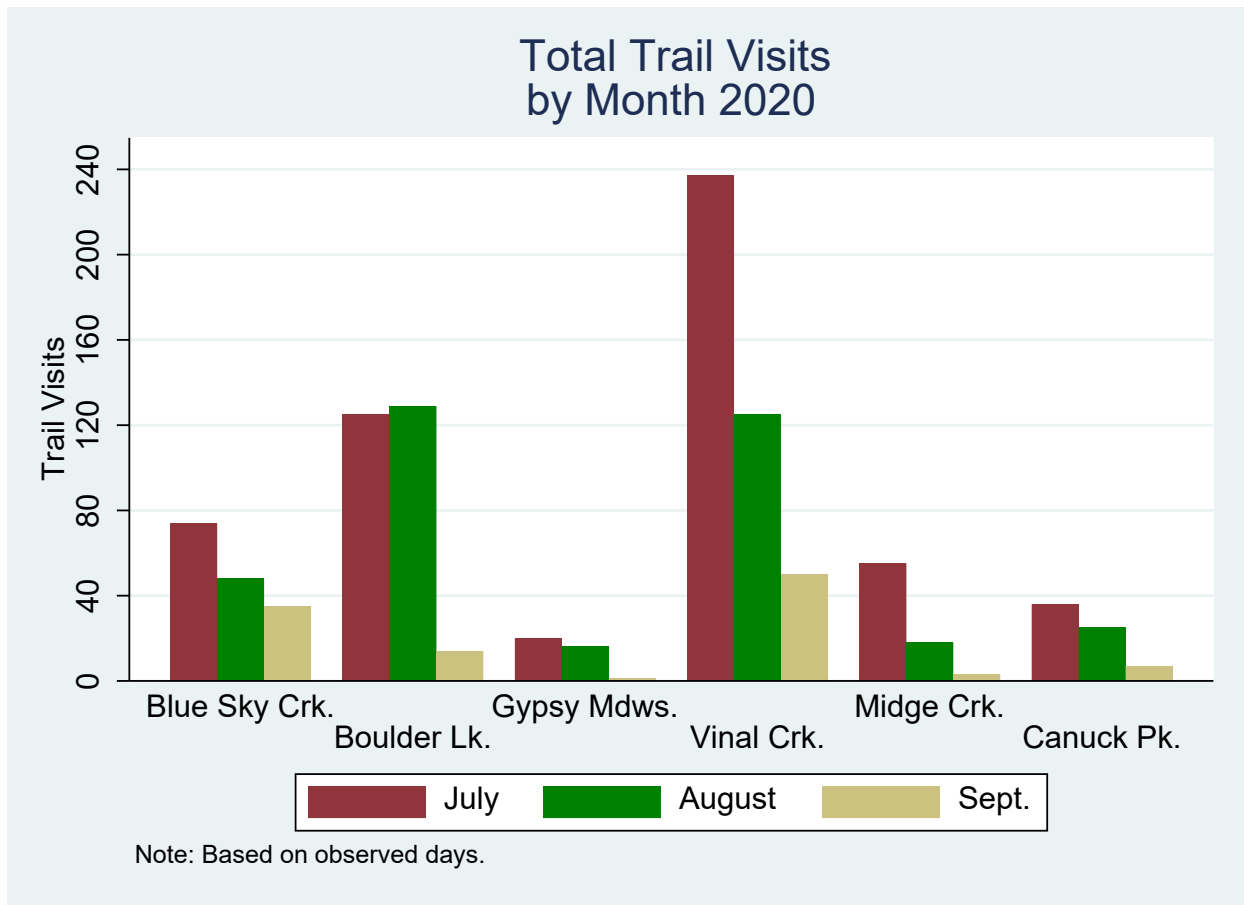
Locations monitored include, from east to west: Blue Sky Creek, Bluebird Lake, Boulder Lake, Gypsy Meadows, Vinal Creek⁴, Midge Creek, and Canuck Peak. More information about these sites, including the corresponding trail name and number, are in Appendix A.

Figure 1 displays the total number of trail visits across all sites in July, August, and September. Bluebird Lake was not included in these graphs because it demonstrated a trail count that was substantially higher than the rest of the monitored sites. The use of Bluebird Lake did not scale with the other sites, warranting its own graph of daily counts. The sites appear in these graphs running from east to west which is the typical direction thru hiker travel on the PNNST.

July 2020 had the most trail visits, compared to August and September, for all sites except Boulder Lake, which had the most trail visits during August. These use patterns are likely influenced in part by west-bound thru-hikers typically passing through these areas earlier in the season in order to complete their end-to-end hike of the PNNST during the window of time when trails are snow-free from snowmelt in the high passes along the PNNST in Glacier National Park and before snow falls in the high passes along the PNNST in Olympic National Park. In July 2020, Vinal Creek had the highest use among the sites (excluding Bluebird Lake, as mentioned above), with over 200 trail visits. Boulder Lake also had a relatively high number of visits, with over 120 trail visits. In contrast, Gypsy Meadows had the lowest use during July, with only about 20 visits. During August, Boulder Lake and Vinal Creek had the highest use of these trails, with each experiencing over 120 trail visits during the month. Gypsy Meadows, Midge Creek, and Canuck Peak all had relatively low visitor use, with fewer than 40 trail visits at each. In September, Vinal Creek had the highest use among these trails, with nearly 80 trail visits. Blue Sky Creek had over 40 trail visits during September. However, Gypsy Meadows and Midge Creek both had very low relative use during September, compared to the other sites and prior months.

⁴ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 1: Comparison of use across all sites during July-September 2020⁵



⁵ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 2 shows a comparison of weekday and weekend use across each site, excluding Bluebird Lake because visits to Bluebird Lake took place on a much larger scale than the rest of our sites. If we included Bluebird Lake in the same figure, it would be more difficult to see the differences between the individual sites. Figure 3 shows the comparison of weekday and weekend use at Bluebird Lake. To stay consistent with the previous years' monitoring reports, Mondays, Tuesdays, Wednesdays, and Thursdays were counted as weekdays and Fridays, Saturdays and Sundays were considered weekend days.

Overall, Bluebird Lake had the greatest difference between weekday and weekend use. Weekends accounted for about 64% of traffic at Bluebird, whereas only 36% of traffic occurred during the weekdays. Bluebird trail use averaged 53.7 daily trail visits during weekdays, versus an average of 98.9 daily trail visits on weekends during 2020. Similarly, Boulder Lakes saw a notably higher percentage of users on weekends compared to weekdays, with about 62% of traffic at Boulder Lakes using the trail during the weekend versus only 38% during weekdays. At Boulder Lakes, average daily trail visits increased from 8.5 on weekdays to 13.8 daily trail visits on weekends. Weekend use was also higher for Blue Sky Creek than weekday use. Notable increases in use on weekends suggests that these sites were very popular for day hikers. Alternatively, there was a small decrease in visitor use on weekends versus weekdays at Midge Creek. Here 59% of trail visits occurred during weekdays, whereas only 41% occurred during weekends. The average number of daily trail visits during weekdays at Midge Creek was 3.8, whereas the average number of daily trail visits during weekends at this site was 2.6. Higher weekend use may indicate more easily accessed trail with higher trail use by working folks that have more free time on the weekends.

There seemed to be almost no difference in use between weekend and weekdays for the Gypsy Meadows, Vinal Creek⁶, and Canuck Peak sites. This lack of variation among the daily weekend and weekday averages, which suggests consistent use of the trails throughout the weeks, may indicate a primarily thru hiker presence or consistent day hiker use. For example, Gypsy Meadows and Canuck Peak are not as easily accessible and take more time to get to compared to some other sites. Thus, they may be largely used by thru-hikers on long-term trips or by retirees/people taking time off with more flexible schedules. These users may result in weekday and weekend use patterns would not vary as widely. Conversely, the Vinal Creek site's trail is more accessible and convenient for short-term trips. It has shown to have more use by groups and organizations (ex. school groups) that may utilize it during the week, thus balancing weekday versus weekend use patterns.

⁶ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 2: Comparison of Weekend and Weekday use across all sites in 2020⁷

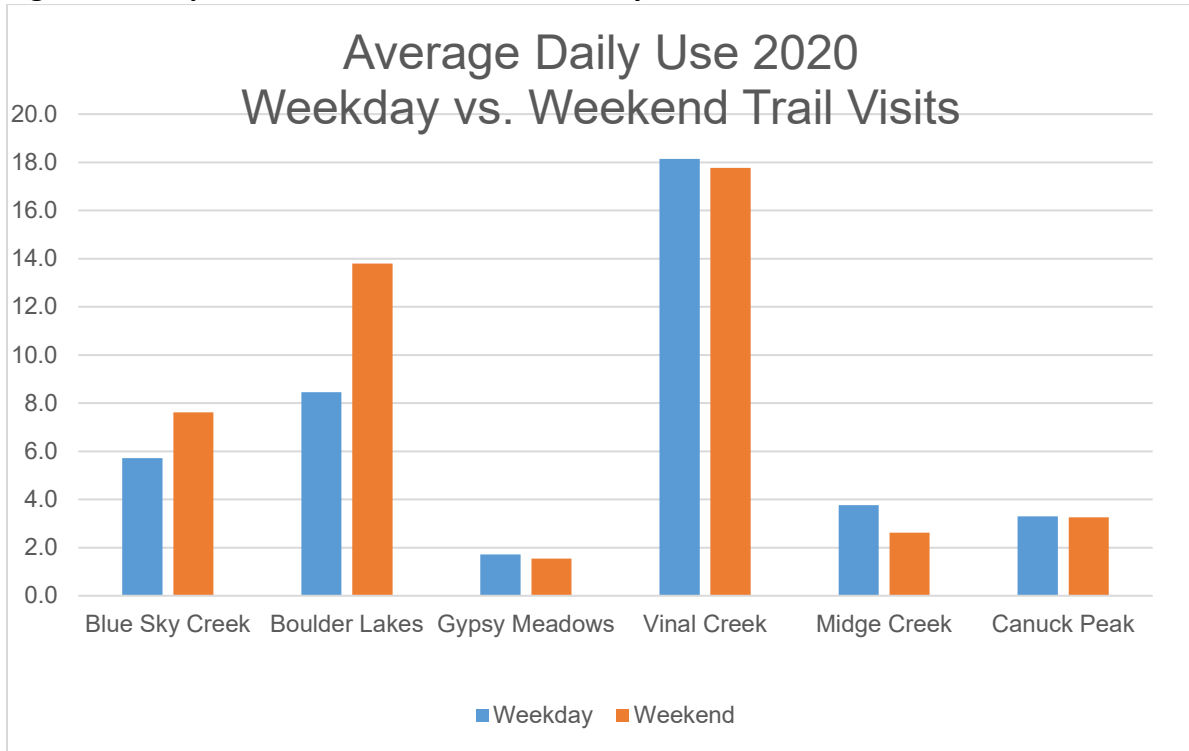
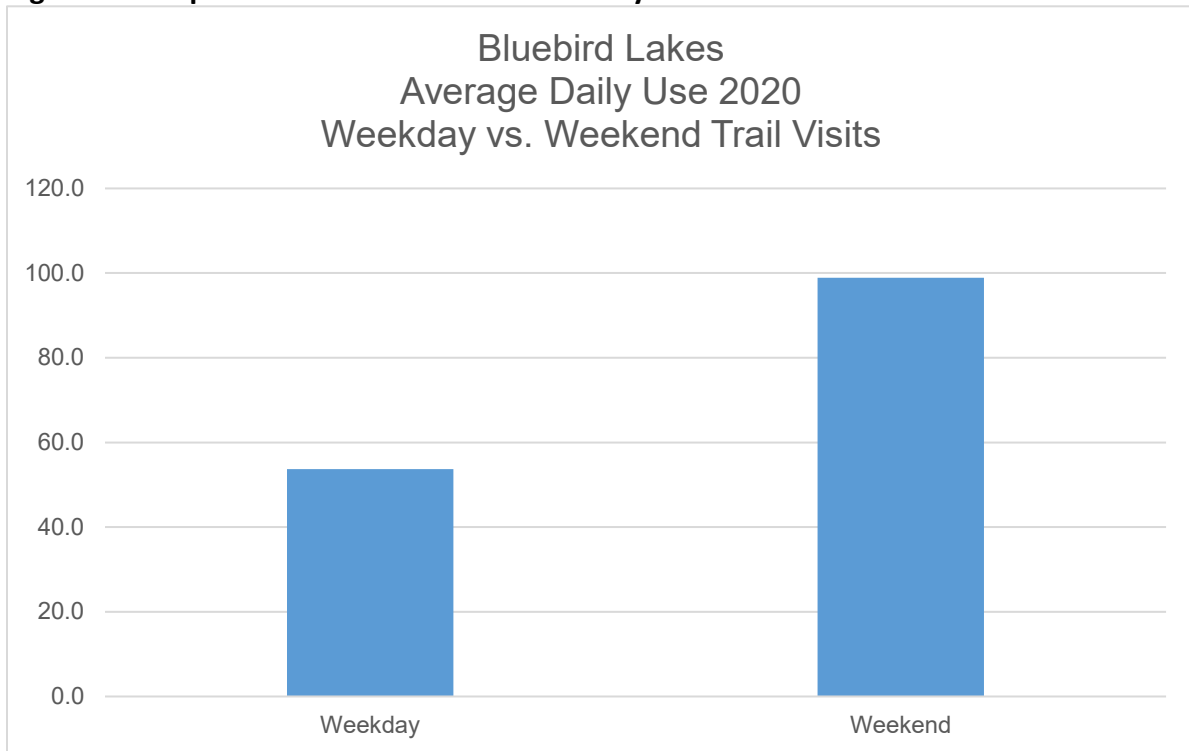


Figure 3: Comparison of Weekend and Weekday use at Bluebird Lake in 2020



⁷ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figures 4, 5, and 6 show a comparison of the percentage of different types of users across each site for July, August, and September, respectively. These graphs include overnight hikers, day hikers, and other types of users (which includes horse riders, crew members, and bike riders).

Figure 4 shows that during July day hikers were the most common type of user for nearly all sites, except Canuck Peak, which had mostly overnight hikers. Bluebird Lake had the highest percentage of day hiker use, with nearly 80% of users being day hikers. At Boulder Lake, overnight hikers and hikers were seen at very similar numbers, with each composing over 40% of the user types found at the site. Midge Creek had the most even distribution of user types, and the most users from the “other” category, which made up over 20% of the trail users at this site.

During August of 2020, there was insufficient data to provide a distribution of users at Gypsy Meadows due to a very small number of users during this month. At all remaining sites, day hikers were the predominant users for each location by a significant margin (making up over 60% of users for all sites). Overnight hikers typically composed the next most common type of user for all sites, though at Blue Sky Creek both overnight hikers and other users made up about 20% of the users each.

For September of 2020, there was insufficient data for a distribution of users at Gypsy Meadows, Midge Creek, and Canuck Peak. For the remaining sites (Blue Sky Creek, Bluebird Lake, Boulder Lake, and Vinal Creek⁸), day hikers again composed the highest percentage of users. At Blue Sky Creek, the second most common user type was “other” users, whereas at Bluebird Lake overnight hikers were slightly more common than other users. Boulder Lake and Vinal Creek had some overnight hikers as well, and no observed users in the other category were seen at these sites during September.

⁸ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 4: Percentage of Types of Users across all sites during July 2020⁹

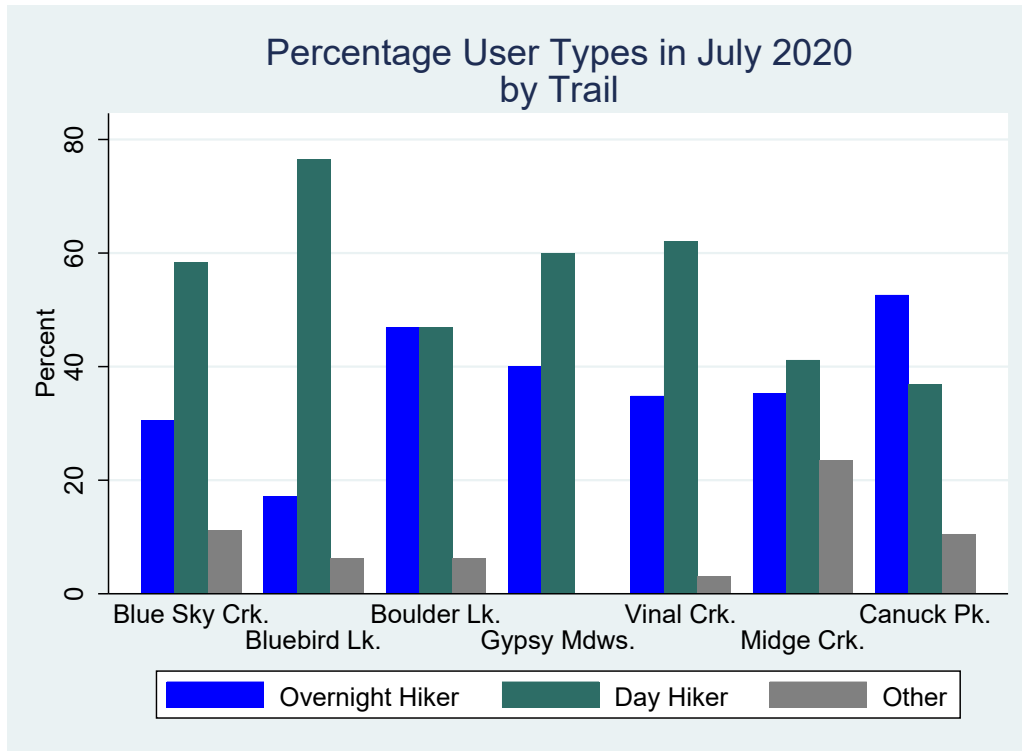
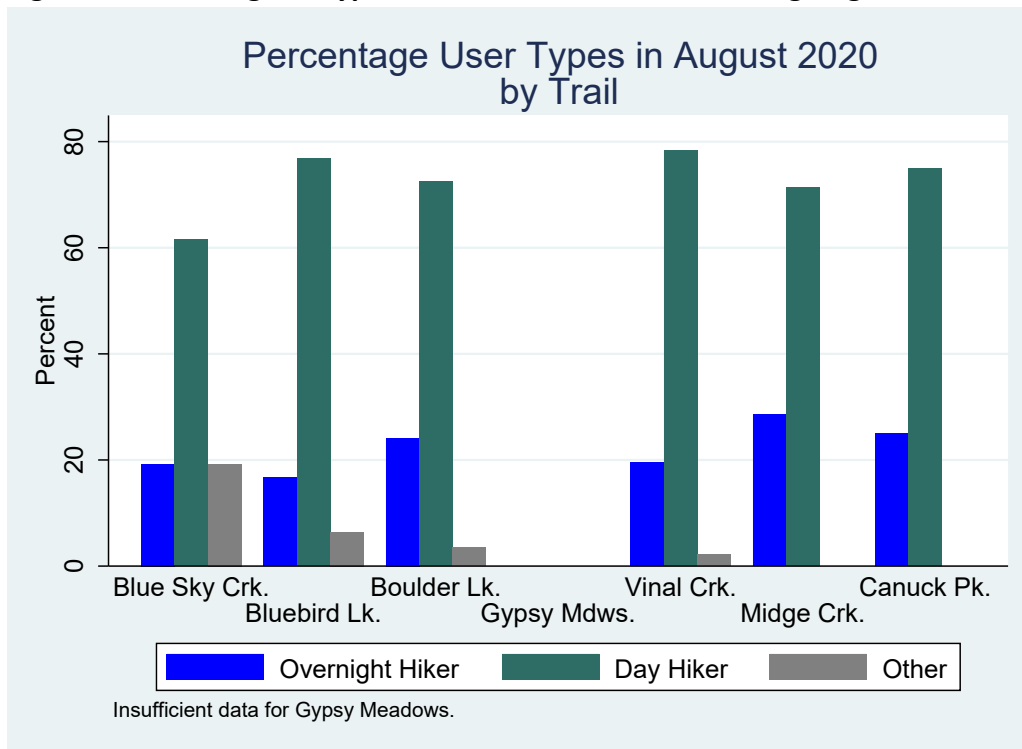
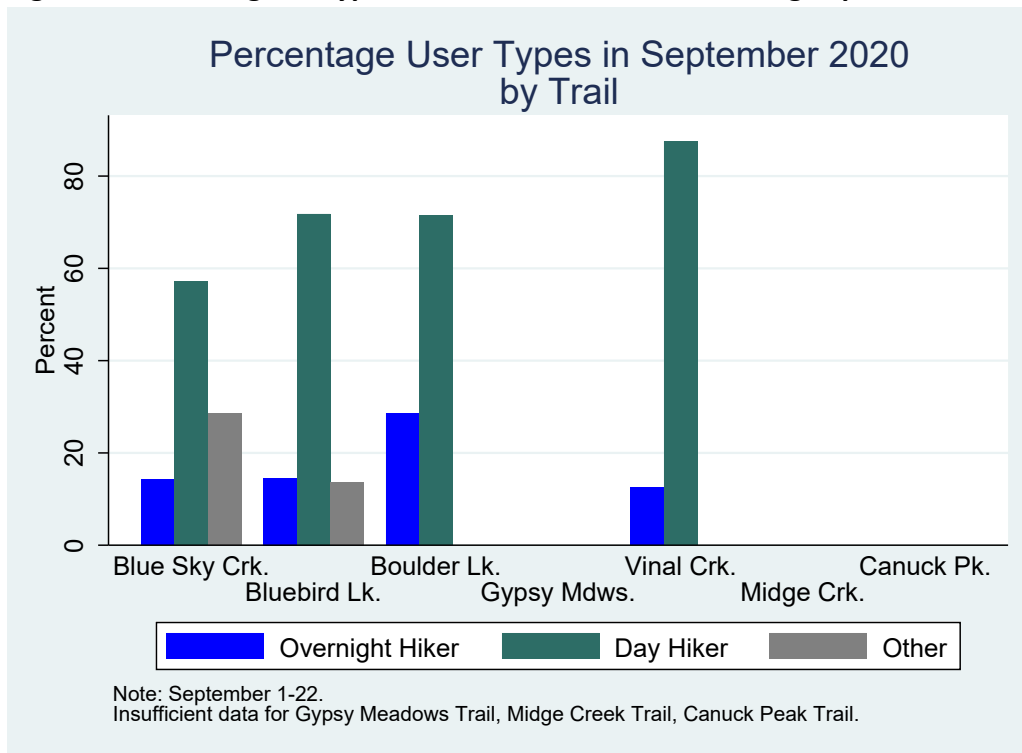


Figure 5: Percentage of Types of Users across all sites during August 2020



⁹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 6: Percentage of Types of Users across all sites during September 2020¹⁰



¹⁰ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Table 2 provides the number of days monitored, monthly counts, daily averages, and minimum/maximum daily counts for each site for July-September 2020. We excluded three days of data for Boulder Lake because they were much higher than the rest of the daily counts; the camera data from these days revealed that there were cattle traveling on the trail, which caused the much higher daily count. Data for August 9th to 20th was excluded for Canuck Peak due to a loss of camera data for the site during these dates. An additional one day of data was also excluded from Canuck due to it having a much higher count than the rest of the daily counts; daily camera data from this day showed that there was a herd of elk traveling on the trail, resulting in the higher daily count.

