

Pacific Northwest National Scenic Trail: 2017 Trail Monitoring Report



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June 10, 2021

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Introduction

The Pacific Northwest National Scenic Trail (PNNST) received its designation in 2009 and is one of 11 designated National Scenic Trails in the United States. The PNNST extends 1,200 miles across three states, seven national forests, six wilderness areas, three national parks, and multiple mountain ranges. Weaving through a diverse landscape, the PNNST encompasses 350 miles of wilderness in addition to more than 400 miles along roadways. In 2009, the PNNST obtained its status as a National Scenic Trail joining ten other trails with this designation. As part of managing such as complex and dynamic trail, the U.S. Forest Service is required to prepare a Comprehensive Plan that includes a purpose statement, refinement of the Congressional route, establishment of the trail corridor, a long-term trail protection plan, and carrying capacity to “provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass.” The trail system is experiencing increasing numbers of day-users, backpackers, and thru-hikers each year. An integrated visitor management plan for the PNNST is needed to ensure the long-term sustainability of both the world-class visitor experiences and the natural, cultural and scenic resources within the PNNST corridor.

During the summer of 2017, the University of Montana (UM) conducted an initial visitor monitoring study on the number of trail visits using multiple sections of the PNNST, mainly in the Flathead National Forest (FNH) and Kootenai National Forest of Montana (KNF). Data collection took place from June 28 through October 8, 2017. Over this period of time, the researcher made seven trips into the field, each lasting between four and six days. There were ten locations monitored, with nine in KNF and one in FNF. Data was collected using infrared trail counters and software from the company, TRAFx. The trail counters were calibrated using trail cameras. This report contains information related to trail use during 2016 on the following trails: (FNF) Whitefish Divide, (KNF) Blue Sky Creek, Bluebird Lakes, Green Mountain, Boulder Lake, Mt. Henry, Vinal Creek¹, Midge Creek, Garver Mountain, and Canuck Peak. See Appendix A, B, and C for locations on map. Further comparisons are available upon request.

Comparisons across sites

Due to variation among time periods when data was collected, sites should only be compared based on their daily averages (Table 1). This ensures as close to an even comparison as possible. Boulder Lake and Bluebird Lake had the highest use of the trails monitored with 6.05 and 5.11 average trail visits per day, respectively. Mt. Henry and Whitefish Divide experienced the lowest use, with 0.57 and 0.53 trail visits per day respectively. Green Mountain is not included as data

¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use. See the Vinal Creek section for more details.

from this counter was compromised. Figure 1 shows the percentages that each counter received out of the total number of counts for the season. Due to the lack of night vision and the knowledge that hikers sometimes travel in the night, counts from those hours were discretionary. Animal activity may also be the cause of potential over-counts, but in those circumstances, the data was reviewed by the research team.

Table 1: Master Summary of all sites¹

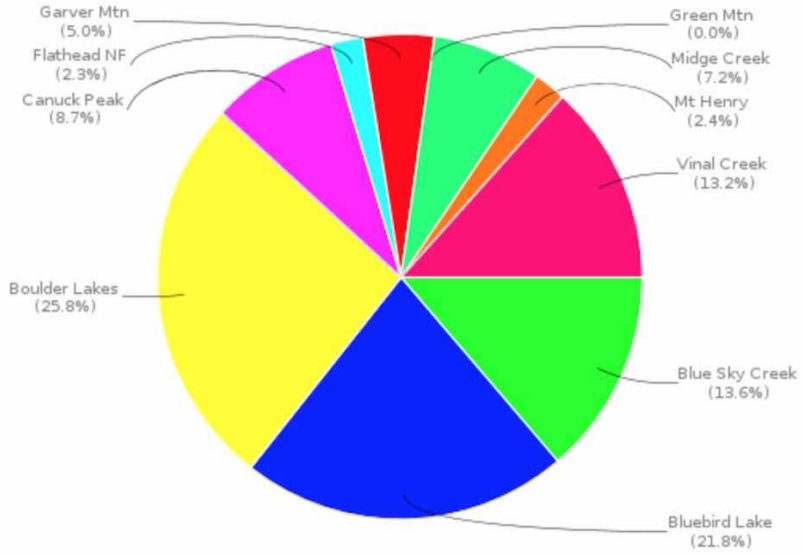
Year	Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ADT [†]	ADT [†] x365	Days with data
2017	Blue Sky Creek							117*	78*					3.179	1,160	56
	Bluebird Lake							1,271*	192	18	133*			5.113	1,866	71
	Boulder Lakes							241	314	38	0*			6.051	2,209	98
	Canuck Peak							220*	58	31	10*			2.039	744	76
	Flathead NF							33*	14	11	12*			0.529	193	85
	Garver Mtn						0*	63	29	19	26*			1.172	428	99
	Midge Creek						0*	57*						1.692	618	13
	Mt Henry							10*	11	17	81*			0.568	207	81
	Vinal Creek						105*	189	97*	10	6*			3.072	1,121	97

ADT[†] = Average Daily Traffic

* = based upon that month's ADT [Learn more](#) Indicates months with less than 6 days of data.

¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Figure 1: Comparison of use across all sites¹



Site Name	Daily Average
Blue Sky Creek	3.2 (13.6%)
Bluebird Lake	5.1 (21.8%)
Boulder Lakes	6.1 (25.8%)
Canuck Peak	2.0 (8.7%)
Flathead NF	0.5 (2.3%)
Garver Mtn	1.2 (5.0%)
Green Mtn	0.0 (0.0%)
Midge Creek	1.7 (7.2%)
Mt Henry	0.6 (2.4%)
Vinal Creek	3.1 (13.2%)

¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Flathead National Forest (Whitefish Divide Trail)

Figure 2 contains the weekly counts from the trail counter on the Whitefish Divide trail. The week of July 10 to July 17 saw the most use, with 14 trail visits. An average of 3.9 trail visits were recorded on the Whitefish Divide Trail during the weeks monitored. Figure 3 includes the daily averages from the trail counter on the Whitefish Divide trail. The highest use days were Friday and Saturday, with an average of 0.9 and 1.0 visitor per day respectively. Figure 4 shows a breakdown of the highest use week of this trail: July 21-27. There were 13 counts during this time occurring on three days, July 21, 22, and 27 with 6, 5, and 3 counts respectively. July 21 and 22 are Friday and Saturday, suggesting a slight spike on weekends, potentially from day use.

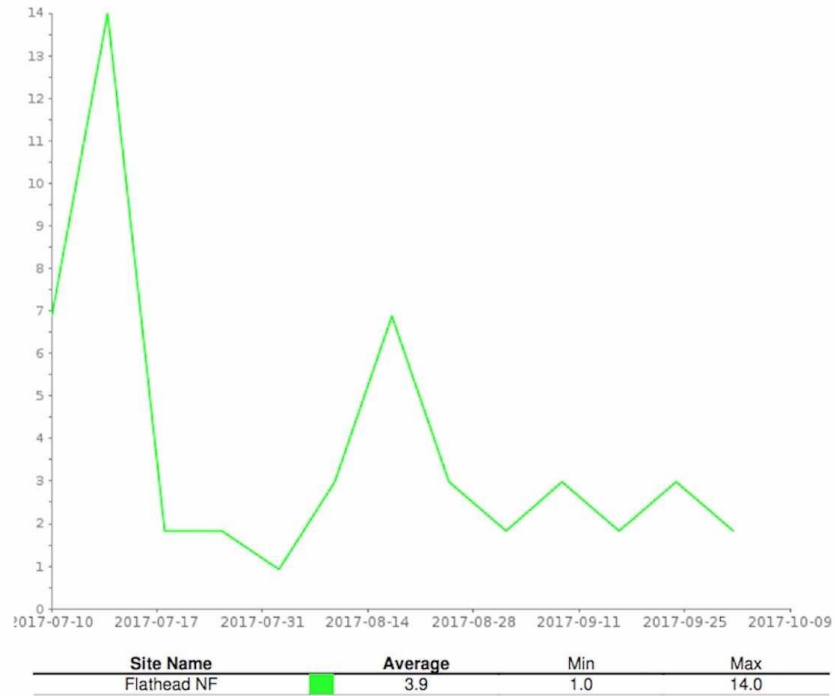
Based on camera data, this trail was frequented by multi-day hunters during the fall season and day hikers on weekends, which could account for the higher weekend traffic. Through first hand observation and discussions with hikers, this trail is also frequented by grizzly bears, which could cause some potential over-counts.

Figure 5 shows the counts for this trail counter as they correspond to the air quality in Kalispell. This data suggests that air quality does not correlate strongly with whether or not users are taking this trail. The large spike in air quality to an unhealthy level does correlate to a time when no counts were recorded. Potentially trail visitors avoided this trail when air quality was unhealthy. Figure 6 shows the counts for this trail counter as they correspond to the maximum temperature in Eureka. Since this is the first year of monitoring, it is unclear whether the low use of this trail is normal or if that was a result of the high temperatures of this season. During the months that the Whitefish Divide Trail was monitored, an estimated 60 trail visitors used the trail. I would recommend continuing to monitor this trail as it is used primarily by thru-hikers and is currently the only site monitored in Flathead National Forest.