Table 2 Monitoring Data for July, August, and September 2020¹¹

<i>Site¹</i>	<i>Days Monitored (Monthly)</i>	<i>Count (Monthly)</i>	<i>Daily Average</i>	<i>Max (Daily)</i>
<u>July</u>				
Blue Sky Trail	31	74	2	13
Bluebird Lake Trail	21	603	29	93
Boulder Lake Trail	31	125	4	16
Canuck Trail	22	36	2	6
Gypsy Meadows Trail	31	20	1	6
Midge Creek Trail	31	55	2	9
Vinal Creek Trail	31	237	8	24
<u>August</u>				
Blue Sky Trail	31	48	2	8
Bluebird Lake Trail	31	694	22	59
Boulder Lake Trail	27	129	5	25
Canuck Trail	31	25	1	3
Gypsy Meadows Trail	31	16	1	4
Midge Creek Trail	31	18	1	4
Vinal Creek Trail	31	125	4	17
<u>September</u>				
Blue Sky Trail	22	35	2	7
Bluebird Lake Trail	22	327	15	65
Boulder Lake Trail	21	14	1	3
Canuck Trail	19	7	0	2
Gypsy Meadows Trail	21	1	0	1
Midge Creek Trail	21	3	0	2
Vinal Creek Trail	21	50	2	15

¹ Official Trail designations appear in Appendix A.

¹¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Trail Use by Site

Blue Sky Creek 2020

Blue Sky Creek Trail can serve as a gateway trail between Flathead and Kootenai National Forests for overnight hikers. The Blue Sky Creek monitoring site is located about 1.0 miles from the trailhead, which begins on the east side of Grave Creek Rd/NF-114, where NF-7020 branches off. From the parking area, the trailhead can be found across a walking bridge. During 2020, the counter and camera were set up on the north side of the trail.

Looking northeast. Blue Sky trailhead parking



Looking north-northeast. 2020 counter location.



Looking north. 2020 camera location.

From June 25, 2020 through September 22, 2020, an estimated 245 trail visits were recorded on Blue Sky Creek Trail. Figure 7.1 displays the daily trail visit counts for the Blue Sky Creek site.

Figure 7.2 shows the total weekly trail visits at the Blue Sky Creek Site. The week with the highest use was July 27th-August 2nd, with 25 trail visits. A weekly average of 12.5 trail visits were recorded at the Blue Sky Creek site during the weeks monitored.

Figure 7.3 includes the daily average number of trail visits by the day of the week at the Blue Sky Creek site. The highest use days were Saturday and Sunday, with an average of 4.0 and 2.1 visitors per day respectively. Based on camera data, this trail was frequented by day hikers on the weekends, which could account for the higher weekend traffic which is typical of day use patterns.

Figure 7.4 shows the distribution of user types observed at Blue Sky Creek over 2020. The most common type of user included day hikers, which composed about 58.5% of users. This was followed by overnight hikers, which made up 23.2% of the users at this site. In addition to the users noted in this figure, there was one individual observed riding an ATV by this site as well.

Figure 7.1 Blue Sky Creek Daily Trail Visit Counts

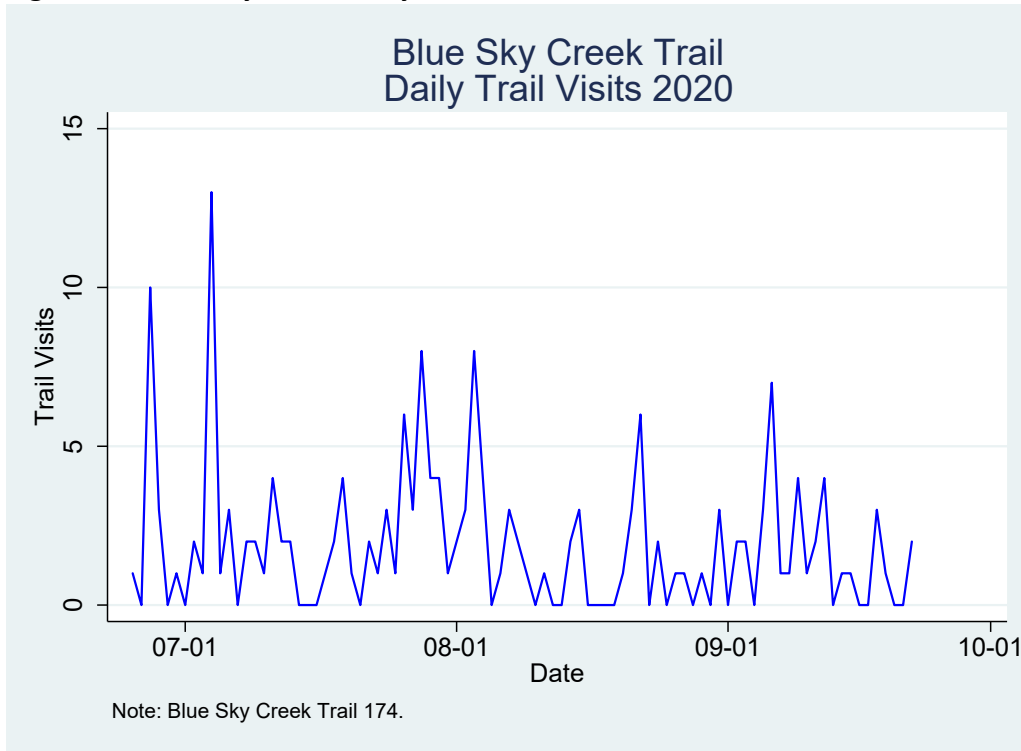


Figure 7.2 Blue Sky Creek Weekly Counts

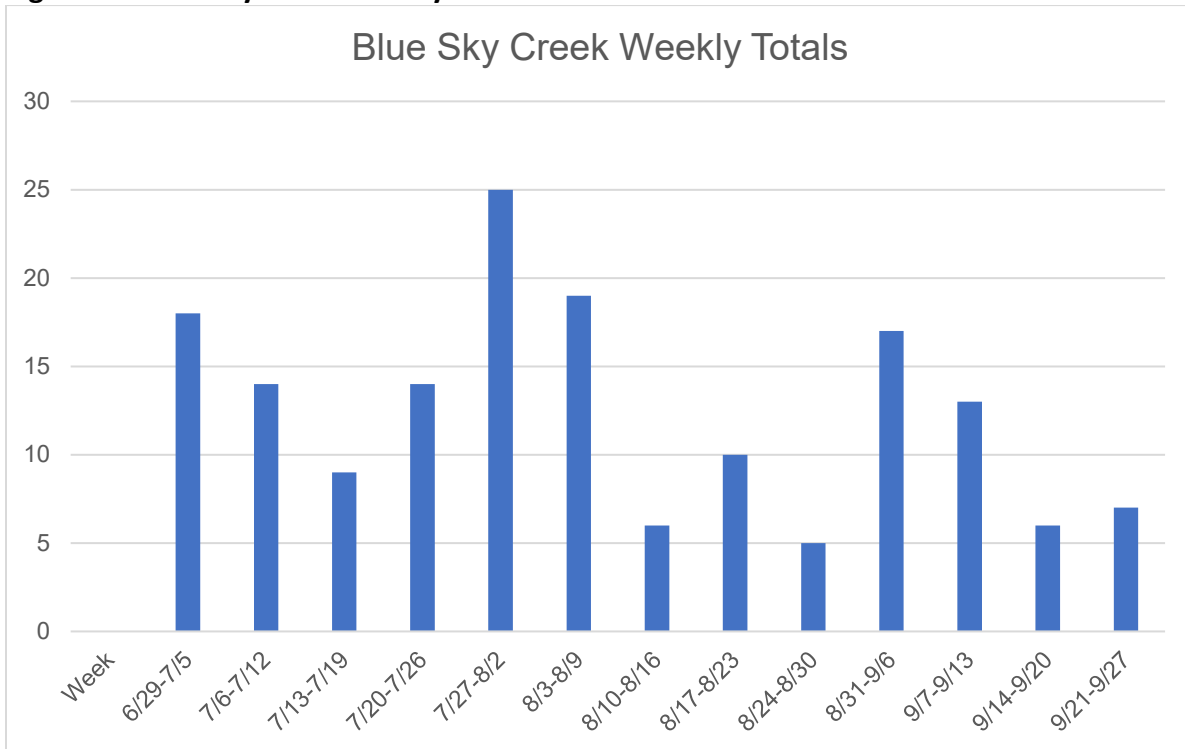


Figure 7.3 Blue Sky Creek Daily Averages by Day of the Week

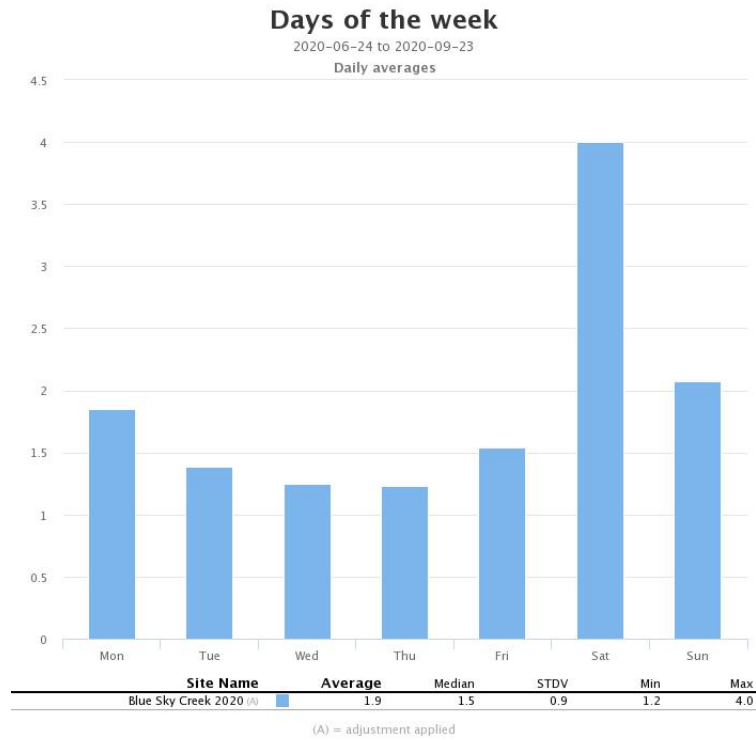
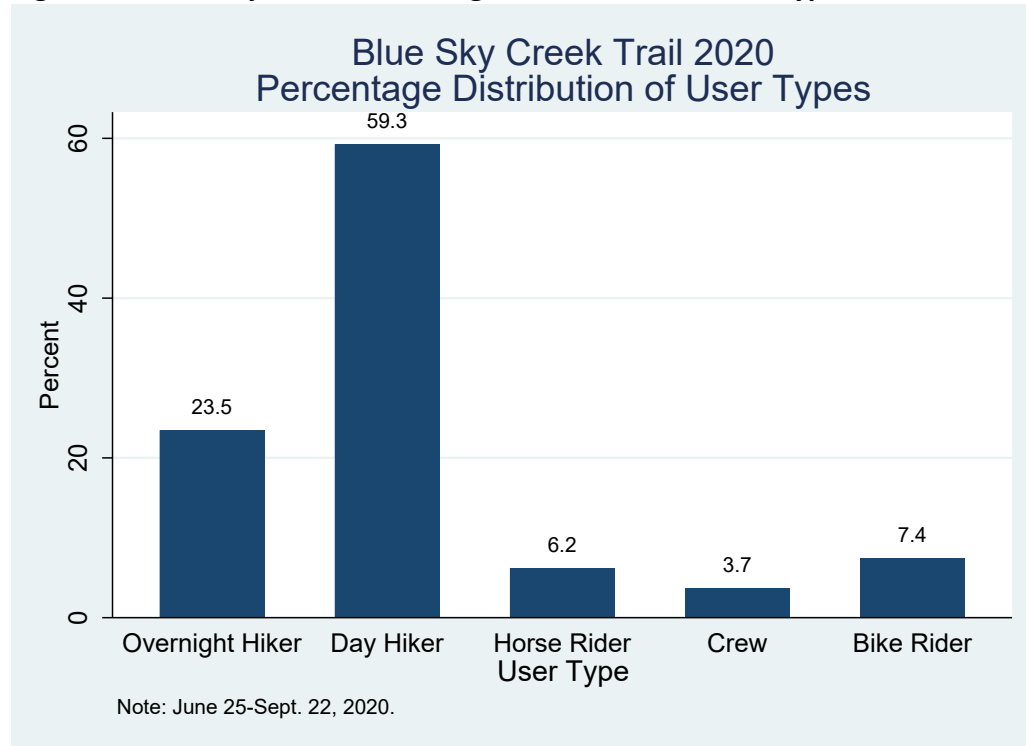


Figure 7.4 Blue Sky Creek Percentage Distribution of User Types 2020



Bluebird Lake 2020

The Bluebird Lake Trail is located past the parking site for Blue Sky Creek. The trailhead can be found by continuing up Grave Creek Road to the final section, NF-319, where it ends in a parking area. Along the way there will be signs and branches off to Therriault Lakes and a horse camp. From the parking lot entrance, the trailhead is on the south side. From the trailhead, the Bluebird Lake monitoring site is approximately 2.1 miles up the trail. At about 2 miles up the trail there is an intersection. The camera and counter are situated on the righthand branch, toward the Bluebird Lake turnoff, and amongst a forested section between two clear openings. During 2020, the counter and camera were set up on the north side of the trail.



2020 counter and camera locations.

From July 11, 2020 through September 22, 2020, an estimated 1729 trail visits were recorded at the Bluebird Lake site. Figure 8.1 displays the daily trail visit counts for this site. As mentioned above in the “Comparison Across Sites” section of the report, Bluebird Lake exhibited much higher use than the other trails. The day of highest use within the field season was Saturday, July 18th, with 93 trail visits.

The data shows that Bluebird Lake is the most used trail within the summer hiking season out of all the trails monitored for this report. The trail’s proximity to Eureka might be a factor in relatively high use numbers and patterns. It is also located relatively close to Whitefish and Kalispell, which have larger populations, and is utilized by Canadian travelers fairly often. Moreover, Bluebird Lake is a scenic area at high elevation, which could make it a trail of high interest among users. Additionally, Bluebird Lake is near a campground that could account for increased trail visits. According to Kootenai National Forest recreation managers, Bluebird Lake was the only trail on Kootenai National Forest identified as “high use” in a 1978 trail inventory. In 2020, Bluebird Lake was the busiest trail monitored, while the trail with the next highest use was Vinal Creek¹². Figure 8.2 shows Bluebird Lake counts compared to Vinal Creek.

Figure 8.3 shows the total weekly trail visits at the Bluebird Lake site. The weeks with the highest use were July 13th-19th and July 20th-26th, with these weeks having 247 and 224 trail visits respectively. A weekly average of 147.6 trail visits were recorded at the Bluebird Lake site during the weeks monitored.

Figure 8.4 includes the daily averages number of trail visits by the day of the week at the Bluebird Lake site. The highest use days were Saturday, Sunday and Friday, with an average of 40.2, 33.6, and 25.1 visitors per day respectively. Based on camera data, this trail was frequented by hikers with dogs, day hikers and overnight hikers, bike riders, and horse riders. This wide variety of user types may account for the higher use counts in the month of July and August compared to other sites.

Figure 8.5 shows the distribution of user types observed at the Bluebird Lake site. The majority of users included day hikers, which composed about 75.9% of the user types observed. This was followed by overnight hikers, which made up 16.5% of the users at this site.

¹² The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 8.1 Bluebird Lake Daily Counts

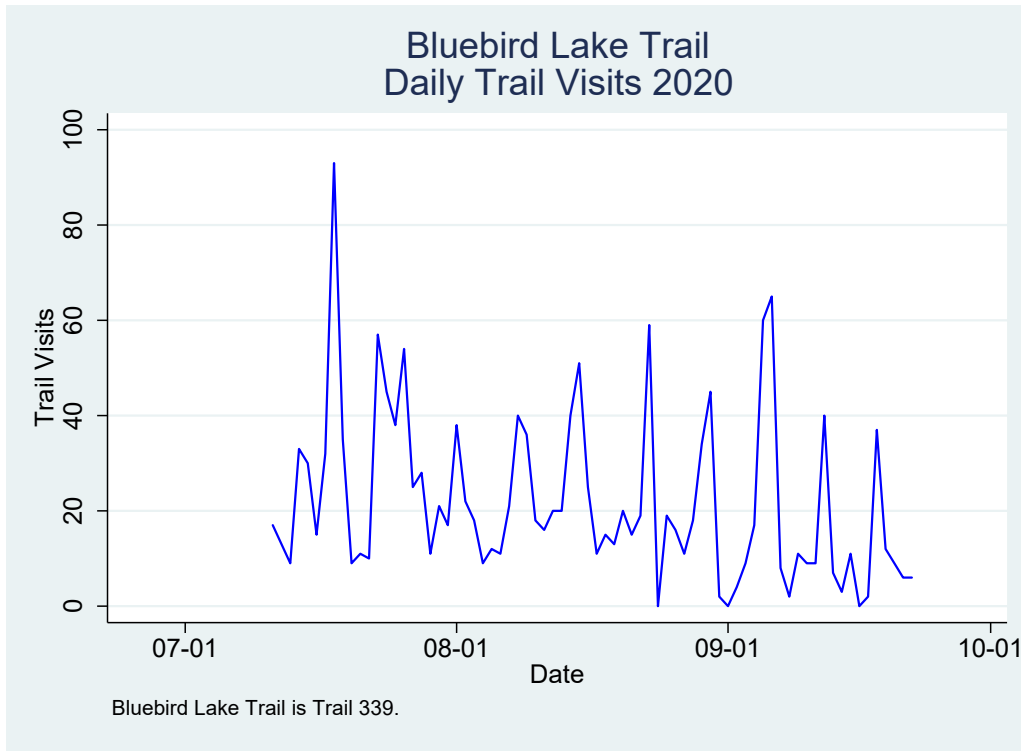
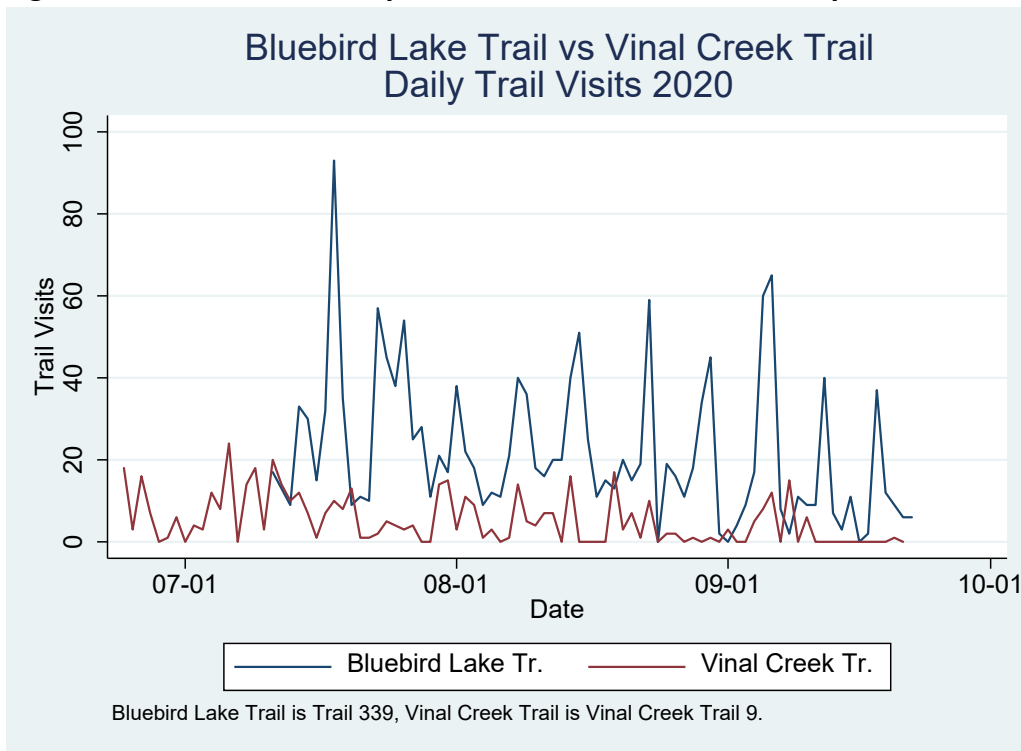


Figure 8.2 Bluebird Lake Daily Counts Vs. Vinal Creek Trail Daily Counts¹³



¹³ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 8.3 Bluebird Lake Weekly Counts

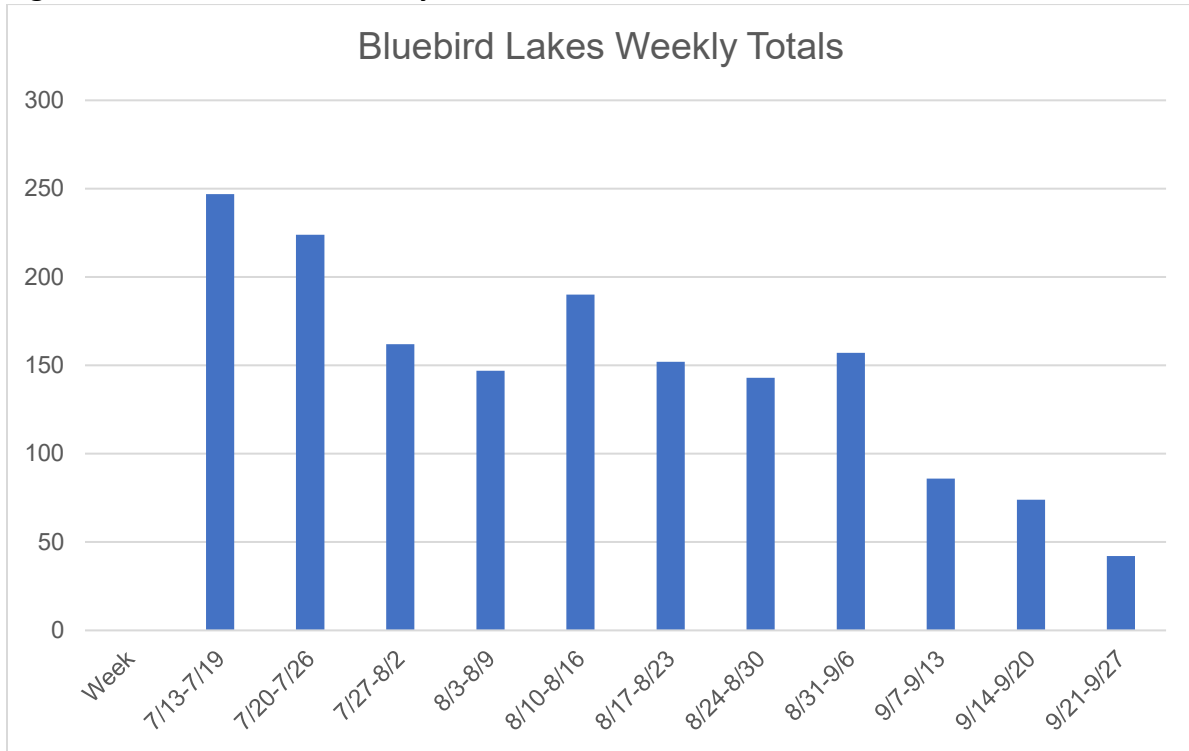


Figure 8.4 Bluebird Lake Daily Averages by Day of the Week

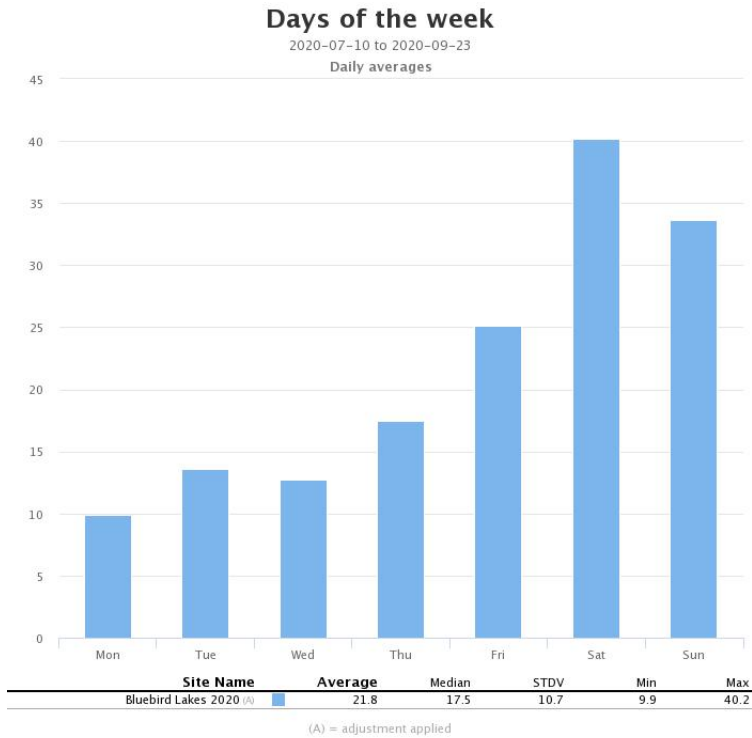
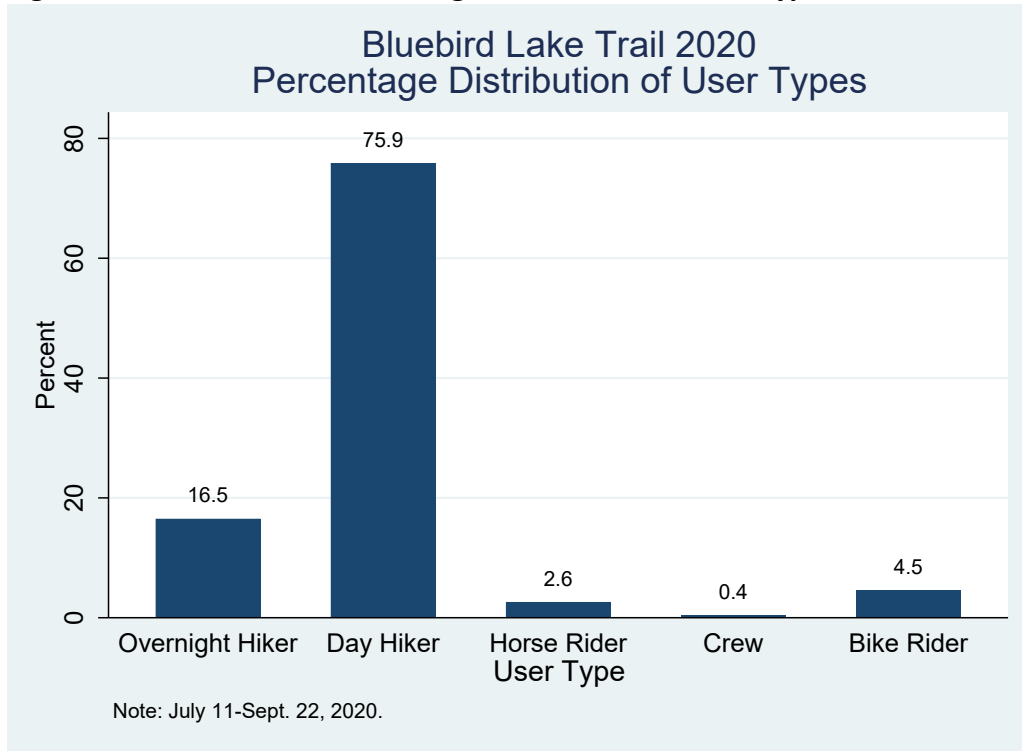


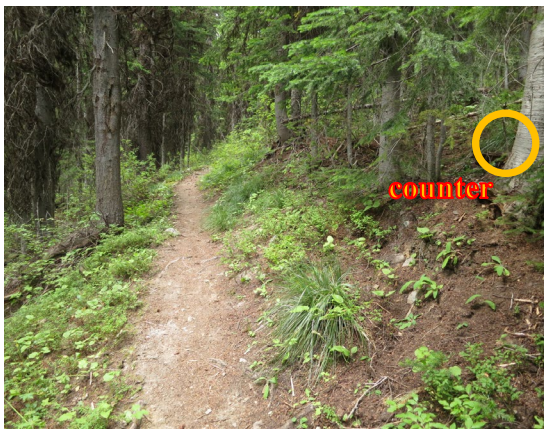
Figure 8.5 Bluebird Lake Percentage Distribution of User Types



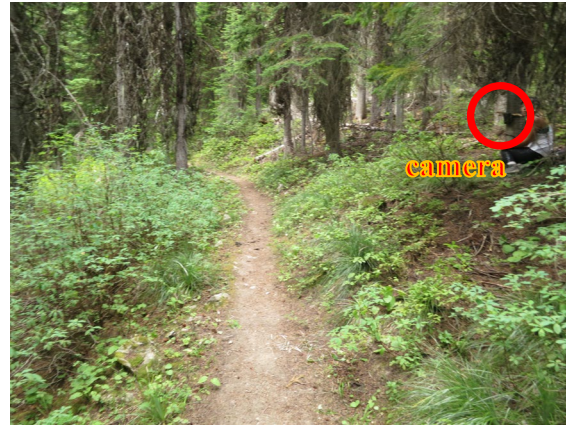
Boulder Lake 2020

Boulder Lake Trail (#62) can be found from Highway 37 by crossing Kooconusa Bridge and traveling north on FDR 470 for 2.3 miles, turning onto Boulder Creek Road 337 and following it 10 miles, before then turning onto Road 7229. The start of the trail can be found about 1.2 miles from this turnoff. The Boulder Lake monitoring site is located about 1.8 miles from the parking site.

Boulder Lake and Gypsy Meadow site parking



2020 counter location.



2020 camera location.

From July 10, 2020 through September 21, 2022 an estimated 287 trail visits were recorded on the Boulder Lake Trail. Figure 9.1 shows the estimated daily trail visit counts for the Boulder Lake site.

Figure 9.2 shows the total weekly trail visits at the Boulder Lake site. The weeks with the highest use were July 6th-12th and August 24th-30th, with these weeks having 58 and 50 trail visits respectively. A weekly average of 20.5 trail visits were recorded at the Boulder Lake site during the weeks monitored.

Figure 9.3 includes the daily average number of trail visits by the day of the week at the Boulder Lake site. The highest use days were Saturday and Friday, with an average of 6.1 and 4.4 visitors per day respectively. Based on camera data, this trail was frequented by day hikers on the weekends, which could account for the higher weekend traffic which is typical of day use patterns. Based on the camera data, the trail was frequented by day use hikers with dogs.

Figure 9.4 shows the distribution of user types observed at the Boulder Lake site. The most common type of user included day hikers, which composed about 60.3% of users. This was followed by overnight hikers, which made up 35.3% of the users at this site.

Figure 9.1 Boulder Lake Daily Trail Visit Counts

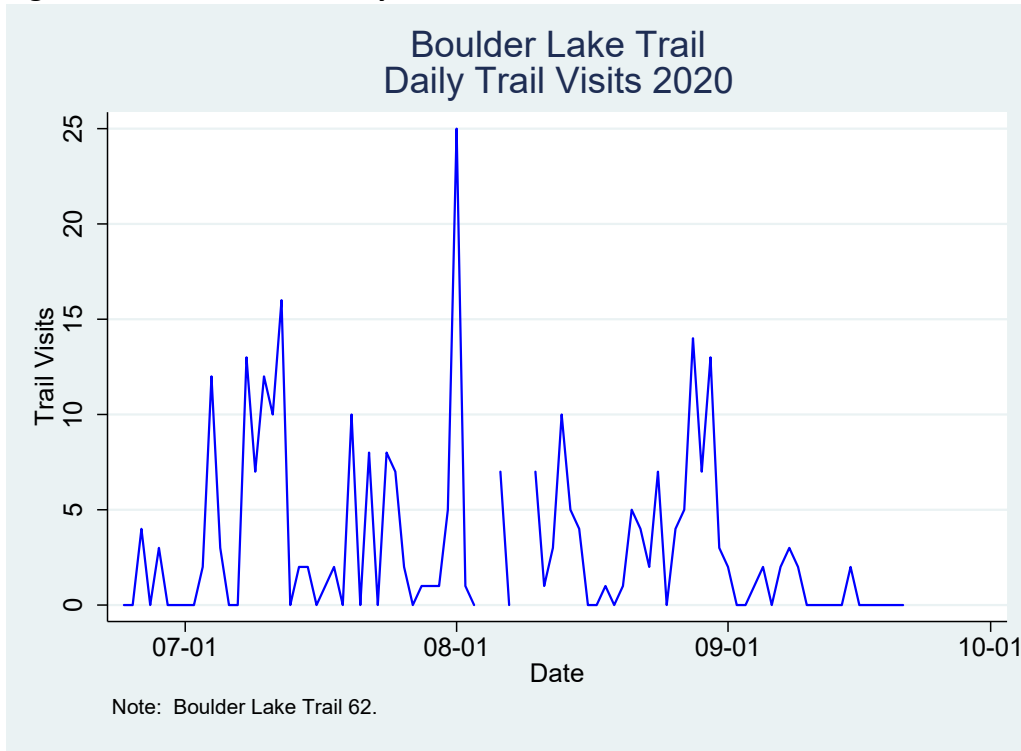


Figure 9.2 Boulder Lake Weekly Counts

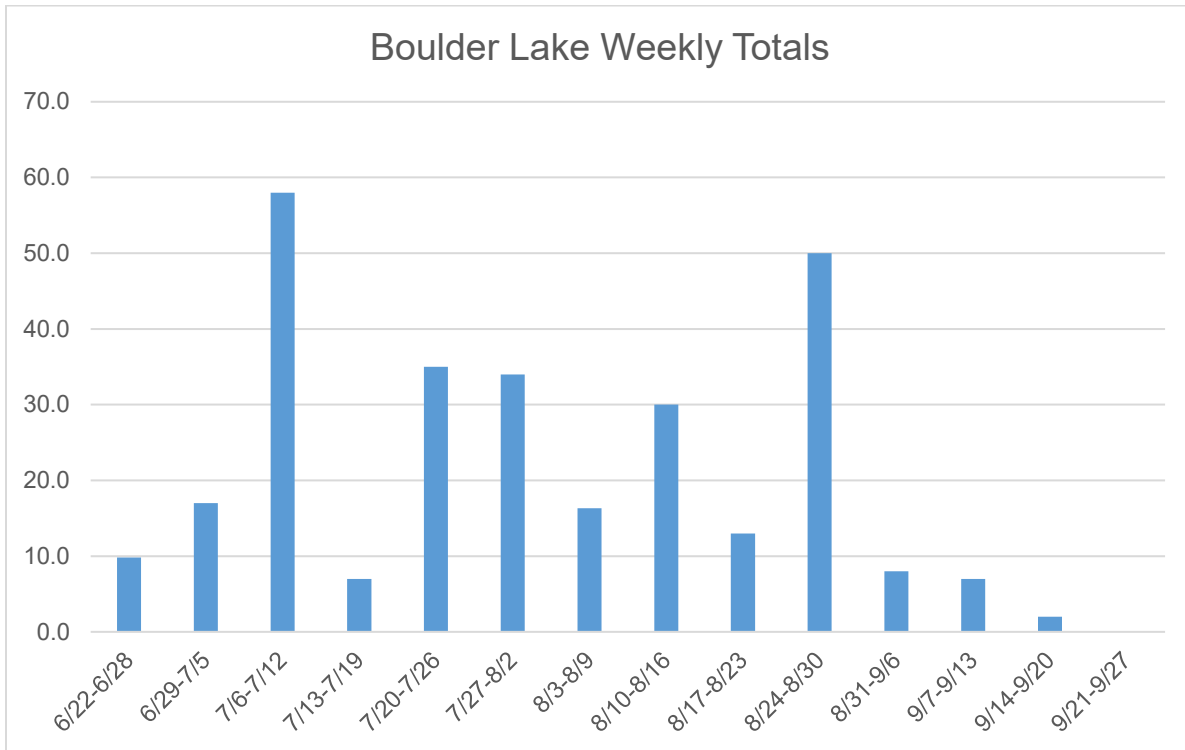


Figure 9.3 Boulder Lake Daily Averages by Day of the Week

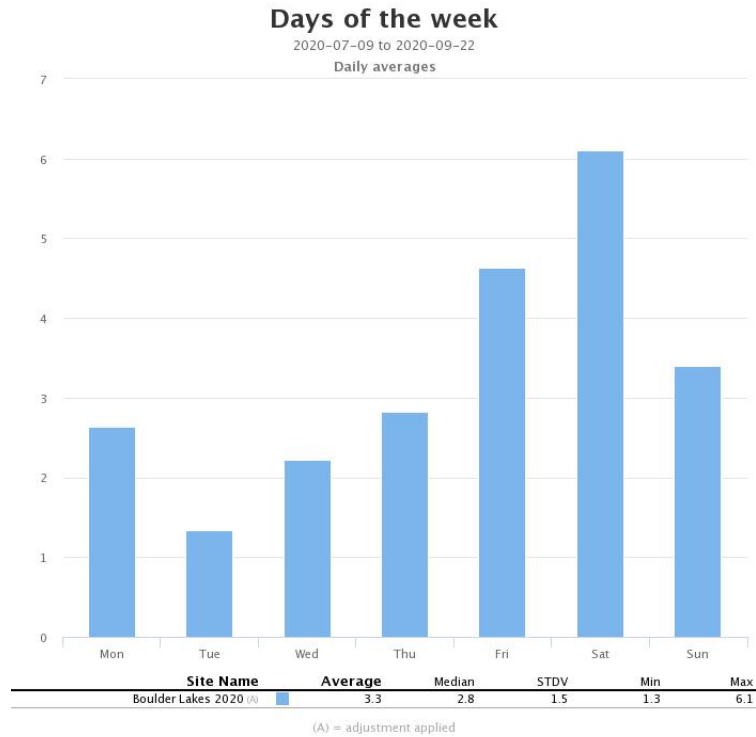
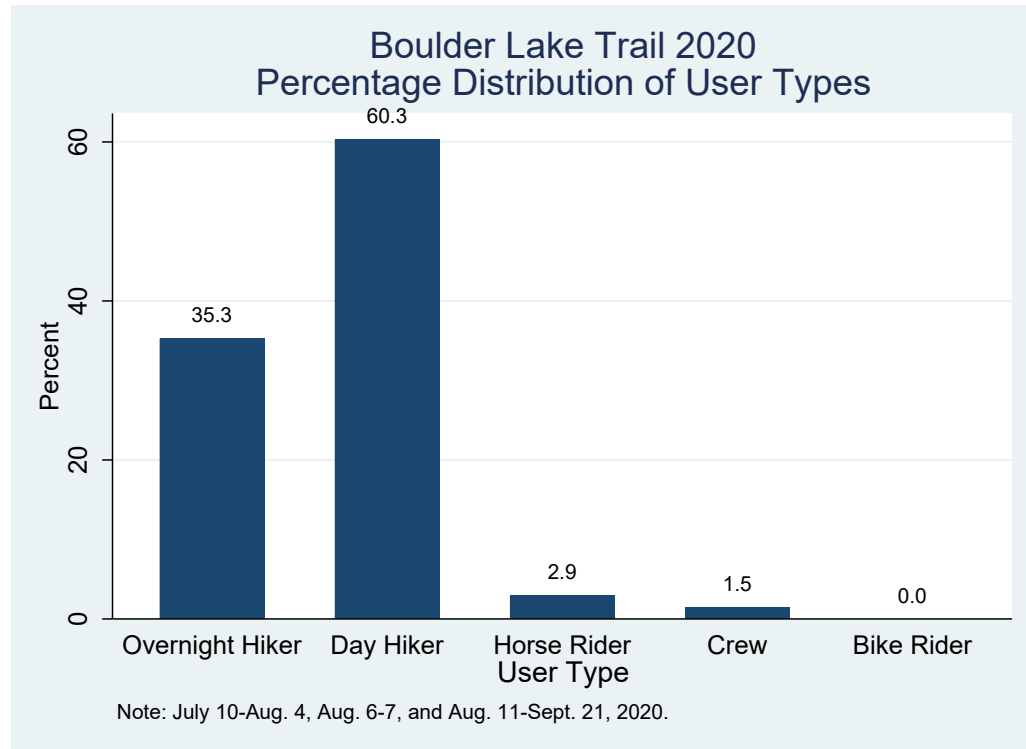


Figure 9.4 Boulder Lake Percentage Distribution of User Types



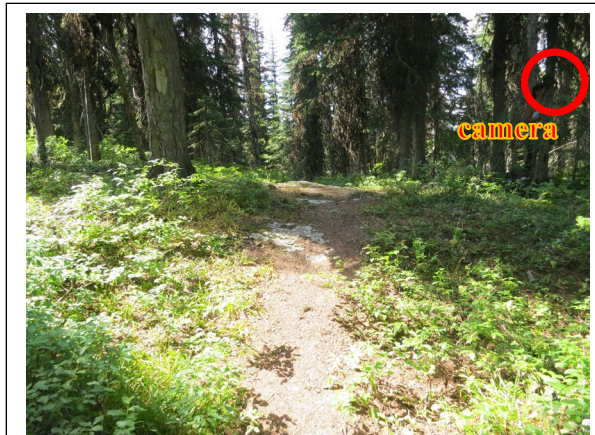
Gypsy Meadows 2020

The Gypsy Meadows site is located about 3.4 miles from the parking area that is also used to access the Boulder Lake site. Continuing up the trail from Boulder Lakes and past the turnoff on the left to the lake, the trail will take a series of switchbacks up the mountain. At the top of the mountain the PNNST will take an immediate right. Following this trail, there will be another fork in the trail, wherein the monitoring site is to the left. This part of the trail will start a descent down toward Gypsy Meadows. The 2020 trail camera and counter were set up shortly after crossing a stream and beginning another slight ascent.

Boulder Lake and Gypsy Meadow site parking



2020 counter location.



2020 camera location.

From June 24, 2020 through September 21, 2020, an estimated 43 trail visits were recorded at the Gypsy Meadows site. Figure 10.1 displays the daily trail visit counts for the Gypsy Meadows site.

Figure 10.2 shows the total weekly trail visits at the Gypsy Meadows site. The week with the highest use was July 6th-12th, with 13 trail visits total. A weekly average of 3.1 trail visits were recorded at the Gypsy Meadows site during the weeks monitored.

Figure 10.3 includes the daily average number of trail visits by the day of the week at the Gypsy Meadows site. The highest use days were Thursday, Sunday, and Saturday, with an average of 0.9, 0.7, and 0.6 visitors per day respectively.