Image 1: Location of the Whitefish Divide Trail Counter



Figure 2: Whitefish Divide Trail Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 3: Whitefish Divide Trail Daily Averages

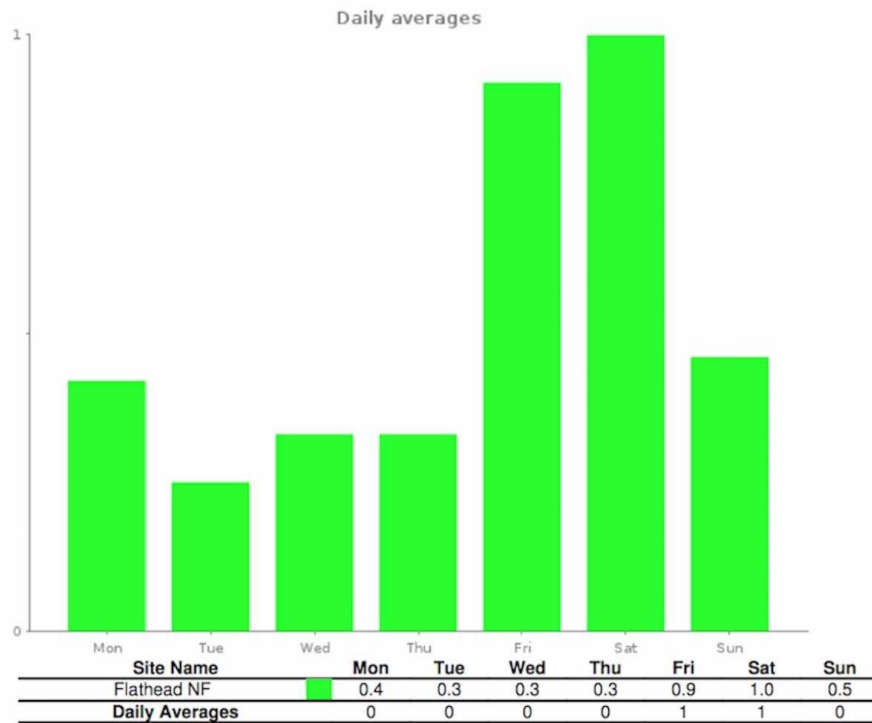


Figure 4: Whitefish Divide Trail Highest Use Week

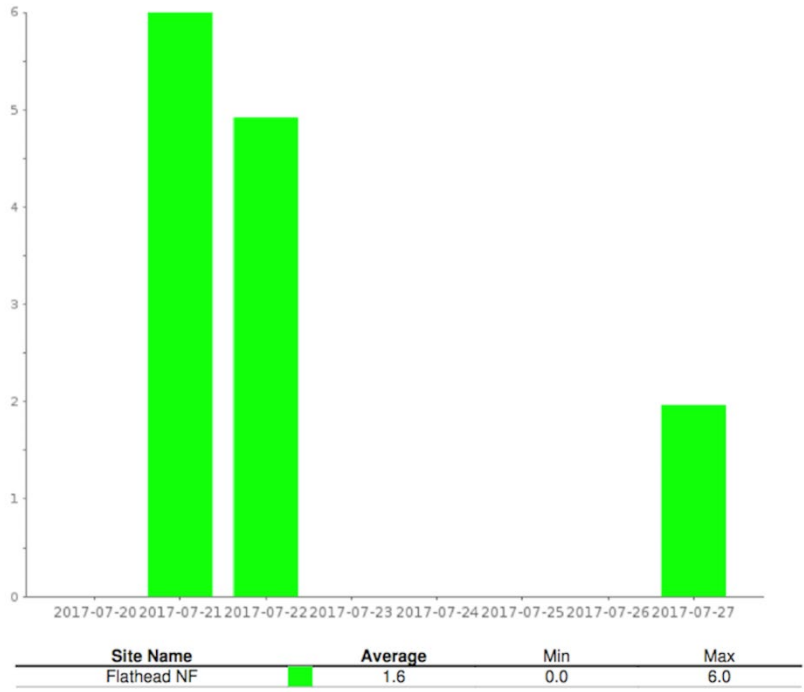


Figure 5: Whitefish Divide Trail and Air Quality

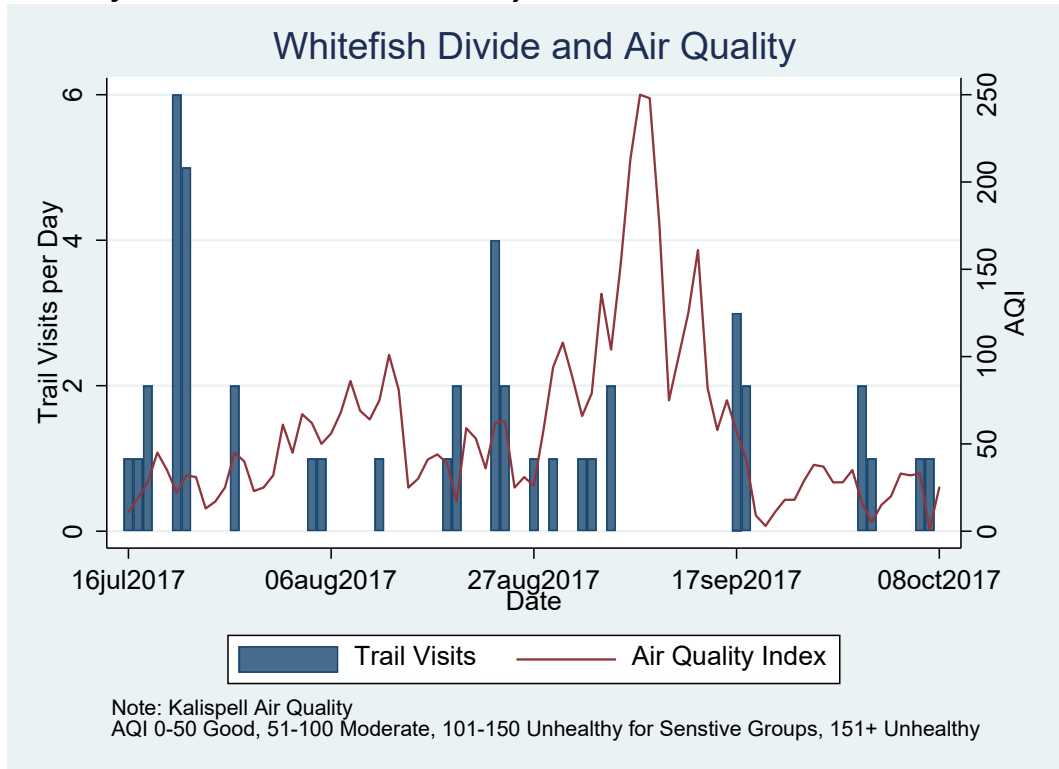
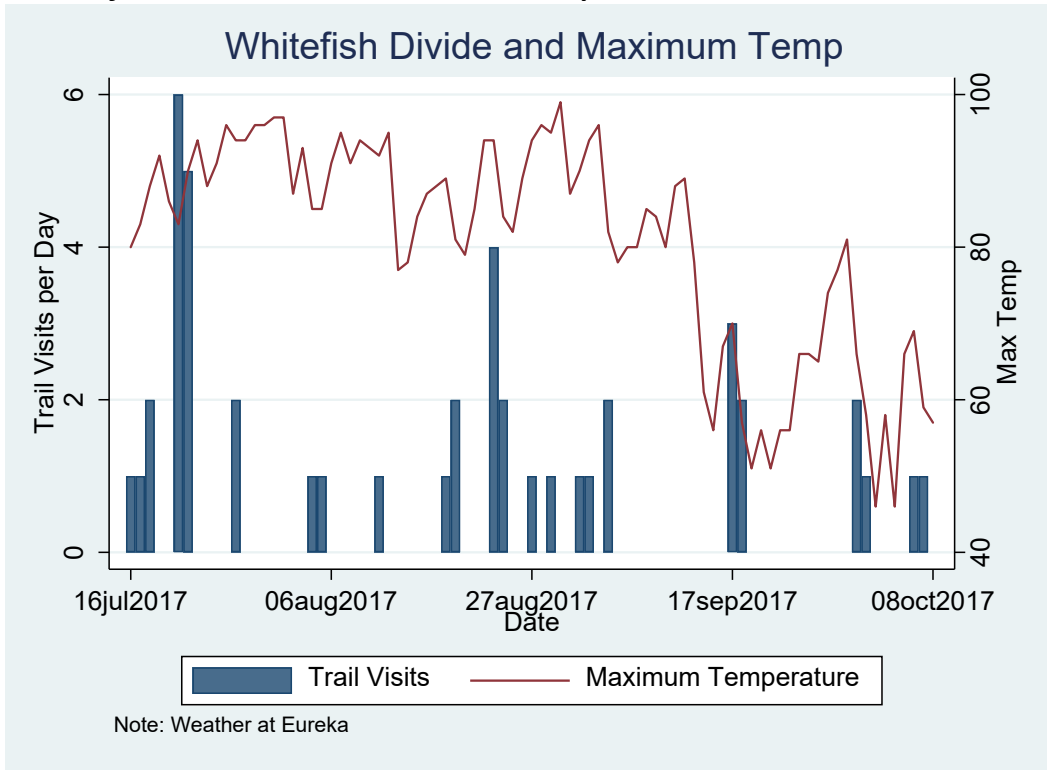


Figure 6: Whitefish Divide Trail and Maximum Temperature



Blue Sky Creek

Figure 7 contains the weekly counts from the trail counter at Blue Sky Creek. This trail closed due to the Gibraltar Ridge fire on August 8 and was taken down due to threat of the fire on August 27. The week of June 26 to July 3 registered the most counts with 63 trail visits. There was an average of 25.8 trail visits per week while this trail was being monitored. Figure 8 contains the daily averages from the Blue Sky Creek trail counter. Friday and Saturday had the most use, with averages 5.0 and 4.9 trail visits respectively.

Based on personal observation, there were frequently horse trailers and cars of day hikers parked by the trailhead on weekends. This could account for higher weekend travel. Just prior to the trail's closure, there was also a posting on the trailhead concerning bears frequenting the trail. This could cause potential over-counts. Figure 9 contains the daily counts from the highest use week from this counter: July 1-7. This correlates to two potential causes: early thru-hiker bubble or the Fourth of July holiday. Figure 10 shows the air quality in Kalispell as it relates to the registered counts.

The trends in air quality increasing in number (becoming unhealthier) follows an increase in trail visits along this trail. The air quality becoming increasingly unhealthy did not deter use in this area. Figure 11 relates the maximum daily temperature in Eureka to the registered counts. There appears to be almost a correlation between higher use and higher temperature during some of the spikes. During the time that the Blue Sky Creek trail was monitored, an estimated 195 trail visitors used the trail. I would recommend continuing to monitor this trail, as it is the gateway trail between Flathead and Kootenai National Forests and is used regularly by thru-hikers.

Image 2: Location of the Blue Sky Creek Trail Counter



Figure 7: Blue Sky Creek Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 8: Blue Sky Creek Daily Averages

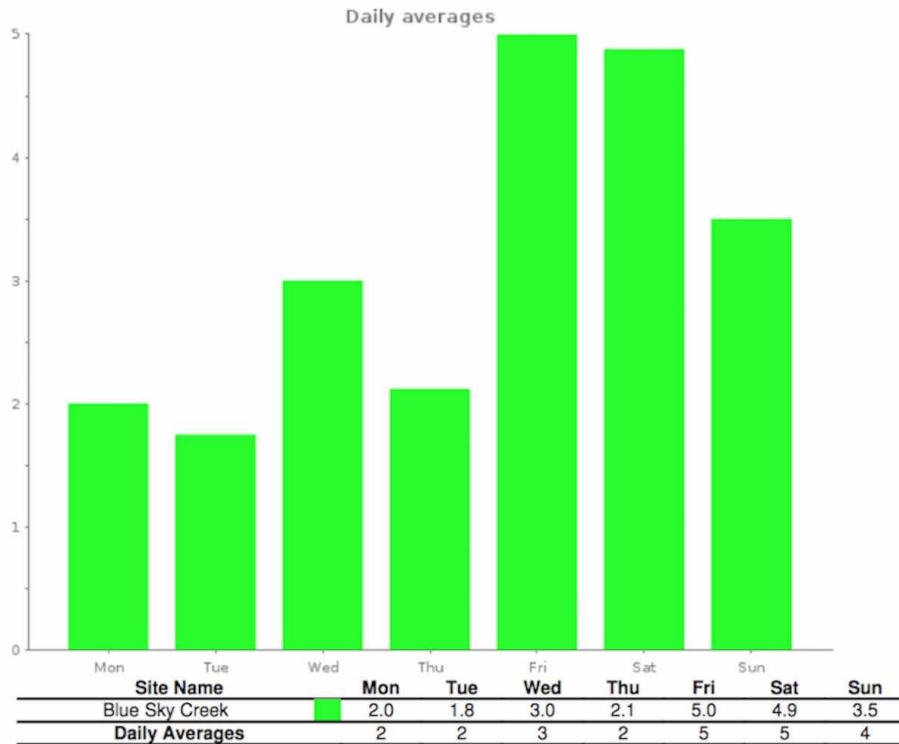


Figure 9: Blue Sky Creek Highest Use Week

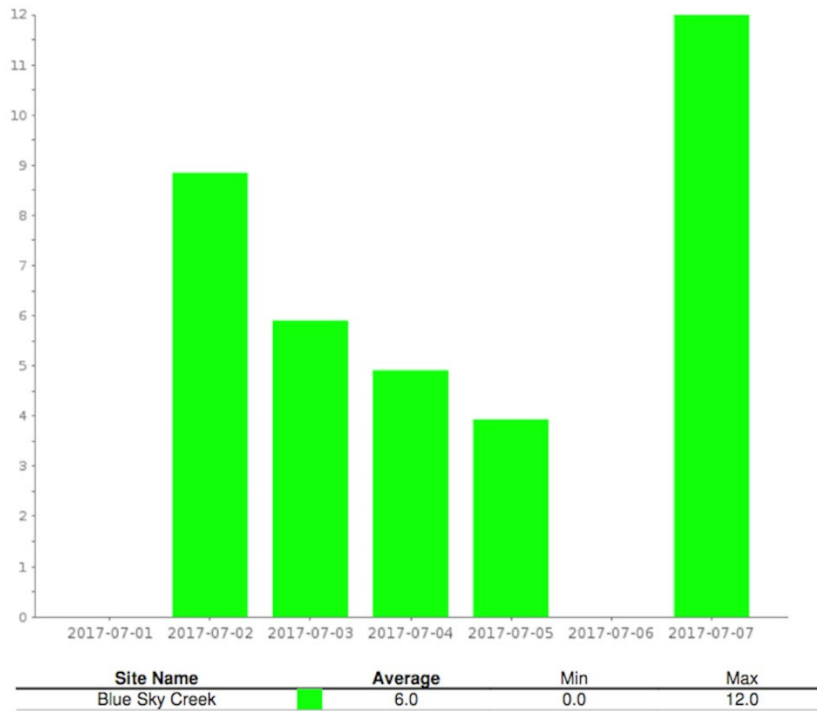


Figure 10: Blue Sky Creek Air Quality

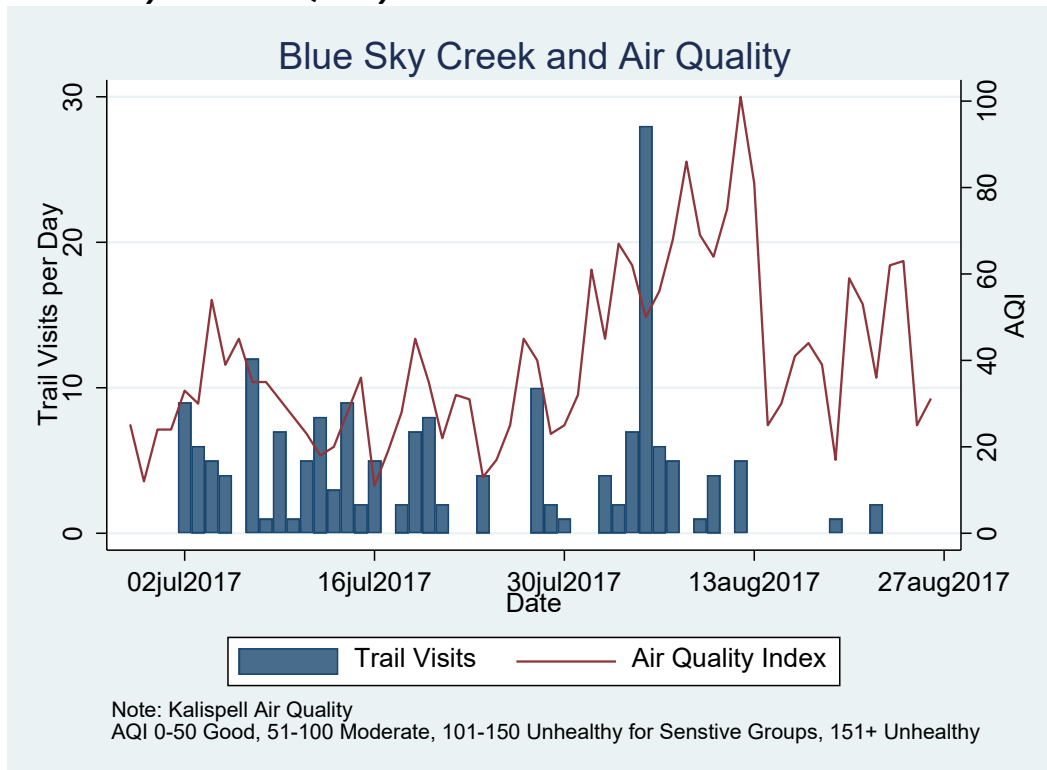
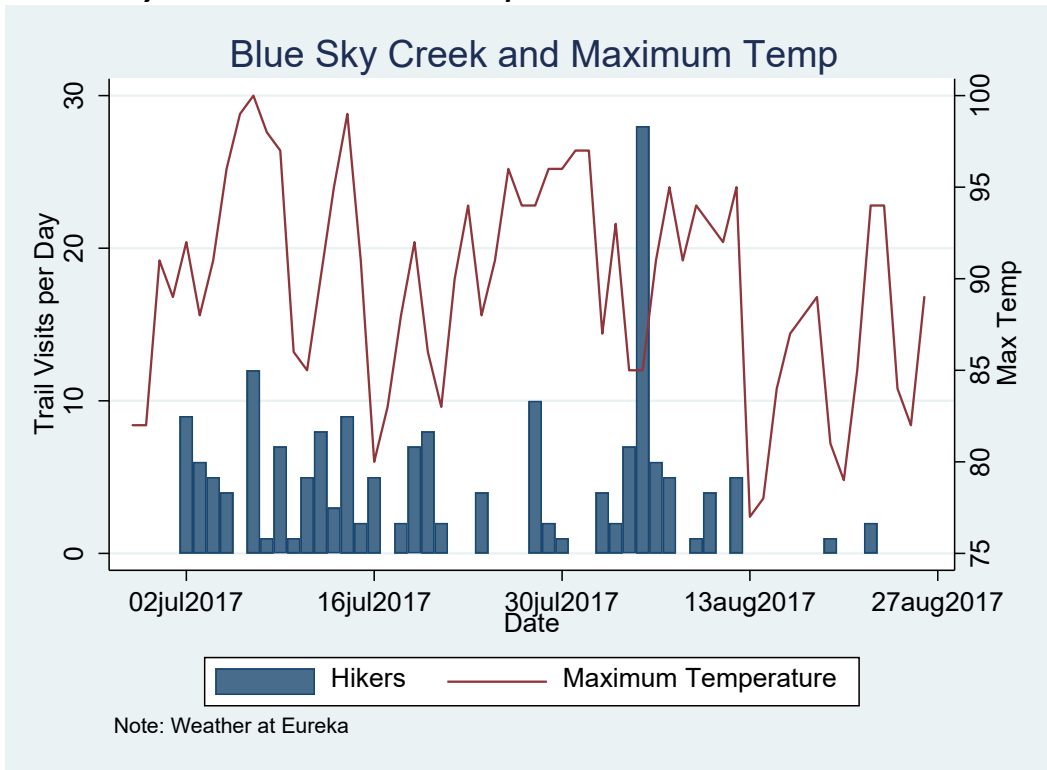