Figure 10.4 shows the distribution of user types observed at Gypsy Meadows. The most common type of user observed at this site was overnight hikers, which composed about 50.0% of users. This was followed by day hikers, which made up 40.6% of the users at this site.

Figure 10.1 Gypsy Meadows Daily Trail Visit Counts

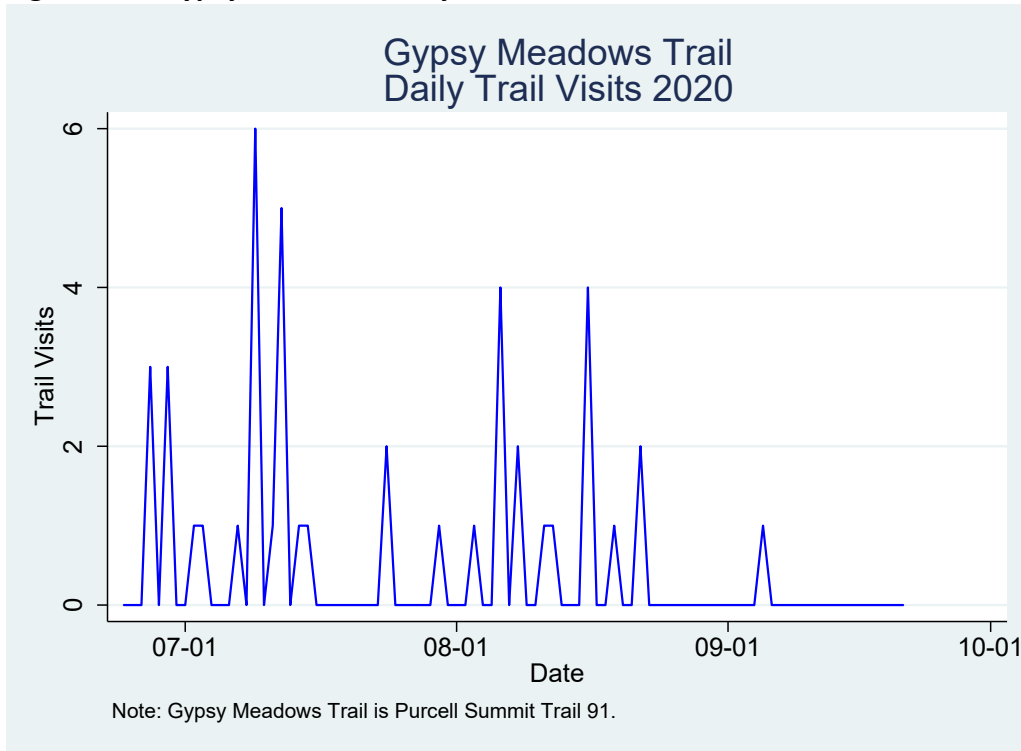


Figure 10.2 Gypsy Meadows Weekly Counts

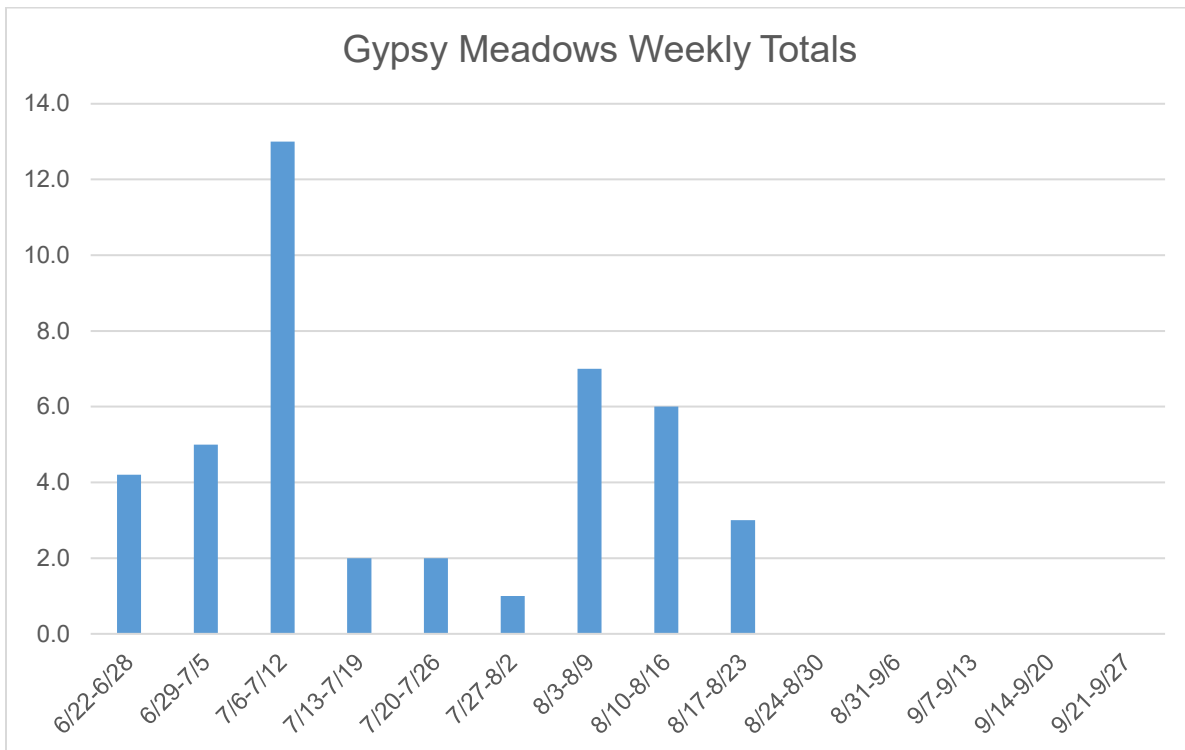


Figure 10.3 Gypsy Meadows Daily Averages by Day of the Week

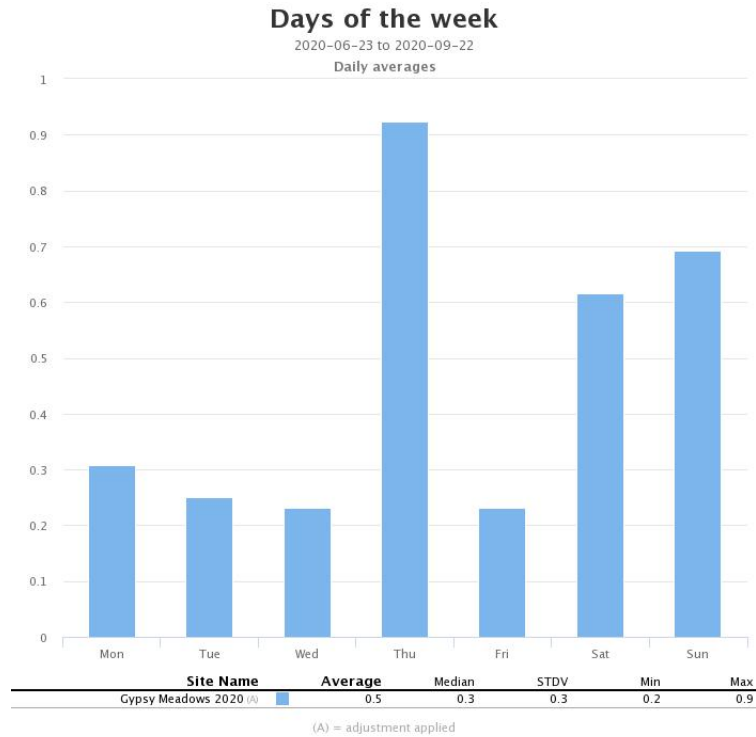
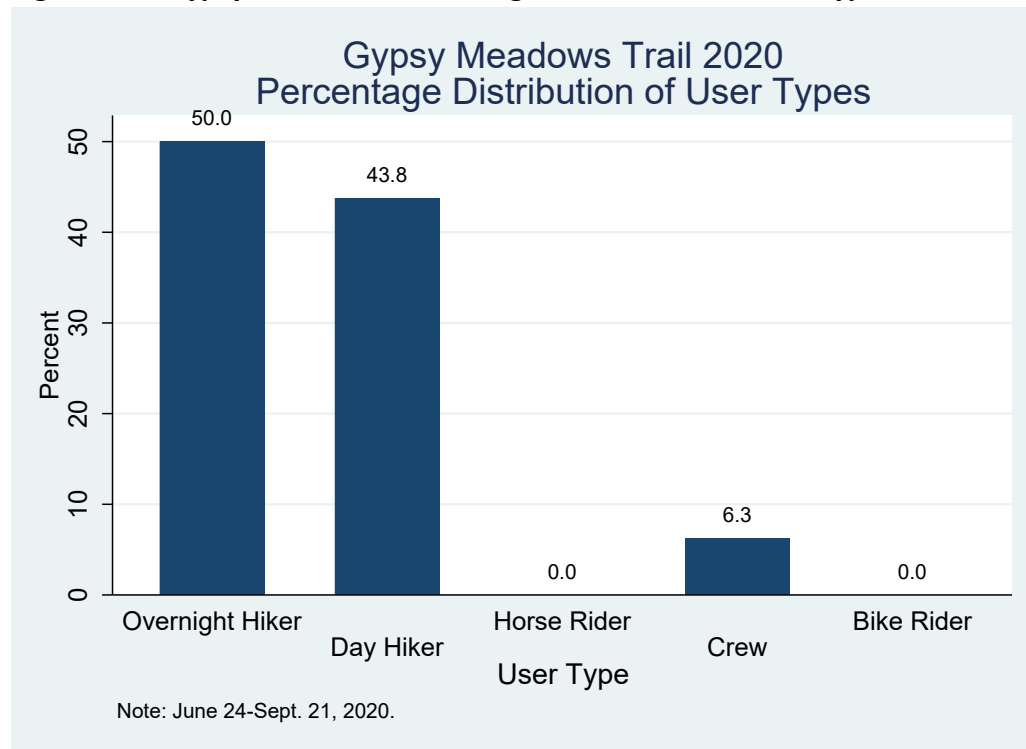


Figure 10.4 Gypsy Meadows Percentage Distribution of User Types



Vinal Creek 2020

The Vinal Creek monitoring site is not on the PNNST. The monitoring site is located on Vinal Creek Trail #9 and to the west of where the PNNST is co-located on this trail. Data presented for the Vinal Creek site is not PNNST use data.

Vinal Creek Trail #9 is part of the Vinal Creek/Mt. Henry National Recreation Trail. A portion of PNNST hikers may utilize the monitored section of the Vinal Creek #9 trail en route to stock up on supplies in Yaak, Montana, or to circumvent a section of the PNNST on Trail #41 between Fish Lakes and the Yaak River that climbs in elevation. Thus, the monitoring site may still provide useful information on some trail use patterns that are relevant to the PNNST. Additionally, Vinal Lake Trail #9 trail use from the trailhead to Fish Lakes is important to monitor for the Kootenai National Forest's grizzly bear management.

The start of Vinal Creek Trail #9 can be found on the east side of NF-746, off of CR 508. It is about 8 miles south of the Canadian border. The Vinal Creek monitoring site is located about 0.8 miles up from the trailhead. During 2020, the counter and camera were set up on the north side of the trail.

Vinal Creek Trailhead Parking





Looking to hiker's left. 2020 counter location.



Looking east. 2020 camera location.

From June 22, 2020 through September 21, 2020, an estimated 481 trail visits were recorded at the Vinal Creek site¹⁴. Figure 10.1 displays the daily trail visit counts for this site.

Figure 11.2 shows the total weekly trail visits observed at the Vinal Creek site. The week with the highest use was July 6th-12th, with this week having 55 trail visits. A weekly average of 32.2 trail visits were recorded at the Vinal Creek site during the weeks monitored.

Figure 11.3 includes the daily averages number of trail visits by the day of the week at the Vinal Creek site. The highest use days were Friday, Saturday, and Sunday. Friday and Saturday both had an average of 6.1 visitors per day, and Sunday had an average of 5.6 visitors daily. This trend suggests an increase in weekend use from day hikers.

Figure 11.4 shows the distribution of user types observed at Vinal Creek. The majority of users were day hikers, which composed about 71.5% of users. This was followed by overnight hikers, which made up 25.7% of the users at this site.

¹⁴ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 11.1 Vinal Creek Daily Trail Visit Counts¹⁵

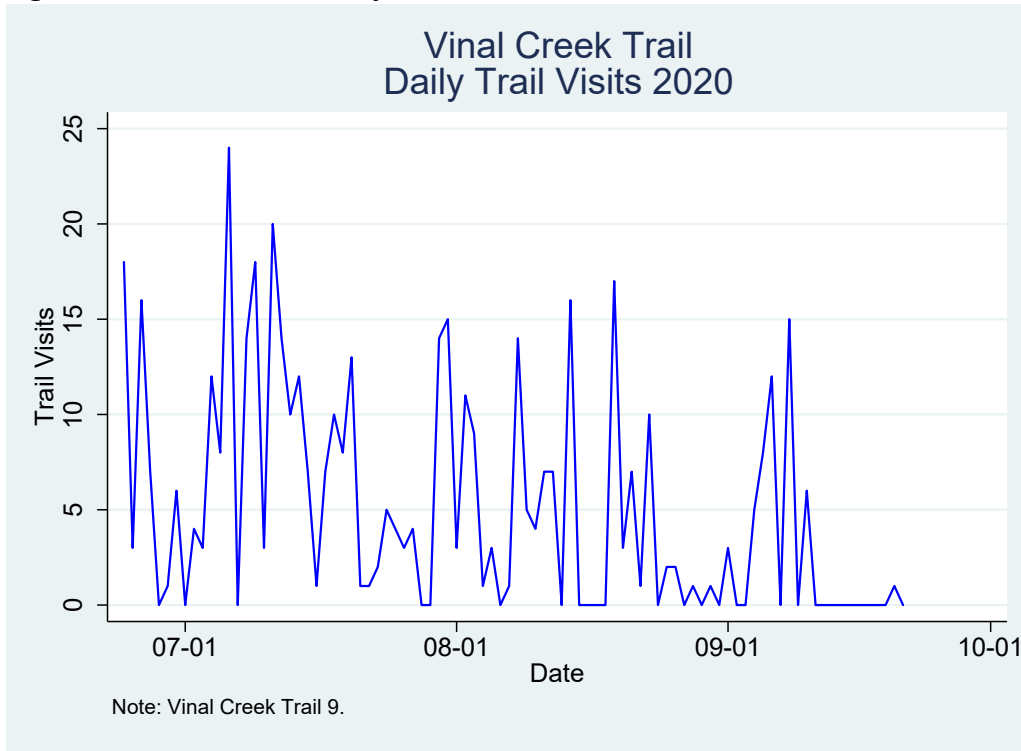
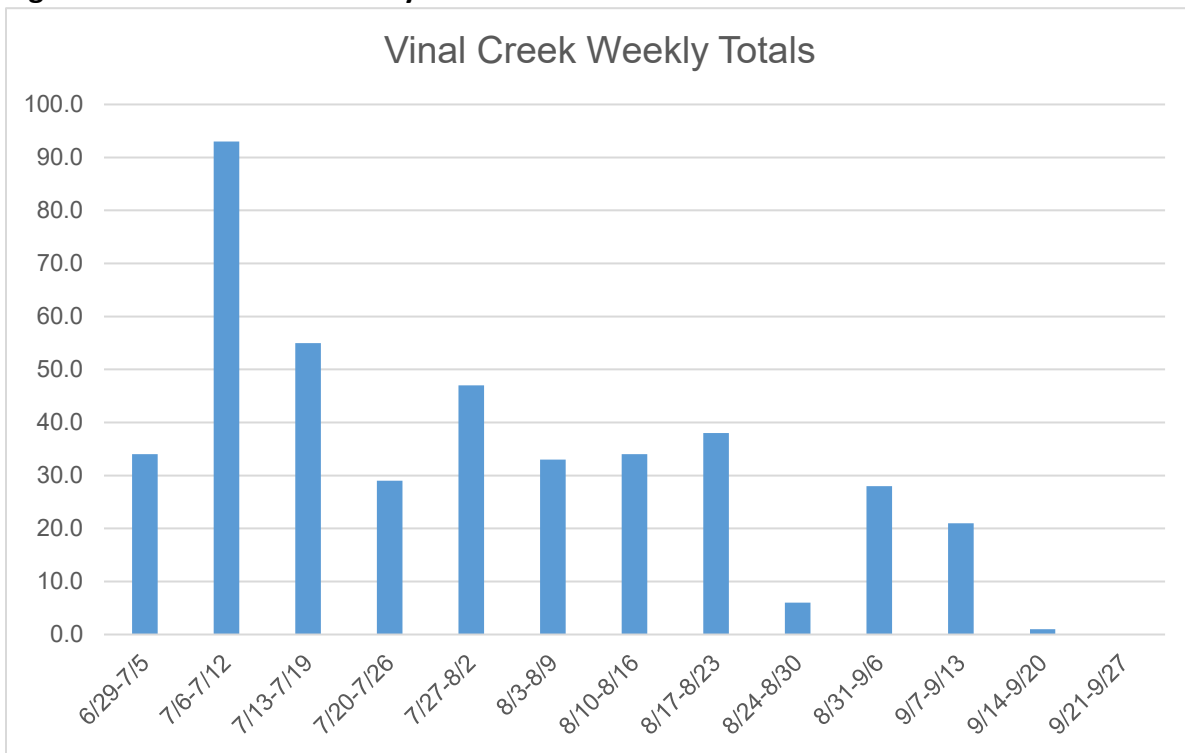


Figure 11.2 Vinal Creek Weekly Counts



¹⁵ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 11.3 Vinal Creek Daily Averages by Day of the Week¹⁶

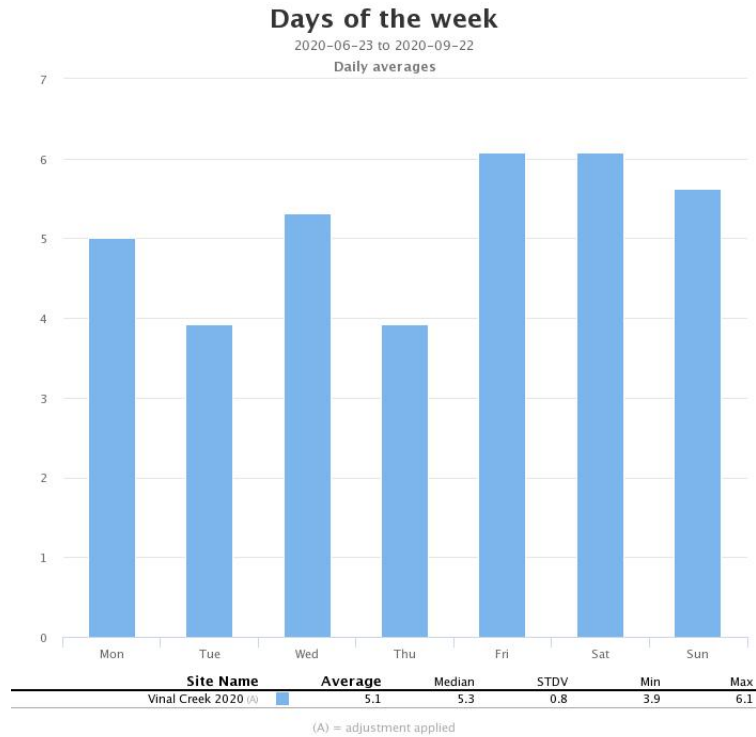
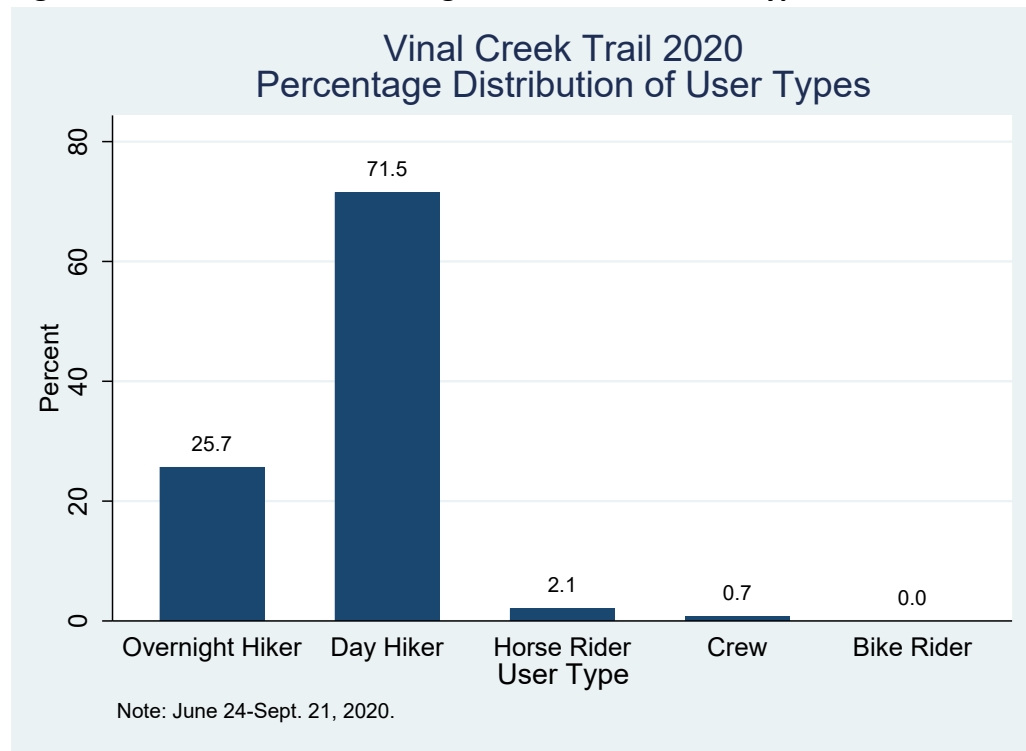


Figure 11.4 Vinal Creek Percentage Distribution of User Types



¹⁶ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Midge Creek 2020

Midge Creek Trail (#177) can be accessed from a trailhead found at the end of road NR-5902, on the south side. The Midge Creek site is about 0.6 miles from the start of the trail.



Looking west. 2020 counter and camera locations.

From June 23, 2020 through September 21, 2020, an estimated 84 trail visits were recorded at the Midge Creek site. Figure 12.1 displays the daily trail visit counts for Midge Creek.

Figure 12.2 shows the total weekly trail visits at the Midge Creek Site. The week with the highest use was July 6th-12th, with 26 trail visits. A weekly average of 6.0 trail visits were recorded at the Midge Creek site during the weeks monitored.

Figure 12.3 includes the daily averages number of trail visits by the day of the week at the Midge Creek site. The highest was Thursday, which had an average of 1.3 visitors per day.

Figure 12.4 shows the distribution of user types observed at Midge Creek. The most common type of user included day hikers, which composed about 51.9% of users. This was followed by overnight hikers, which made up 33.3% of the users at this site.

Figure 12.1 Midge Creek Daily Trail Visit Counts

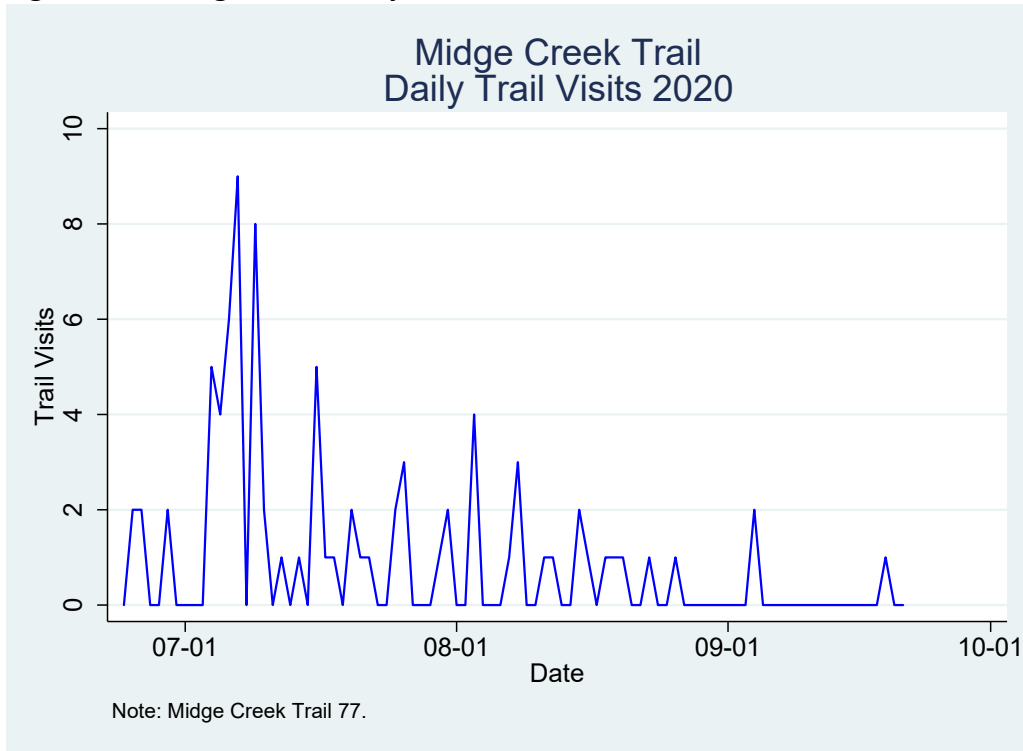


Figure 12.2 Midge Creek Weekly Counts

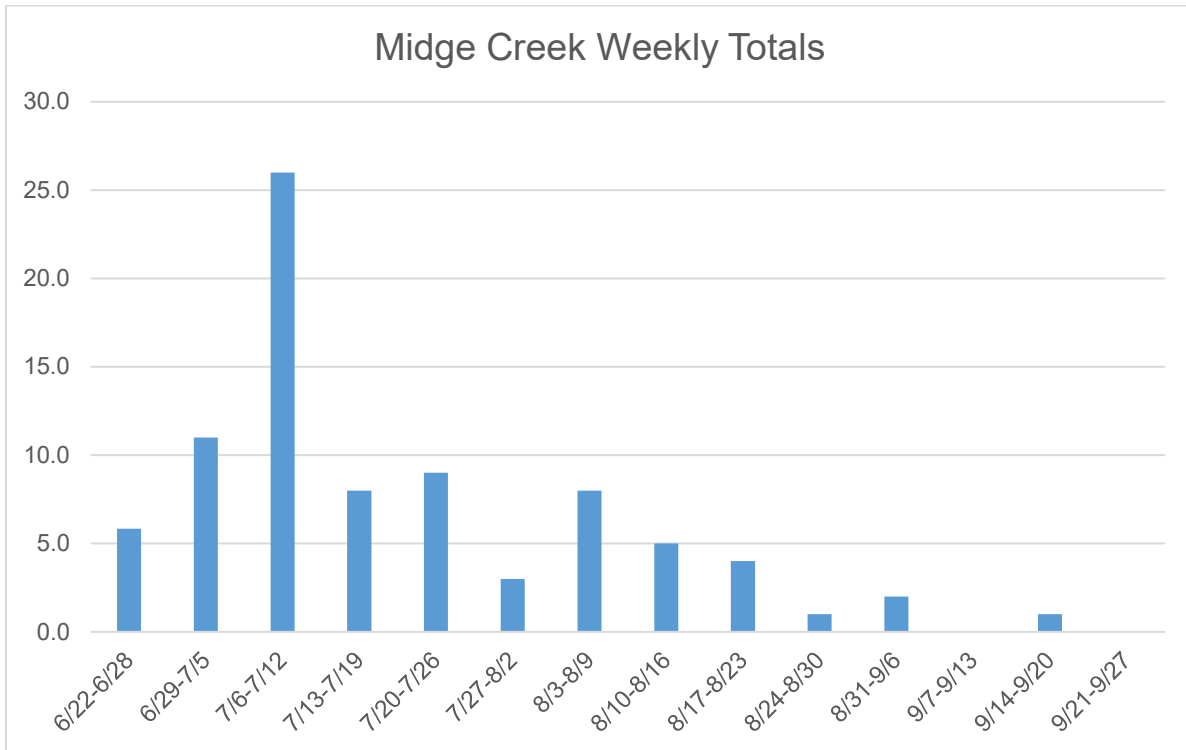


Figure 12.3 Midge Creek Daily Averages by Day of the Week

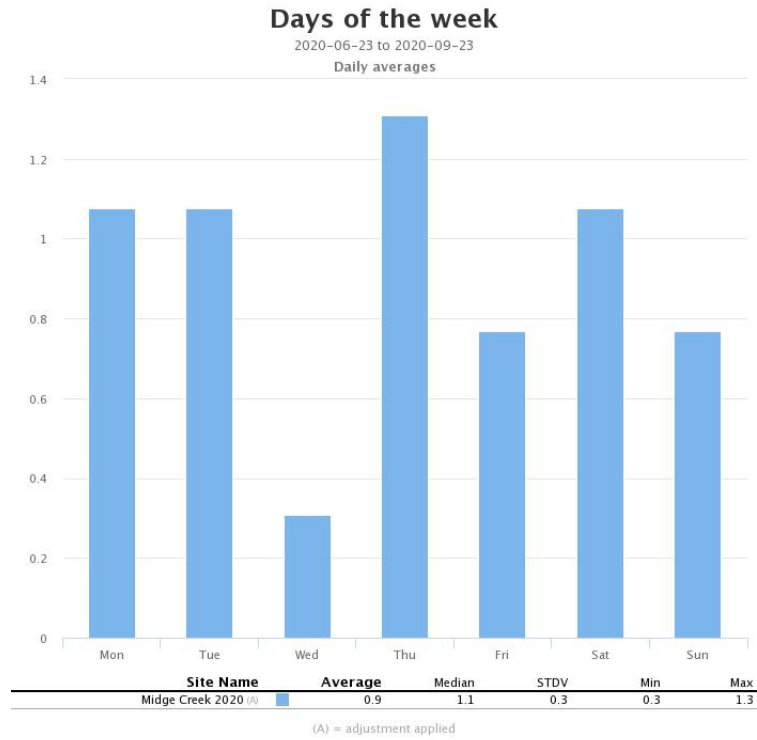
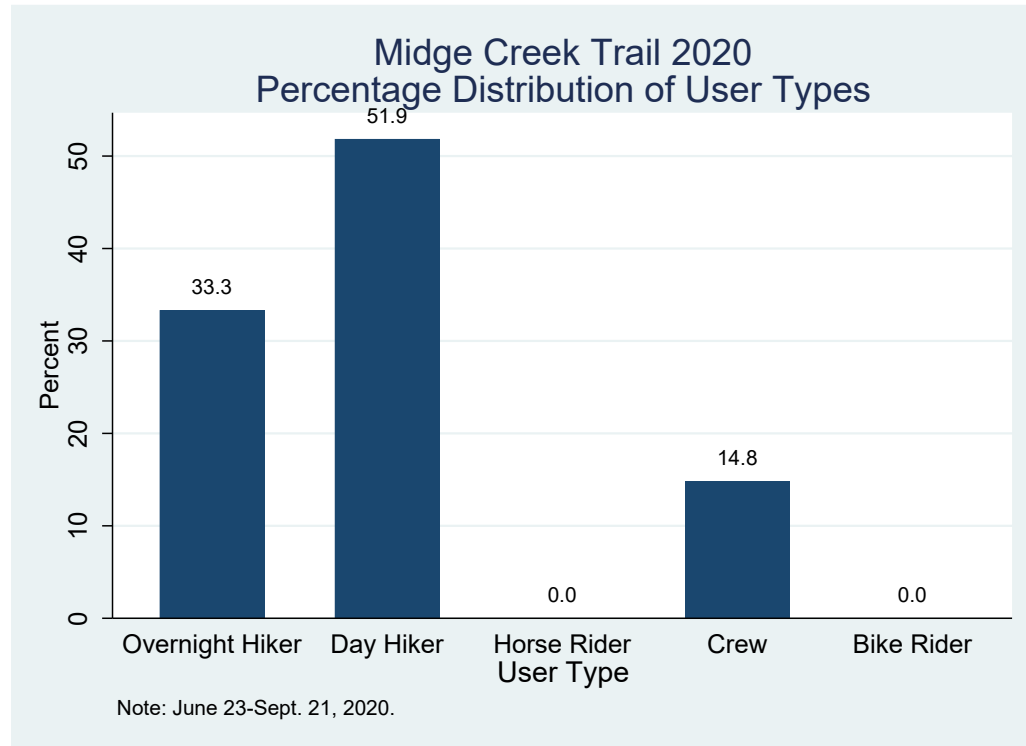


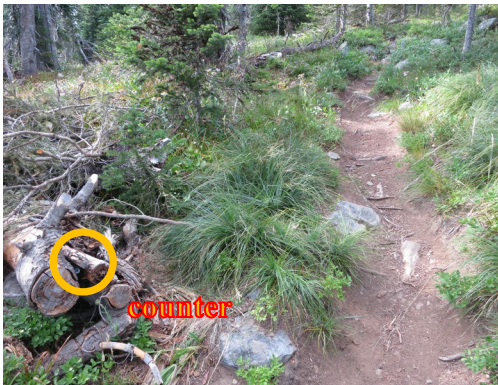
Figure 12.4 Midge Creek Percentage Distribution of User Types



Canuck Peak 2020

Canuck Peak Trail can be found by following Spread Creek Road (NF-4354 and 435) up to the summit, where the road then continues into Idaho. The trailhead is on the north side. The Canuck Peak monitoring site is located about 1.0 miles from the trailhead, relatively close to the summit.

Looking west. Canuck Peak Trailhead Parking



Looking north. 2020 counter location.



Looking south. 2020 Camera and counter location.

From July 10, 2020 through September 20, 2020, an estimated 77 trail visits were recorded at the Canuck Peak site. Figure 13.1 displays the daily trail visit counts for the Canuck Peak site.

Figure 13.2 shows the total weekly trail visits at the Canuck Peak Site. The weeks with the highest use were July 13th-19th and July 6th-12th, with 17 and 14 trail visits respectively. A weekly average of 6.3 trail visits were recorded at the Canuck Peak site during the weeks monitored.

Figure 13.3 includes the daily averages number of trail visits by the day of the week at the Canuck Peak site. The highest use day was Sunday, with an average of 1.8 daily visitors.

Figure 13.4 shows the distribution of user types observed at Canuck Peak. Day hikers and overnight hikers were equally common on this section of the trail, each composing about 46.7% of the users observed at Canuck Peak. The remaining users were crew, composing 6.7% of the user types noted.

Notably, this site's data may be assessed in relation to the Kootenai National Forest's trail registration card information for this location. According to this registration data, during 2020 there were likely around 47 thru hikers among 27 registered groups. Additional visitors submitted cards without indicating their party size, so total use is not known. In comparison, according to camera and counter data, there were an estimated 38 overnight hikers (46.7% of the 82 estimated trail users), a category that includes thru hikers (though thru hikers, in-and-out overnight hikers, and hikers traveling through a smaller portion of the trail could not be distinguished).

Figure 13.1 Canuck Peak Daily Trail Visit Counts

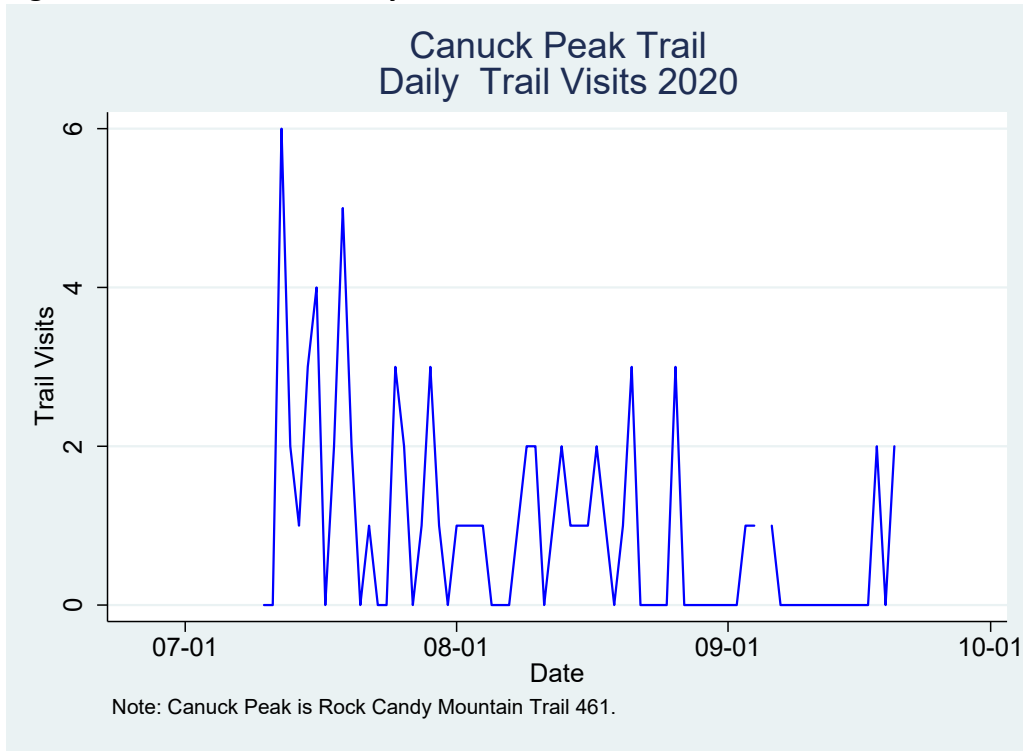


Figure 13.2 Canuck Peak Weekly Counts

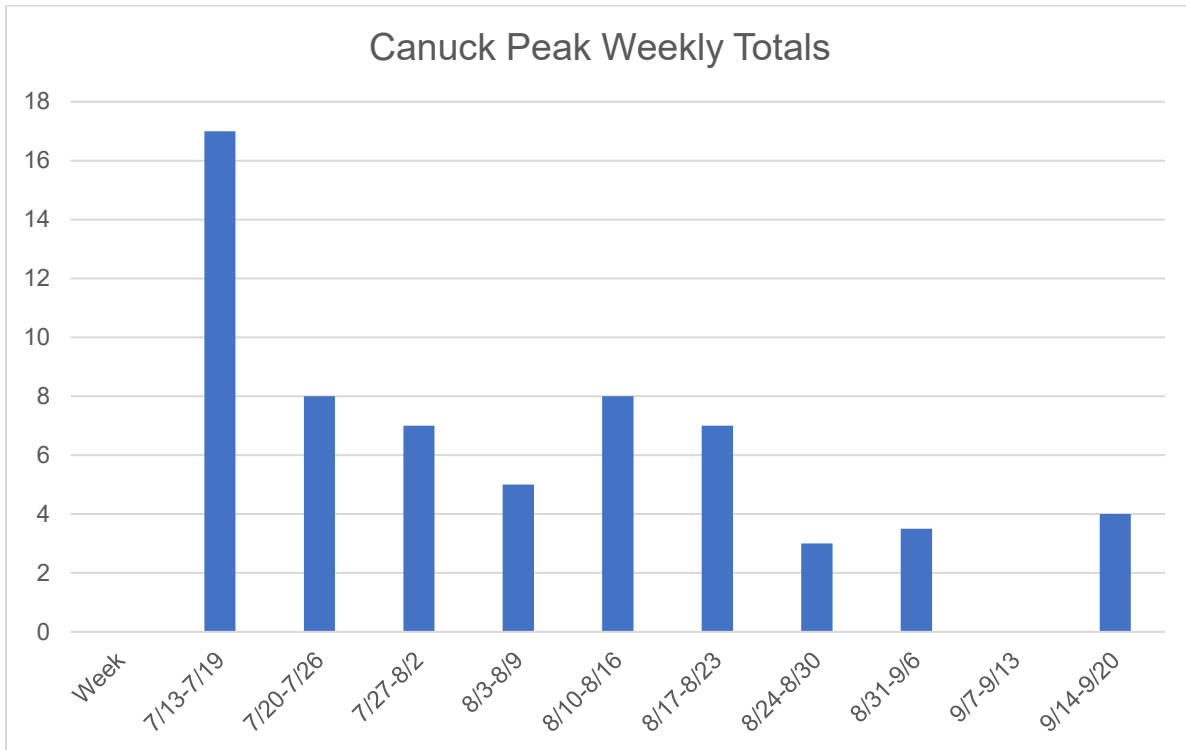


Figure 13.3 Canuck Peak Daily Averages by Day of the Week

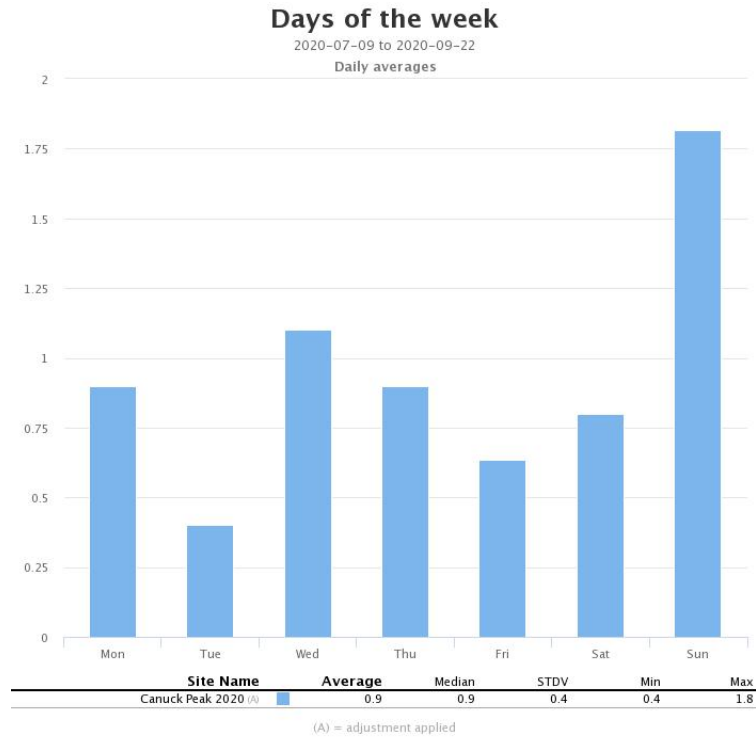
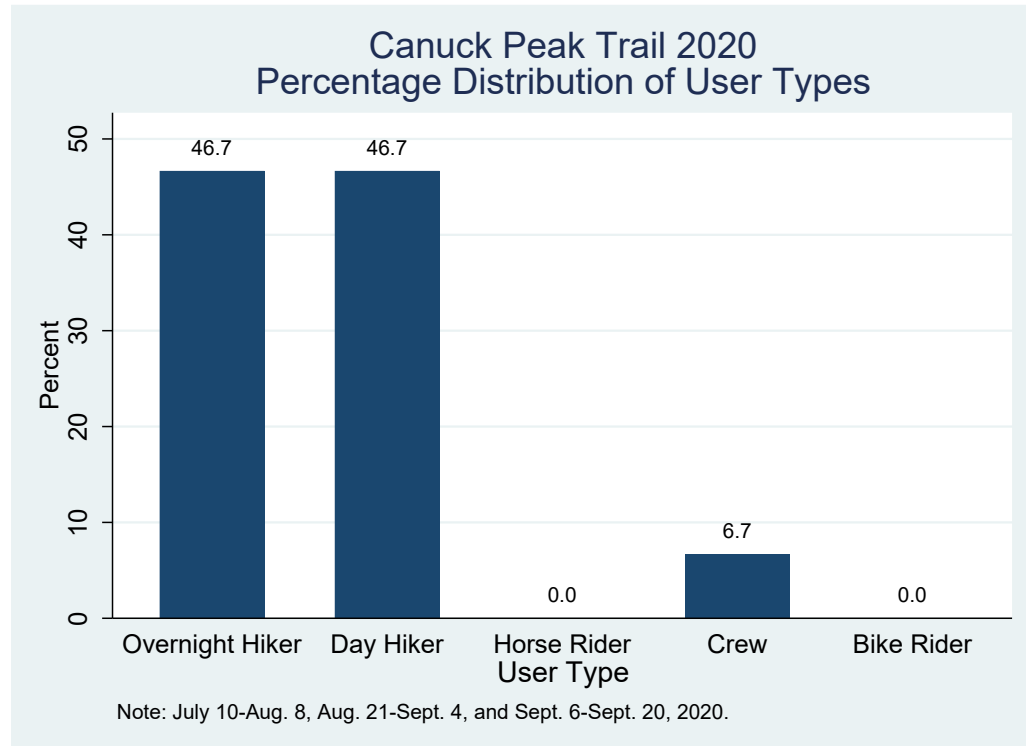


Figure 13.4 Canuck Peak Percentage Distribution of User Types



Comparison of 2017, 2018, 2019, and 2020

The following graphs compare use of trails between the past four monitoring seasons. The graphs separately depict the July, August, and September trail counts to allow for a more in-depth examination of use at each site within the month, compared between the years. Bluebird Lake trail has again been separated out due to its much larger counts relative to the other sites.