Figure 11: Blue Sky Creek and Maximum Temperature



Bluebird Lakes

Figures 12-16 contain the findings from the trail counter at Bluebird Lakes. This trail counter was set up on July 28 only 11 days before access to the trail was closed due to the Gibraltar Ridge Fire. The fire closure was effective from August 8 through September 25. The data available reflects the whole time that the counter was in place, through October 8. Figure 6 contains the weekly counts from the Bluebird Lake trail. The week of July 24 to July 31 recorded the most counts with 392. Figure 7 contains the daily averages from the Bluebird Lake trail counter. Saturday and Sunday receive the highest use, with averages of 13.1 and 5.9 trail visits respectively.

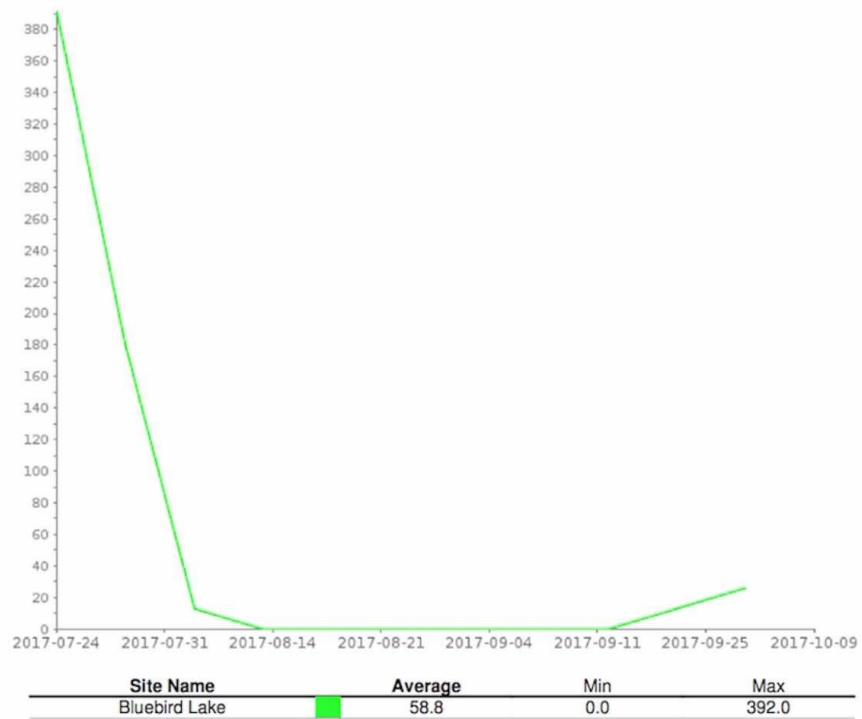
Based on personal observations, this trailhead was constantly busy with both hikers and fishermen. The proximity to the campground could also account for increased traffic. During the time when the Bluebird Lake trail was monitored, there were an estimated 1,414 trail visits on this trail. Figure 14 contains the daily counts from the highest use week: July 30-August 6. During this time, there were peak days on Thursday, August 3 and Saturday, August 5. Based on personal observation of the site, I would assume that these spikes correlated with weekend day-use. Figure 15 shows the counts from this location compared to the air quality from Kalispell. Due to the closure from the Gibraltar Ridge Fire, there are few if any counts during this time so whether air quality would deter use here is not able to be decided.

Figure 16 shows the counts from this location compared to the maximum temperature in Eureka. As with discussion of Figure 15, the Gibraltar Ridge Fire closure removed the majority of usable data that could have been compared here. However, the high use at the beginning appears unfazed by the high temperatures, leading to the conclusion that heat does not deter use much in this area. I would suggest continuing to monitor this site, as it is used by thru-hikers as well as heavily by day users.