Because no calibration factors were available from 2017, the 2018 calibration factors have been applied to the 2017 data in these graphs. We applied new calibration factors to the 2019 data as well as the 2020 data. Comparison of the counts should be made with caution due to variations in the ability to determine accurate calibration factors for each year and individual sites. The accuracy of these factors may be influenced by factors such as the number of days monitored, cameras' minimal intervals, and researcher errors. However, it remains useful to compare these trends for overall patterns of use and changes over time, even if individual counts are estimates.

Additionally, when making these comparisons it is important to note that the calibration factors for 2017, 2018, 2019, and 2020 were calculated in somewhat different ways. Calibration factors for 2019 and 2020 accounted for all trail users (including overnight hikers, day hikers, horse riders, bike riders, and trail/administrative crew members). In contrast, 2018 data was calibrated only for day and overnight hikers (thus excluding trail/administrative crew members, horse riders, and bike riders). Therefore, while the percentage of trail users that were trail/administrative crew members, horse riders and bike riders is relatively small, comparisons between 2017, 2018, 2019, and 2020 are not entirely equivalent. Trail user estimates for 2017 and 2018 would likely be at least slightly higher than the reported hiking visit estimates.

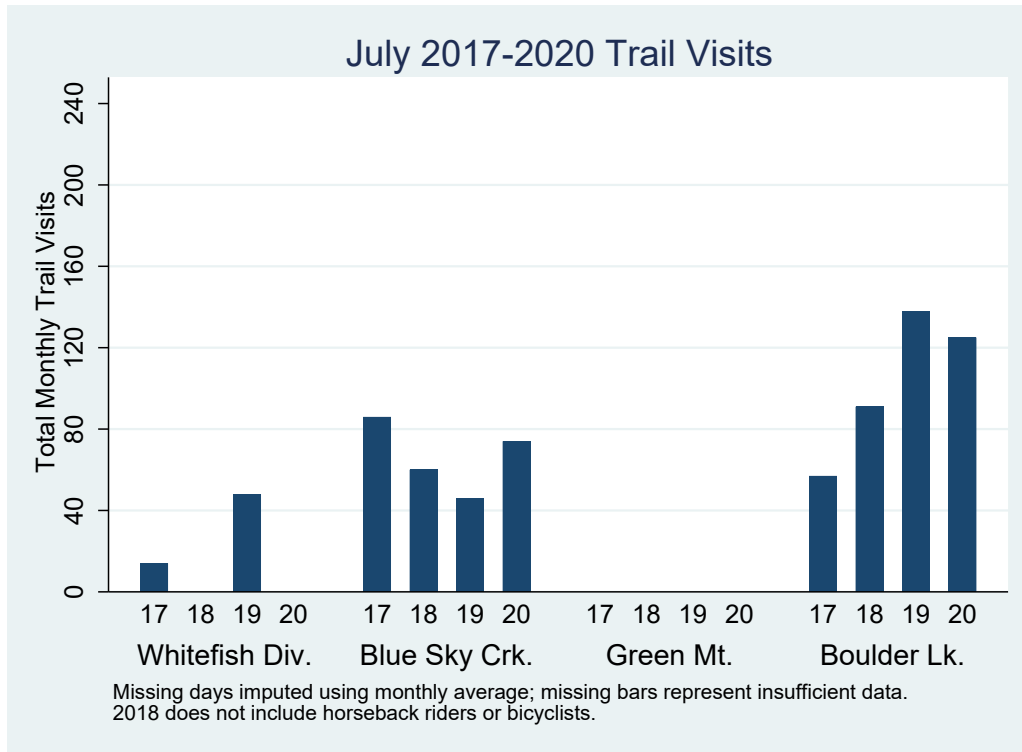
Figures 14 and 15 compare trail visit counts for each trail for July during 2017, 2018, 2019, and 2020. The 2018 counts in July are generally larger at each trail than in 2017, indicating an overall slight increase in use on these trails during July from 2017 to 2018. The Blue Sky Creek site does not follow this possible trend, demonstrating a slightly higher trail count in July 2017 than 2018. The 2019 counts in July differ between sites. In 2019, there appeared to be a decrease in use at the Blue Sky Creek, Canuck, and Garver sites and an increase in use at the Gypsy Meadows, Boulder Lake, Midge Creek, and Vinal Creek¹⁷ sites. However, these numbers remained relatively small. Notably, 2018 was a year with bad fire and smoke compared to 2019.

During the 2020 season, trail visits increased at Blue Sky Creek (though they did not reach 2017 numbers), Vinal Creek (where they nearly doubled, potentially due to its ease of access and COVID impacts on usual travel patterns), Midge Creek, and Canuck Peak. However, trail visits decreased in 2020 for Boulder Lake, and Gypsy Meadows.

¹⁷ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

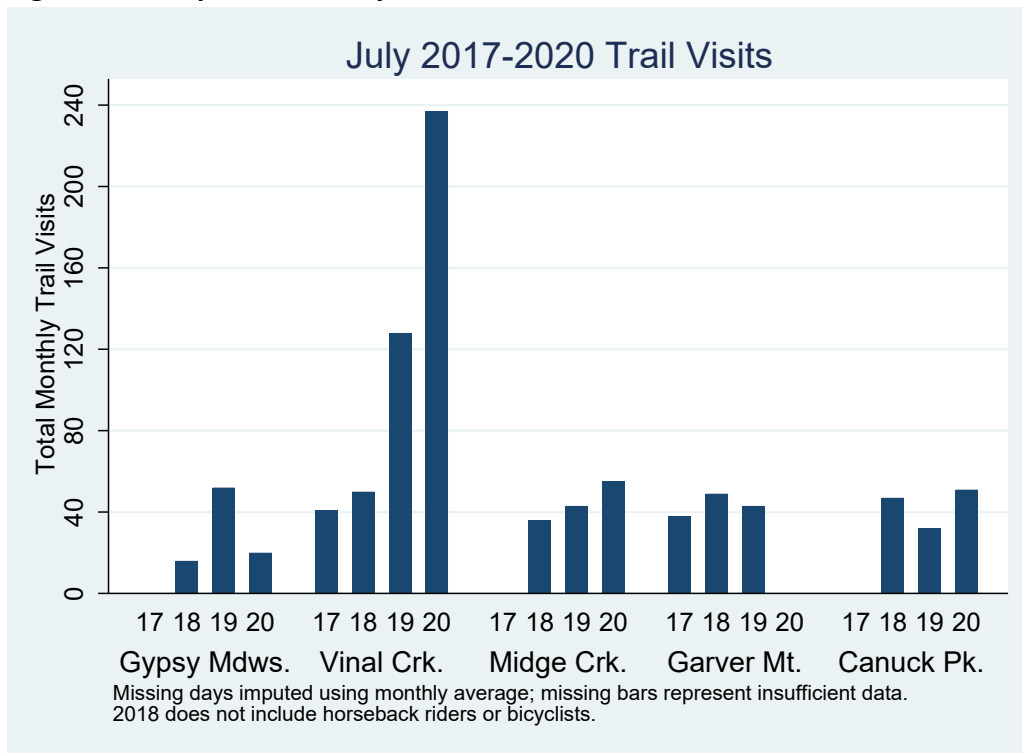
Comparing use over the past few years, Vinal Creek and Midge Creek appear to be undergoing consistent increases in visitor use. Boulder Lake may also be experiencing a trend of general growth over time. Alternatively, Blue Sky Creek, Gypsy Meadows, and Canuck Peak have more variable trends, with more fluctuating changes up and down from year to year.

Figure 14 Comparison of July Counts Between Sites: 2017, 2018, 2019, 2020¹⁸



¹⁸ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

Figure 15 Comparison of July Counts Between Sites: 2017, 2018, 2019, 2020¹⁹²⁰



¹⁹ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

²⁰ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 16 and 17 compare trail visit counts within each site for August during 2017, 2018, 2019, and 2020. Similar to July, the 2018 counts in August are also generally larger at each site than in 2017. The Boulder Lake site does not follow this possible trend because it exhibits a slightly higher trail count in August 2017 than 2018. The 2018 August counts for Garver Mountain, Gypsy Meadows, and Midge Creek were not included in figure 16 due to insufficient data and the Davis Fire, which required early removal of field equipment. Therefore, we cannot make inferences about how use at these sites compared between the other years of the survey.

There was a split in patterns of use between 2018 and 2019 at each of the sites. Whitefish Divide, Green Mountain, and Blue Sky Creek experienced less visitor use in August of 2019 than August of 2018. The 2019 August counts for Vinal Creek²¹, Canuck Peak, and Boulder Lake are larger than August counts for 2018.

Compared to 2019, during the 2020 season, trail visits increased at Blue Sky Creek (though they did not reach 2017 or 2018 numbers), Boulder Lake, Gypsy Meadows, and Vinal Creek. However, trail visits decreased in 2020 for Midge Creek, and Canuck Peak, compared to 2019.

Overall, comparing use over the past few years, Vinal Creek has experienced a consistent increasing trend in trail visits. Boulder Lake also appears to be exhibiting a trend of general growth for August use over time. Alternatively, Blue Sky Creek and Canuck Peak have more variable trends, with more fluctuating changes up and down from year to year.

²¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 16 Comparison of August Counts Between Sites: 2017, 2018, 2019, 2020²²



²² 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

Figure 17 Comparison of August Counts Between Sites: 2017, 2018, 2019, 2020²³²⁴



²³ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

²⁴ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figures 18 and 19 compare trail visit counts within each trail for September during 2017, 2018, 2019, and 2020.

During 2020, estimated trail visit counts increased for Blue Sky Creek, Vinal Creek²⁵, and Canuck Peak. Alternatively, while September counts increased from 2017-2019 at Boulder Lake, in 2020 counts at this site decreased. September counts also decreased from 2019 to 2020 at Gypsy Meadows and Midge Creek. However, fires in the region during the early part of September 2020 may have significantly impacted counts for the month.

Figure 18 Comparison of September Counts Between Sites: 2017, 2018, 2019, and 2020²⁶



²⁵ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

²⁶ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

Figure 19 Comparison of September Counts Between Sites: 2017, 2018, 2019, and 2020²⁷²⁸



²⁷ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

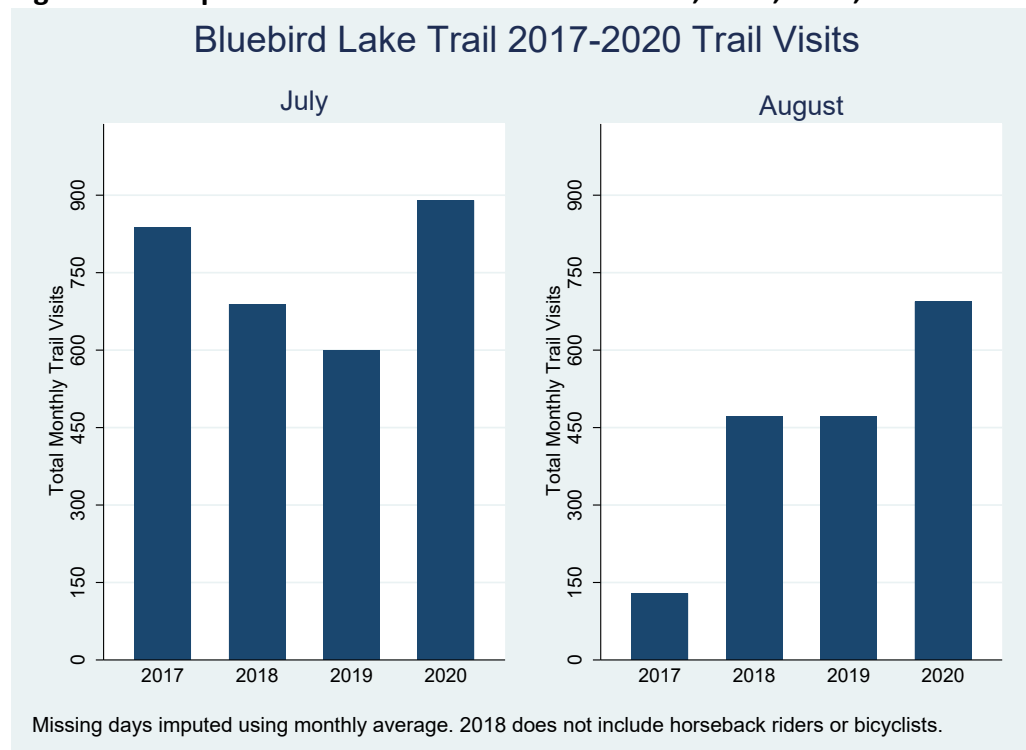
²⁸ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

As mentioned earlier in the report, Bluebird Lake exhibits an average daily and monthly count that is much higher than the rest of the monitored sites.

During 2020, the total count of trail visits at Bluebird Lake was 890 in July and 694 in August, for a total of 1584 for the two months combined. This is an increase from both 2019 and 2018, when the months of July and August had cumulative counts of 1071 and 1161 respectively. Although 2018 and 2019 showed a decrease in visitor use during the month of July compared to 2017, this number increased to a new recorded high in 2020. Additionally, use in August has generally increased in the observed years. Overall, visitor use at Bluebird Lake during the peak hiking season has grown between 2019 and 2020 (Figure 20).

Bluebird Lake also continues to be the most popular trail out of the sites monitored. For comparison, the trail with the next highest use in 2018 was Boulder Lake (with 137 counts in July and August), the trail with the next highest use in 2019 was Vinal Creek (which had a total count of 292), and the trail with the next highest use in 2020 was Vinal Creek (with a total count of 364 over the two months).

Figure 20 Comparison of Use in Bluebird Lake: 2017, 2018, 2019, and 2020²⁹



²⁹ 2017 and 2018 calibration factors accounted for only hikers (including day and overnight), while 2019 and 2020 calibration factors accounted for all trail users.

Comparison of 2019 and 2020 User Types

Figure 21.1 shows the distribution of user types observed at Blue Sky Creek over 2019 and 2020. The most common type of user for both years included day hikers, followed by overnight hikers. However, the percentage of both of these types of users decreased from 2019 to 2020.

Figure 21.1 Blue Sky Creek Percentage Distribution of User Types 2019 vs 2020

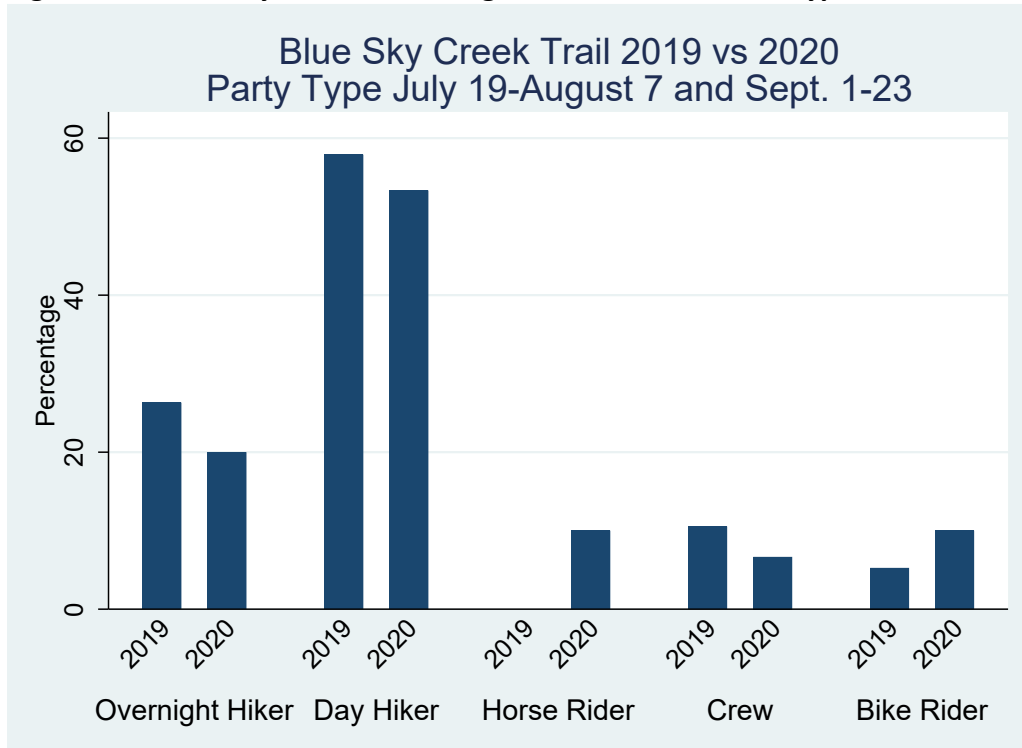


Figure 21.2 shows the distribution of user types observed at Bluebird Lake over 2019 and 2020. The most common type of user for both years included day hikers, at nearly 80% for both years. This was followed by overnight hikers, with nearly 20% of users being overnight hikers for both 2019 and 2020.

Figure 21.2 Bluebird Lake Percentage Distribution of User Types 2019 vs 2020

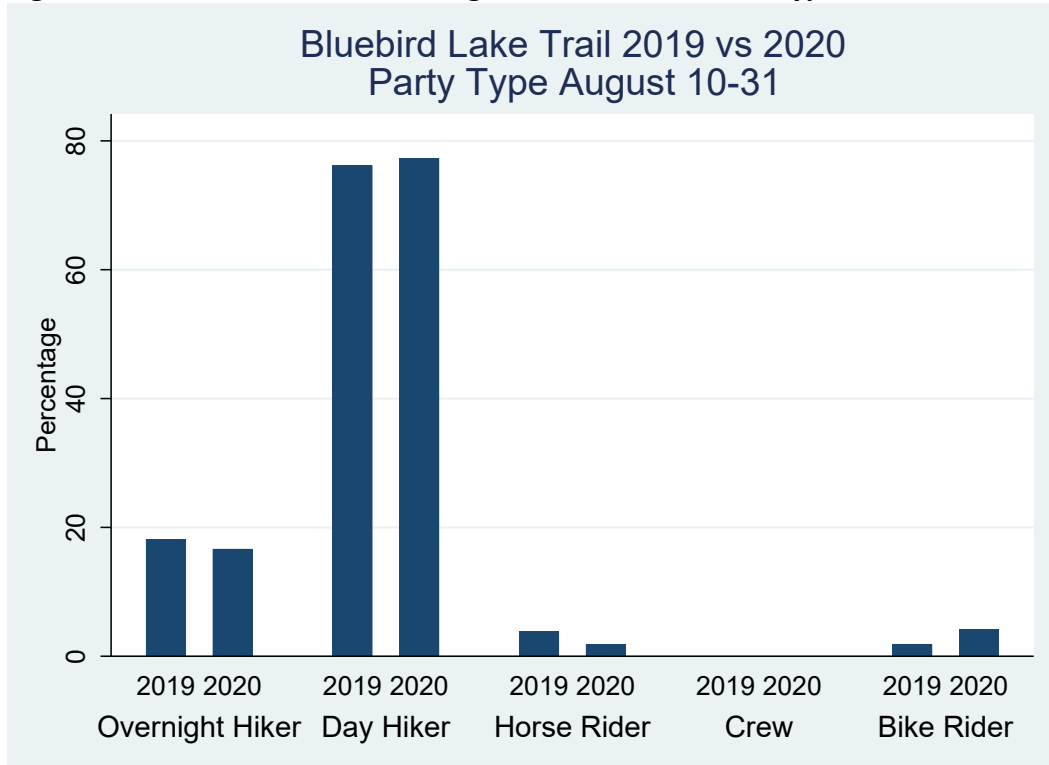


Figure 21.3 shows the distribution of user types observed at Boulder Lake over 2019 and 2020. The most common type of user during 2019 was overnight hikers, though this percentage was closely followed by day hikers, with both types making up nearly 50% of users. In contrast, in 2020, day hikers made up a majority of the users observed at this site, with over 60% of users being day hikers.

Figure 21.3 Boulder Lake Percentage Distribution of User Types 2019 vs 2020

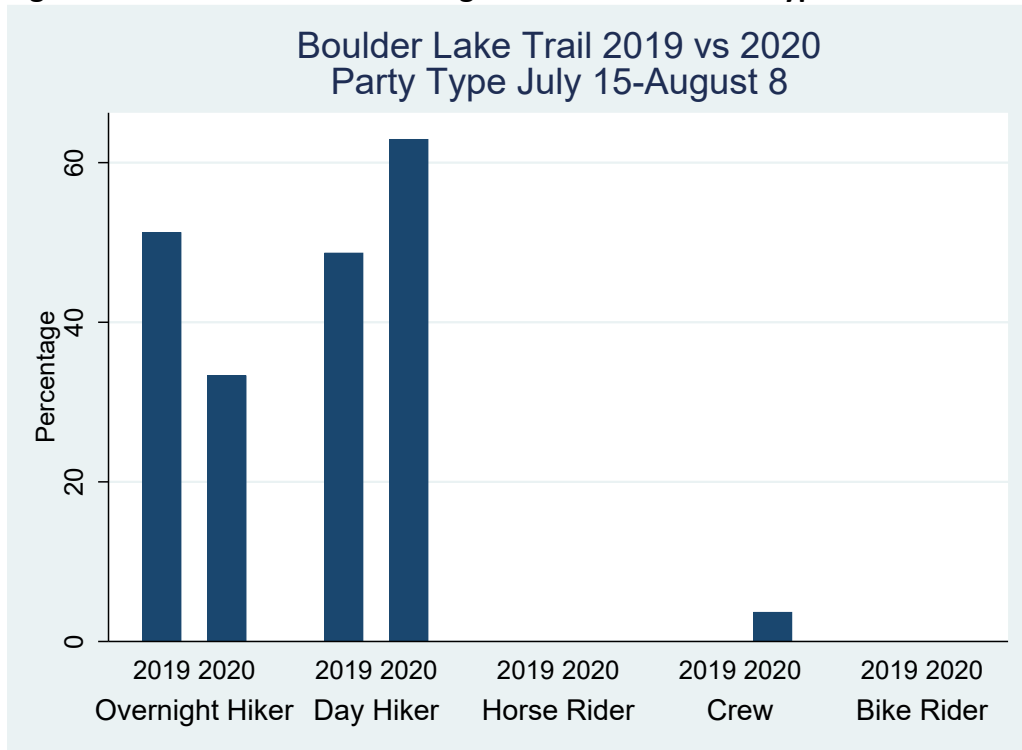


Figure 21.4 shows the distribution of user types observed at Gypsy Meadows over 2019 and 2020. The most common type of user, by far, during 2019 was overnight hikers, with nearly all users being overnight hikers during this year. In contrast, during 2020, most hikers at Gypsy Meadows were day hikers, with over 60% of users being day hikers, and over 20% being overnight hikers.

Figure 21.4 Gypsy Meadows Percentage Distribution of User Types 2019 vs 2020

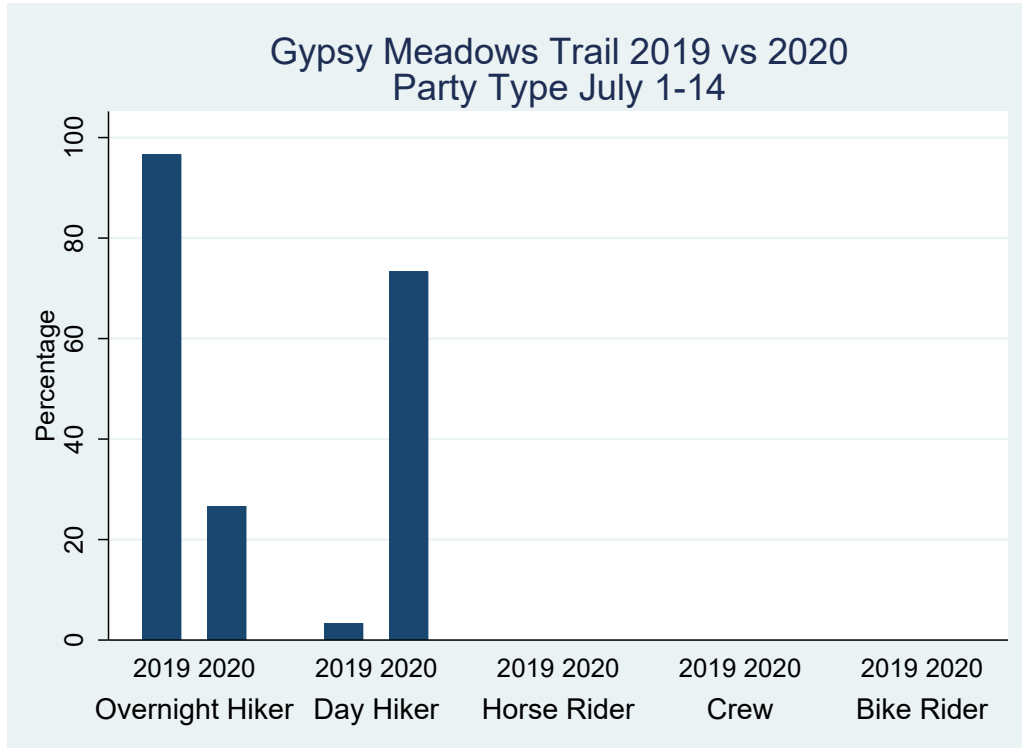
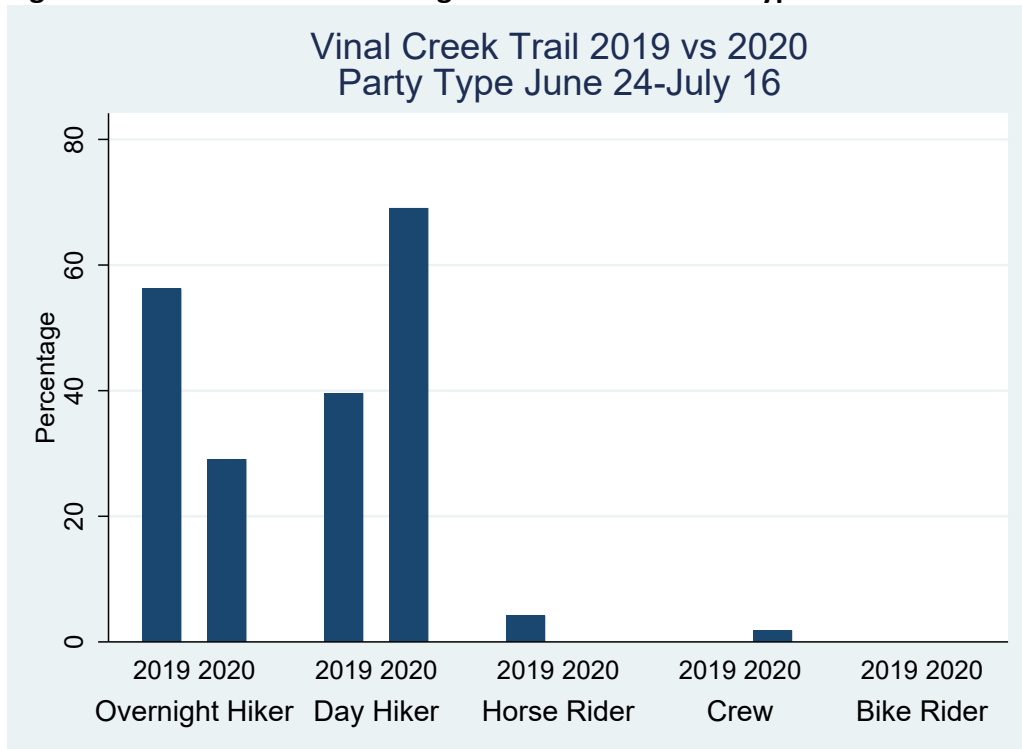


Figure 21.5 shows the distribution of user types observed at Vinal Creek³⁰ over 2019 and 2020. The most common type of user during 2019 was overnight hikers, with nearly 60% of users at this site being overnight hikers. However, during 2020, the most common type of user included day hikers, which made up over 60% of users at this site.

Figure 21.5 Vinal Creek Percentage Distribution of User Types 2019 vs 2020



³⁰ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 21.6 shows the distribution of user types observed at Midge Creek during 2019 and 2020. The most common type of user observed at this site for both 2019 and 2020 was overnight hikers. However, the percentage of overnight hikers dropped from over 80% to a bit over 40% from 2019 to 2020. The percentage of day hikers increased from under 10% to over 20% between 2019 and 2020. Additionally, the percentage of crew members observed increased from under 10% to nearly 40% from 2019 to 2020.

Figure 21.6 Midge Creek Percentage Distribution of User Types 2019 vs 2020

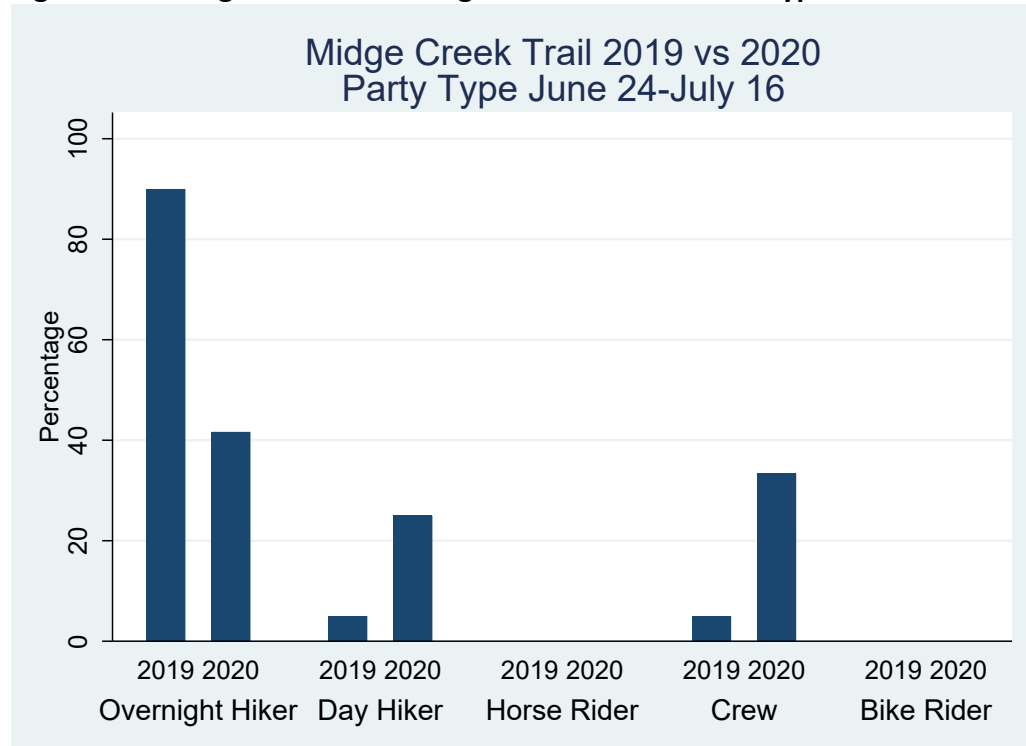
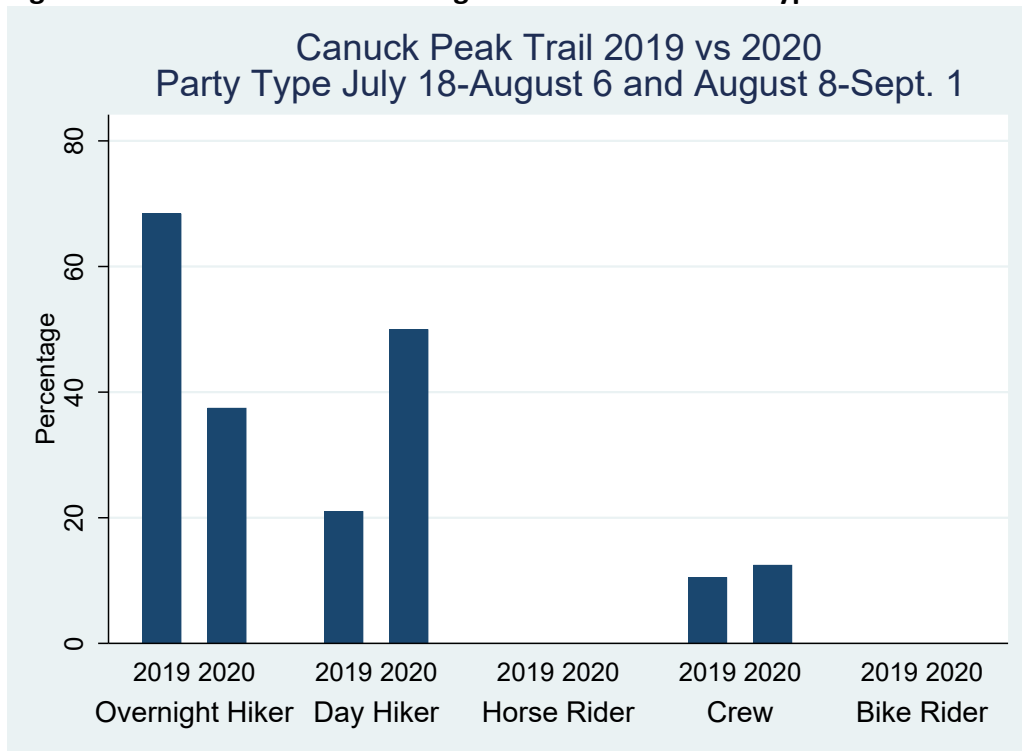


Figure 21.7 shows the distribution of user types observed at Canuck Peak during 2019 versus 2020. The most common type of user observed at this site for 2019 was overnight hikers, with over 60% of users at this site being overnight hikers during this year. In contrast, during 2020, day hikers were the most common type of user at this site, with around 50% of users being day hikers. The second most common type of user during 2019 was day hikers, followed by crew members. The second most common type of user in 2020 was overnight hikers, and crew members were also the third most common type of user for 2020.

Figure 21.7 Canuck Peak Percentage Distribution of User Types 2019 vs 2020



Recommendations and Reflections

Field Work

- During the 2020 field season the number of cameras being used increased from 6 cameras rotated between 10 sites in 2019, to 7 cameras for 7 sites, which allowed for a camera to be set up at each of this year's locations for the entirety of the monitoring season's duration. This increased the ease and efficiency of data collection and analysis and allowed for a larger sample of dates to be used for data calibration.
- The field season was able to begin in mid-June and extend into mid-September. Start and end dates were influenced by trail conditions, with snow limiting access to some sites in the early season, and wildfires influencing air quality later in the season.
- There were no errors in counter data this year and no cameras were stolen, which provided us with near complete representations of use at each site.
- As most of the trails were monitored from mid-June to mid-September and there were few gaps in the data, there were many days of data to calibrate. However, like last year, there was still quite a big difference between the counter and camera data. The calibration factors for the majority of the counters look similar to the ones in 2019 (see Appendix B) and the research team would like to continue improving on the precision of the calibration methods.
- Since cameras were not rotated between the various sites during the 2020 monitoring period, unlike in previous years, we were able to better extrapolate some trends regarding specific types of visitor use (user type and party type) and their corresponding frequency at each site.

Specific Sites

- We were able to improve on our data collection from the 2018 survey due to an absence of wildfires in the area of our sites. The Davis Fire in 2018 prompted the removal of field equipment at the Garver Mountain and Midge Creek sites in early August, which prevented insight into possible peak season use. A field season with limited wildfires allowed us to include sites like Garver Mountain and Midge Creek in cumulative graphs representing comparisons of use in peak seasons across all sites in 2019 (see Figure 1 and Figure 2) and throughout all years.
- During 2019, a hidden and locked camera was stolen from its location at the Vinal Creek³¹ site mid-season. The research team placed another camera in a different

³¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

location on the trail that was more hidden from plain-view. The relocated camera was not stolen and no cameras were stolen during the 2020 field season (though some were investigated by passer-byers). The research team continues to be concerned about the efficacy of the safety lock system in protecting the cameras from potential theft. For sites that are more frequently used, manual calibration by a researcher may be a more appropriate option than a camera. If there are some sites that are particularly hard to hide a camera or appear more vulnerable to theft, the research team may have to forgo cameras at those sites or consider changing the sites for long-term monitoring.

- New cameras purchased for the 2020 field season were particularly susceptible to motion-activated photo-capture in response to foliage movement. For sites like Canuck Peak, where the counter location is in a more open area with more wind movement, the camera regularly took thousands of photos in reaction to moving branches, even when moved around within the vicinity to have slightly different vantage points.

Future Research

- Some possible explanations for the difference in counter and camera data at some sites could be that the infrared cameras take photos every five seconds (the minimum setting), which is too long to capture quick hikers and thus, the cameras do not take these hikers into account. This year, some sites had new cameras, which had a shorter interval of 0 seconds, which may have been able to better capture hikers that were moving quickly. Thus, new cameras may be able to provide more accurate camera data for comparison to counter data, which may yield more accurate calibration factors and trail use estimates for these monitoring sites, though the significance of these potential differences is not known.
- To gain a better understanding of types of users, their travel patterns, and their experience, it is recommended that a short questionnaire be administered by part of the research team at select locations throughout the field season in 2021. This could also be administered using a QSR code that is posted at select trailheads and ranger stations.
- In future reports party size is to be measured as the number of individuals that appear to be traveling together (based on being the same user type and traveling in the same direction) that pass by the camera within two minutes of each other, such that there is at least 2 minutes between one party and the next. These measures will be used to calculate the number of parties using each trail per week in order to assess disturbance patterns. Sites in the Cabinet Yaak Ecosystem (including Boulder Lake, Canuck Peak, Vinal Creek³², Gypsy Meadows, and Midge Creek) are to be prioritized for party size measurements due to management needs.

³² The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

- In order to better understand disturbance patterns related to trail use it is recommended that the research team could engage in systematic trail observations of characteristics like anthropogenic noise. Trail observations could be prioritized, and would be more feasible, for more high use sites such as Bluebird Lake or Vinal Creek³³.
- The 2021 field season is to include Canuck Peak, Vinal Creek, Blue Sky Creek, and Whitefish Divide (last monitored in 2019) as repeat monitoring locations. Additionally, three new Idaho monitoring locations will be added along the PNNST, including sites on the trails near Brush Lake, Lower Parker Ridge, and Pyramid-Ball Lake. Expanding field sites into the Idaho portion of the PNNST will allow for greater understanding of trends in recreational use on the various portions of the PNNST and allow researchers to work with additional managers beyond Montana. In later years, Bluebird Lake may be included again on a rotational basis.

³³ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Appendix

Appendix A. Comparison of 2019 and 2020 Party Sizes

Party size was determined for the 2020 field season using camera data observations. Individuals were assessed as being in the same party if they were of the same user type (overnight hiker, hiker, horse rider, crew member, or bike rider), traveling in the same direction on the trail, and passed the camera within 30 seconds of each other. This was a pilot method developed by the research team for analysis this year. In future reports party size is to be measured as the number of individuals that appear to be traveling together (based on being the same user type and traveling in the same direction) that pass by the camera within two minutes of each other, such that there is at least 2 minutes between one party and the next.

Figure 22.1 shows the approximate percentage distribution of party sizes that were using Blue Sky Creek Trail for 2019 versus 2020. During 2020 most of the trail users at this site appeared to be traveling solo, with 57.3% of the parties having only one individual. An additional 34.1% of the traveling in pairs. This is similar to the trends seen in 2019, as during both years most of the users on this trail appeared to be traveling solo, with the next most common party size including two individuals. However, there was a decrease in the percentage of solo users from 2019 to 2020, and an increase in pairs of users as well as groups of 3 in 2020.

Figure 22.1 Blue Sky Creek Percentage Distribution of Party Size 2019 vs 2020

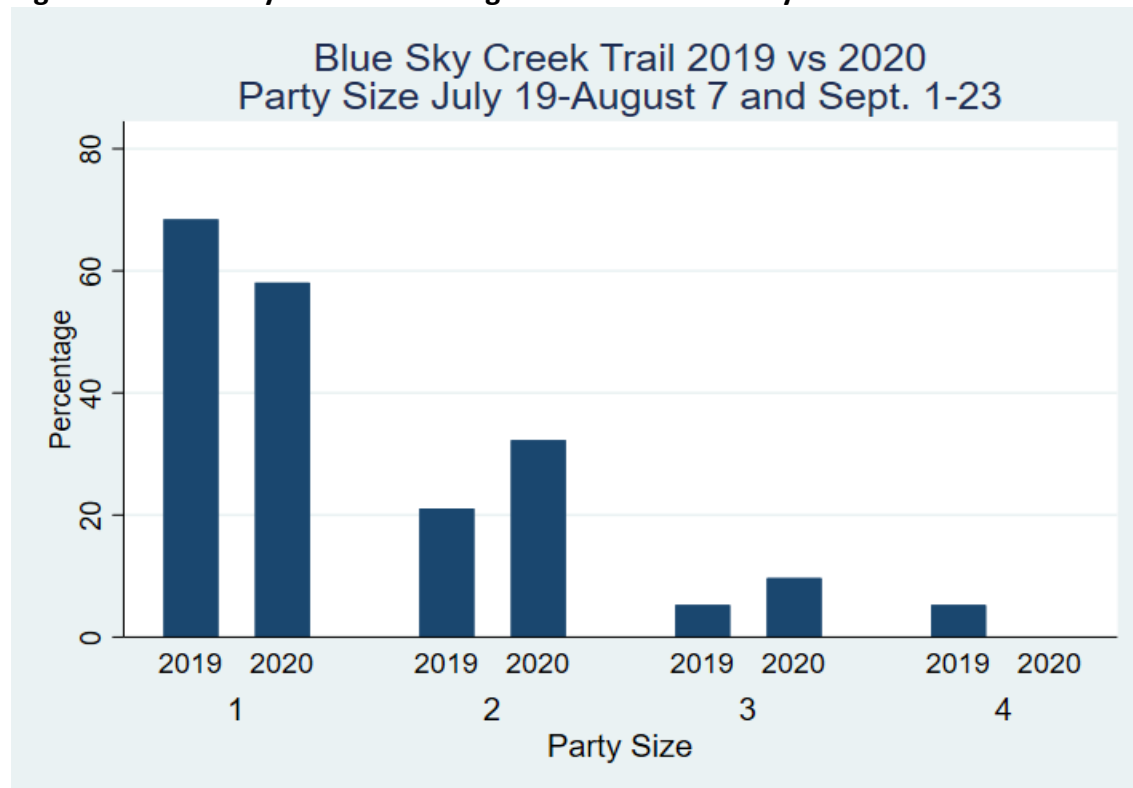


Figure 22.2 shows the approximate percentage distribution of party sizes that were using Bluebird Lake Trail during 2019 versus 2020. During 2019, both solo and pairs of hikers made up a large portion of the parties observed, with each party size making up nearly 40% of the observed parties. However, in 2020, solo hikers were quite a bit more common than pairs of hikers, making up 50.6% of the parties seen, whereas pairs composed 28.8% of the parties. Groups of 3 were the third most common party size for both 2019 and 2020. Additionally, during 2020, there was a more notable spread of party sizes at this site, with some larger groups.

Figure 22.2 Bluebird Lake Percentage Distribution of Party Size 2019 vs 2020

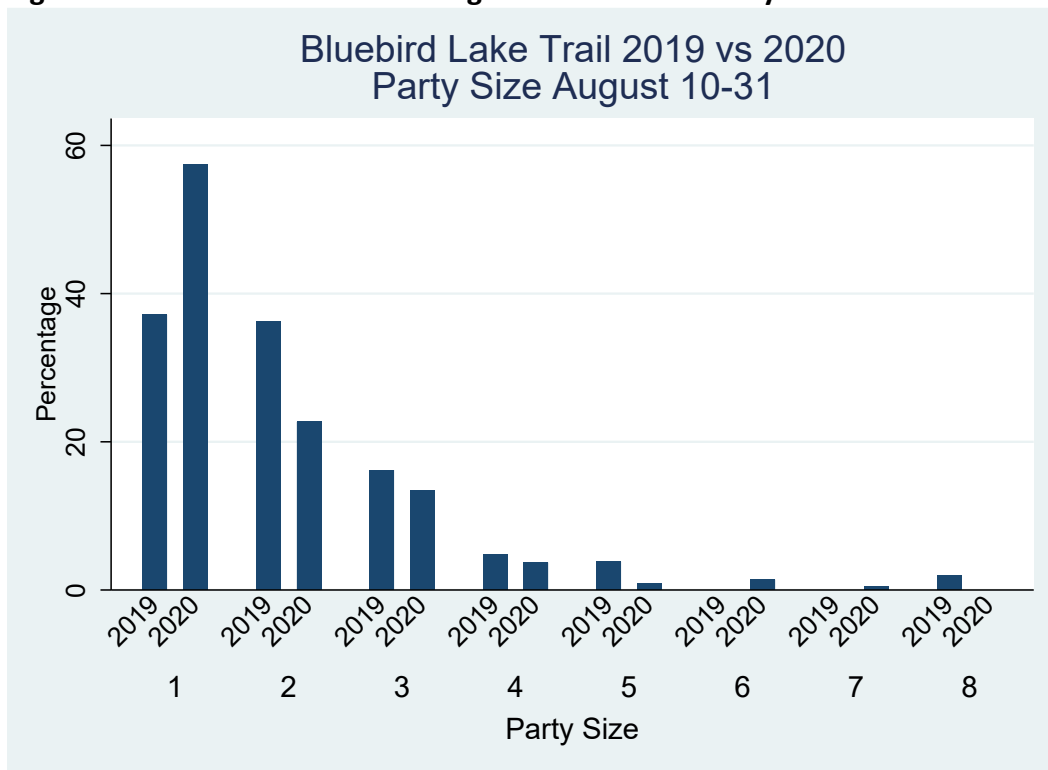


Figure 22.3 shows the approximate percentage distribution of party sizes that were using Boulder Lake Trail during 2019 compared to 2020. During both 2019 and 2020, solo hikers were the most common party size, followed by pairs of hikers. However, solo hikers increased from 2019 to 2020, with 41.2% of the parties observed at this site traveling solo during 2020. Additionally, pairs of hikers decreased from 2019 to 2020, with 29.4% of the parties in 2020 traveling in pairs. For 2020, there were also more large parties at this site than others, with approximately 11.8% of parties being composed of five or more individuals and a maximum party size of 16 people. About 14.7% of the parties at this site appeared to include families with kids.

Figure 22.3 Boulder Lake Percentage Distribution of Party Size 2019 vs 2020

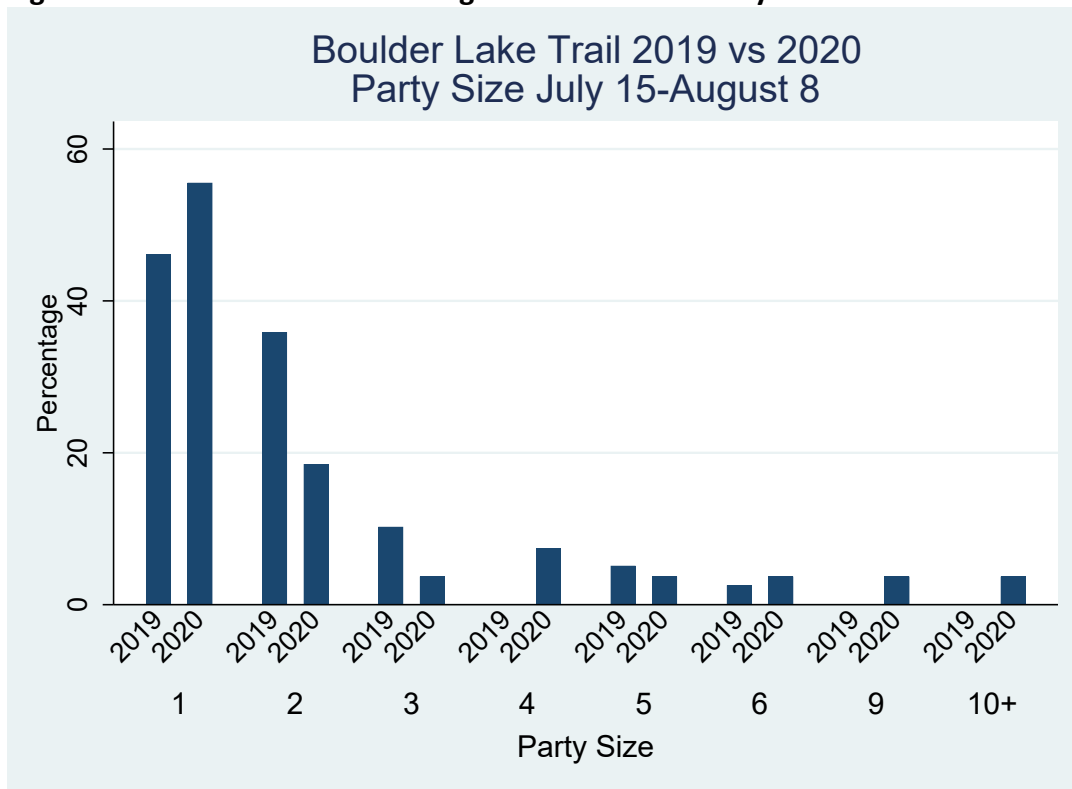


Figure 22.4 shows the approximate percentage distribution of party sizes that were using Gypsy Meadows Trail during the 2019 season compared to 2020. During both 2019 and 2020, solo hikers were the most common party size, followed by pairs of hikers. However, the percentage of solo hikers decreased from 2019 to 2020, with 59.4% of the parties seen in 2020 traveling alone. In contrast, the percentage of pairs of hikers increased to 28.1% during 2020. Larger party sizes were not observed at this site for either year, though some groups of three were seen during 2020.

Figure 22.4 Gypsy Meadows Percentage Distribution of Party Size 2019 vs 2020

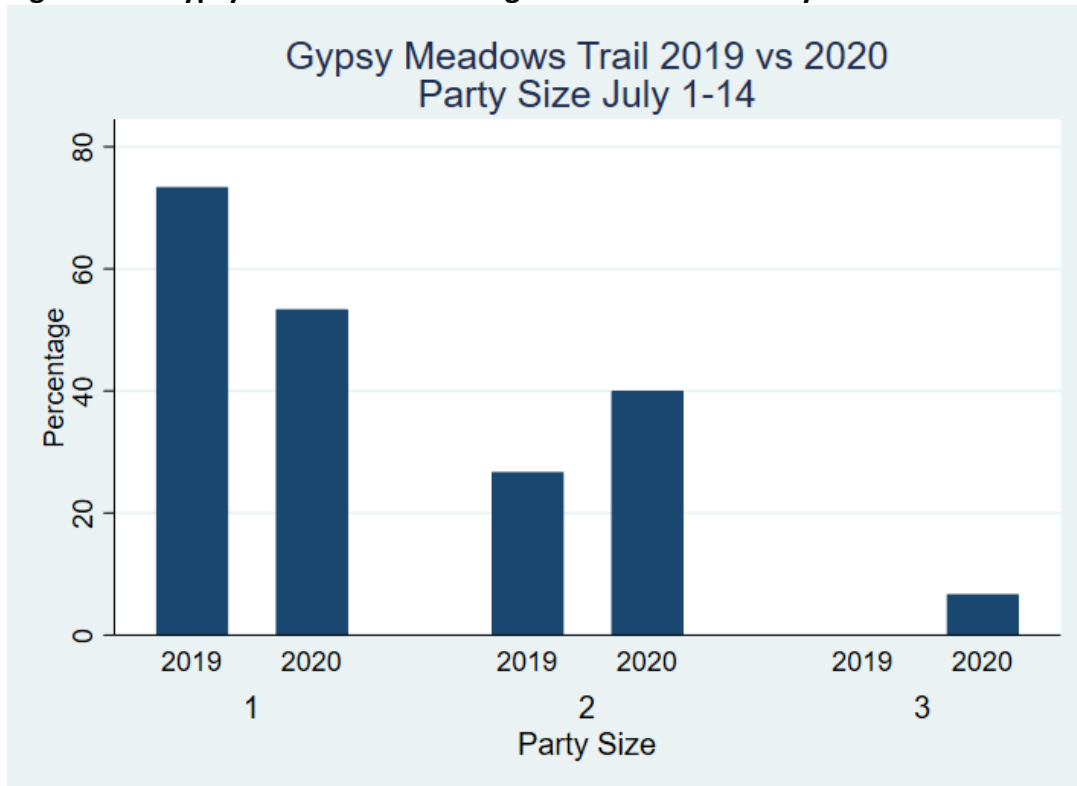
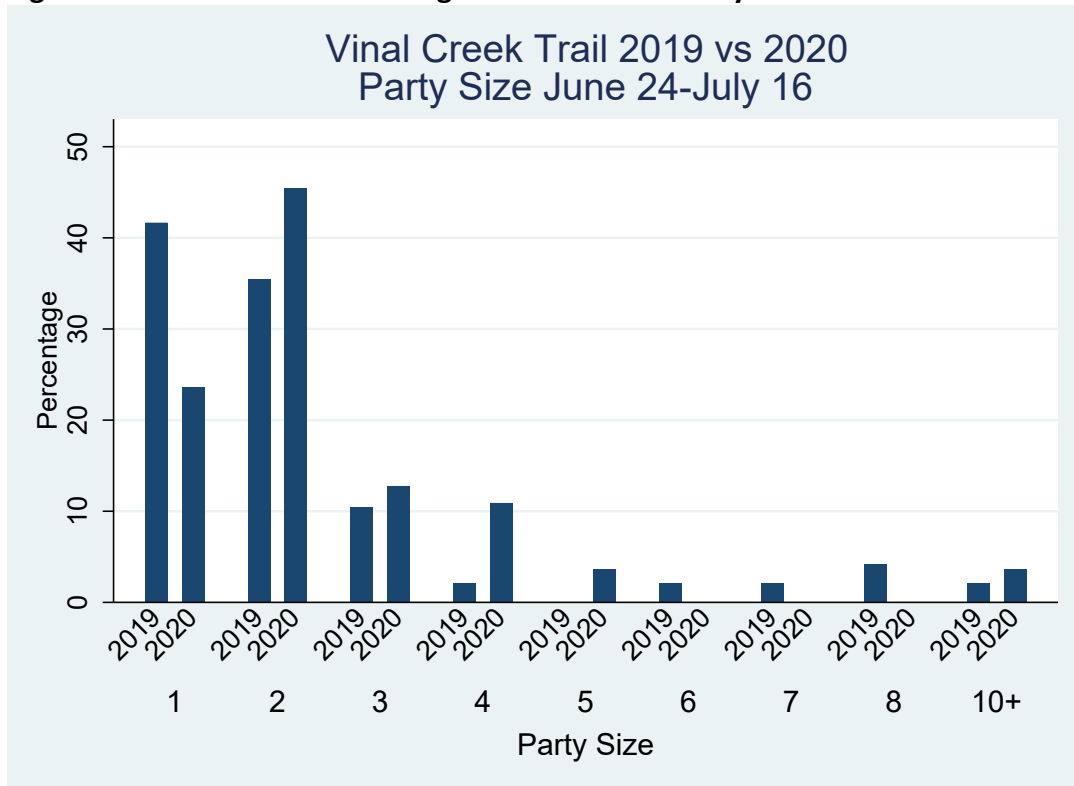


Figure 22.5 shows the approximate percentage distribution of party sizes that were using Vinal Creek³⁴ during 2019 versus 2020. During 2019, solo travelers were the most common party size, followed by pairs of hikers, and then trios. During 2020, pairs were the most common, making up 41.0% of the parties. Solo hikers made up a smaller percentage than they did in 2019, composing about 30.6% of the parties observed during 2020. Trios were the third most common party size for 2020 as well. This site had some larger group sizes during both 2019 and 2020. During 2020, about 12.5% of the groups appeared to include families with children.

Figure 22.5 Vinal Creek Percentage Distribution of Party Size 2019 vs 2020



³⁴ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

Figure 22.6 shows the approximate percentage distribution of party sizes that were using Midge Creek during 2019 versus 2020. During both 2019 and 2020, solo travelers were the most common party size, followed by pairs of hikers. However, solo hikers made up a greater percentage of hikers during 2019 compared to 2020, with over 60% of hikers traveling solo in 2019, versus 44.4% in 2020. About 39.6% of the parties were traveling in pairs during the 2020 season. Additionally, about 14.8% of the types of groups observed at this site during 2020 were crews or crew members.

Figure 22.6 Midge Creek Percentage Distribution of Party Size 2019 vs 2020

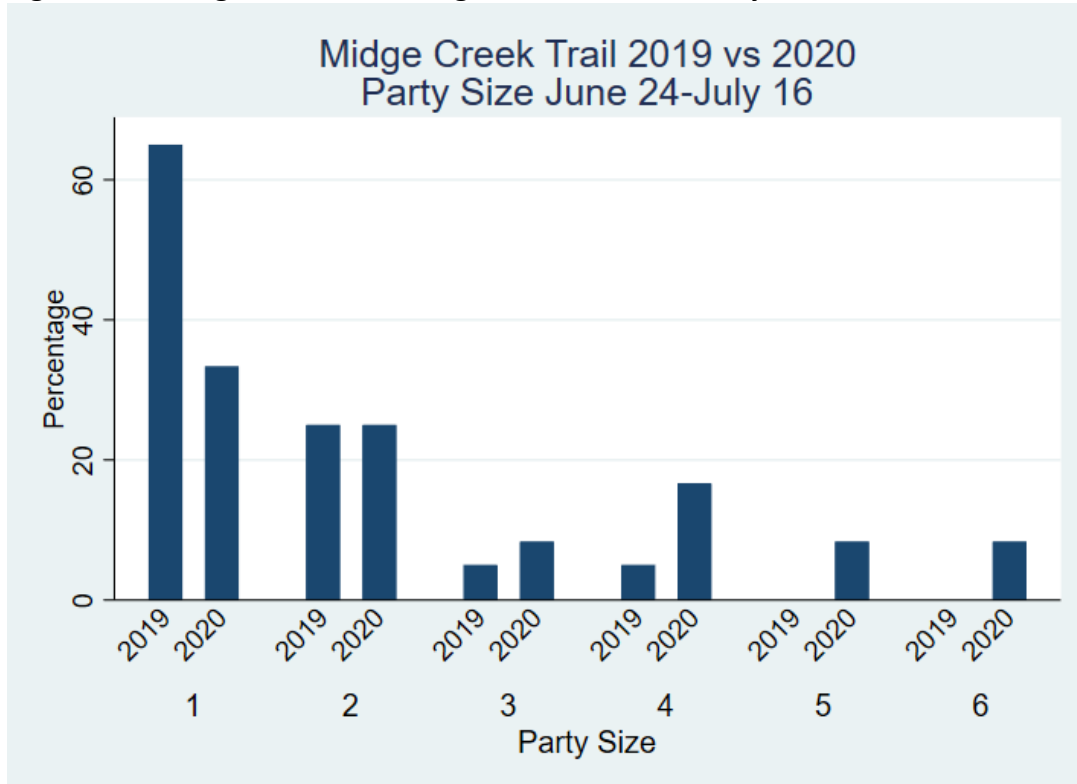
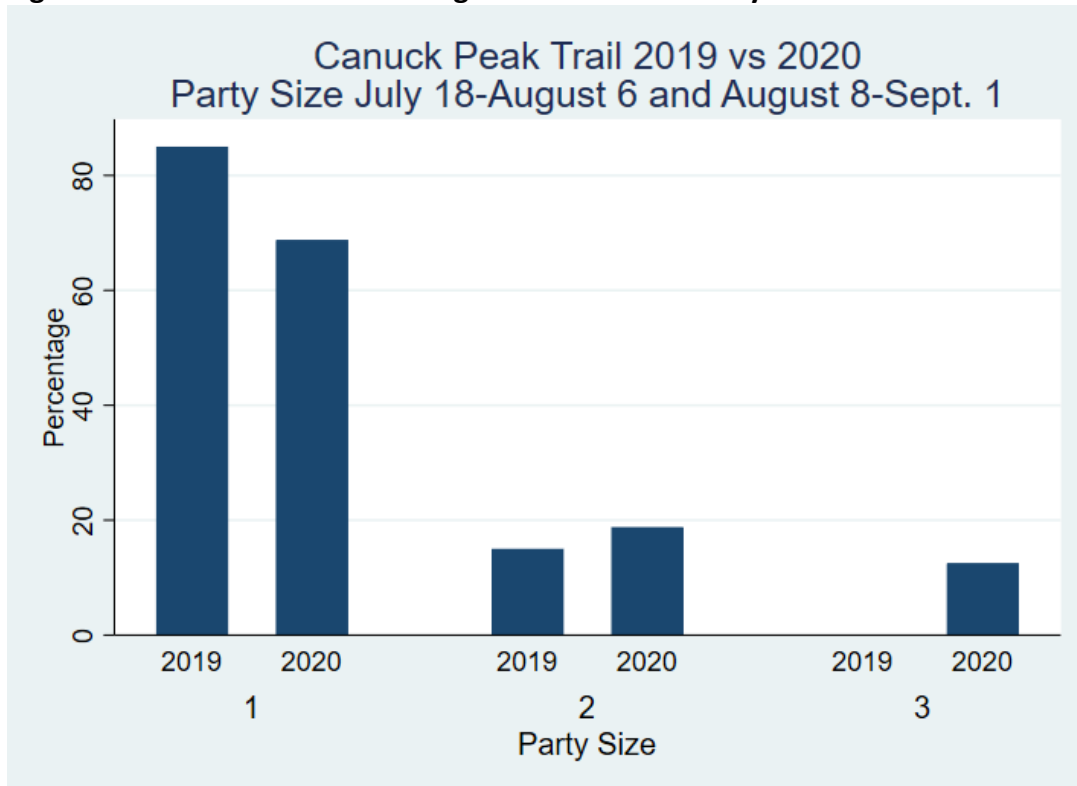


Figure 22.7 shows the approximate percentage distribution of party sizes that were using Canuck Peak during 2019 versus 2020. During both 2019 and 2020, solo travelers were the most common party size (with 60.0% of parties during 2020 involving solo hikers), followed by pairs of hikers (with 23.3% of parties during 2020 including pairs of hikers). The percentage of solo hikers decreased between 2019 and 2020, however. Additionally, the percentage of pairs and trios increased in 2020 compared to 2019. This site did not appear to have any larger groups of users for either 2019 or 2020.

Figure 22.7 Canuck Peak Percentage Distribution of Party Size 2019 vs 2020



Appendix B. Pacific Northwest Trail Association maps of trails in Section 1 and 2 of the PNNST.

Section 1, or “Rocky Mountains,” consists of 149 miles (240 km) of trail from Glacier National Park to Eureka, Montana. Section 2, or “Purcell Mountains,” consists of 97 miles (156 km) of trail from Eureka, Montana to Bonners Ferry, Idaho. The maps follow the trail from East to West and show the general location of trail counter/camera. The trails that included in this study are featured in pages 8-22 of the following sectional maps of the PNNST. The trail name, National Forest designation, and page number are included to orient the reader to the location of the study sites within the PNNST. Specific locations of trail counters/cameras are not included to avoid vandalism in future studies.

Counter/Camera Site	Trail	National Forest	Page Number in Map
Blue Sky Creek	Blue Sky Creek Trail 74	Kootenai National Forest	10-11
Bluebird Lake	Trail 339	Kootenai National Forest	12
Boulder Lake	Boulder Lake Trail 62	Kootenai National Forest	17
Gypsy Meadows	Purcell Summit Trail 91	Kootenai National Forest	17
Vinal Creek ³⁵	Vinal Creek Trail 9 (the monitoring site is not located on the PNNST)	Kootenai National Forest	18
Midge Creek	Midge Creek Trail 77	Kootenai National Forest	21
Canuck Peak	Rock Candy Mountain Trail 461	Kootenai National Forest	22

At the time of this report, the complete 2020 map set of the PNNST, including strip maps with greater details on individual trails, can be downloaded from <https://www.pnt.org/product/2020-pnta-mapset/>

These maps show the locations of the counter/camera sites included in this report. The sites’ corresponding page number is located in the lower right-hand corner of the sections of the map.

The folder containing “Section 1 – Rocky Mountains” includes strip maps for Blue Sky Creek and Bluebird Lake.

³⁵ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.

The folder containing “Section 2 – Purcell Mountains” includes strip maps for Boulder Lake, Gypsy Meadows, Vinal Creek³⁶, Midge Creek, and Canuck Peak.

The Pacific Northwest Trail maps available in future years may be updated, and are likely to be found under <https://www.pnt.org/pnta/maps/>

³⁶ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See pp. 36-39.