Image 3: Location of Bluebird Lake Trail Counter



Figure 12: Bluebird Lake Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 13: Bluebird Lake Daily Averages

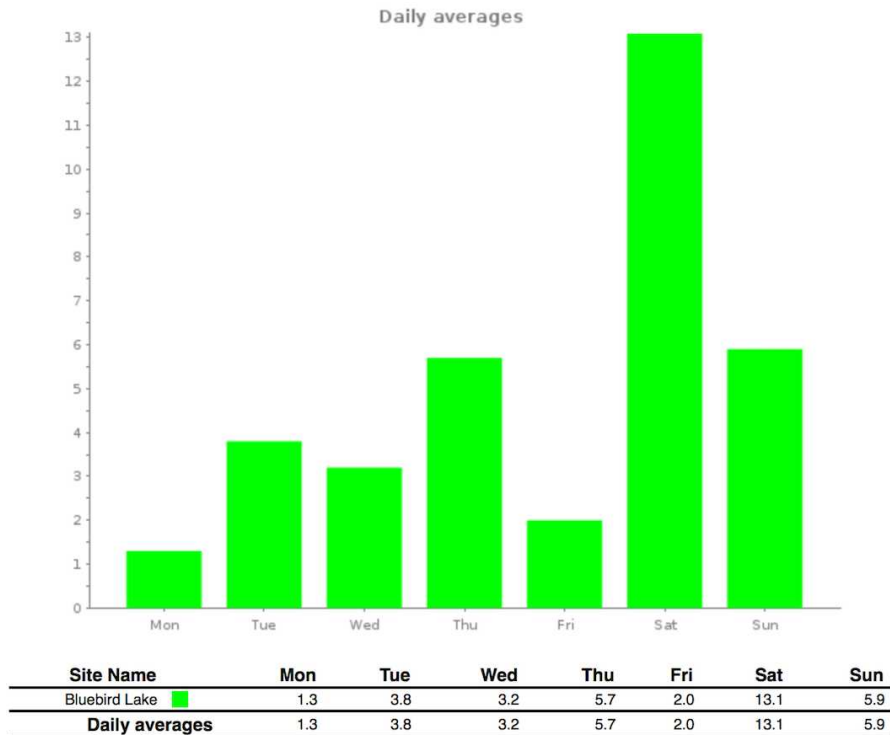


Figure 14: Bluebird Lake Highest Use Week

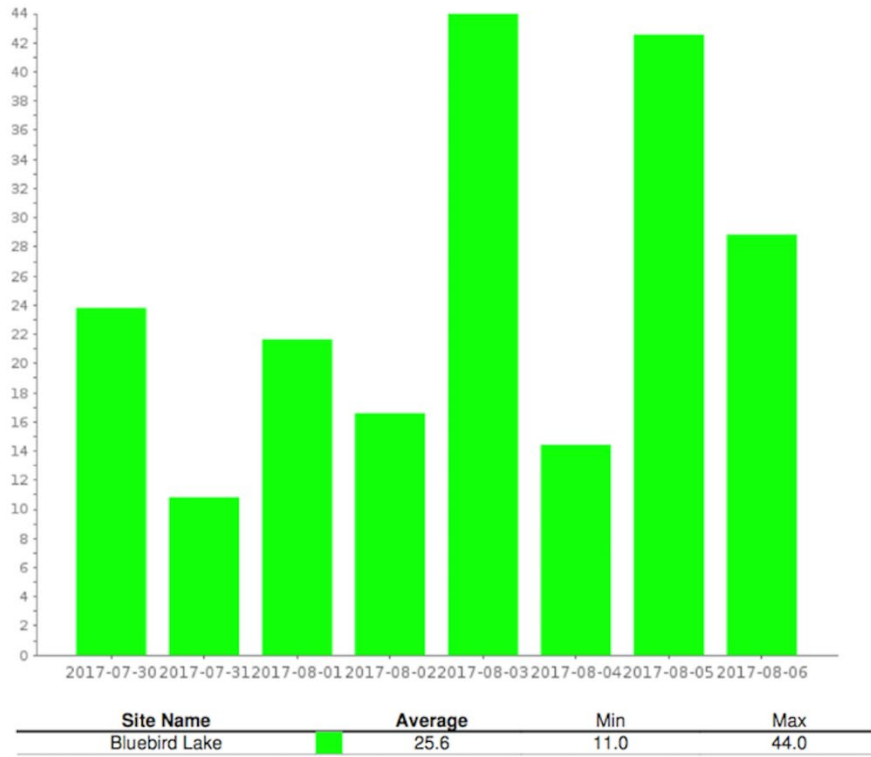


Figure 15: Bluebird Lake and Air Quality

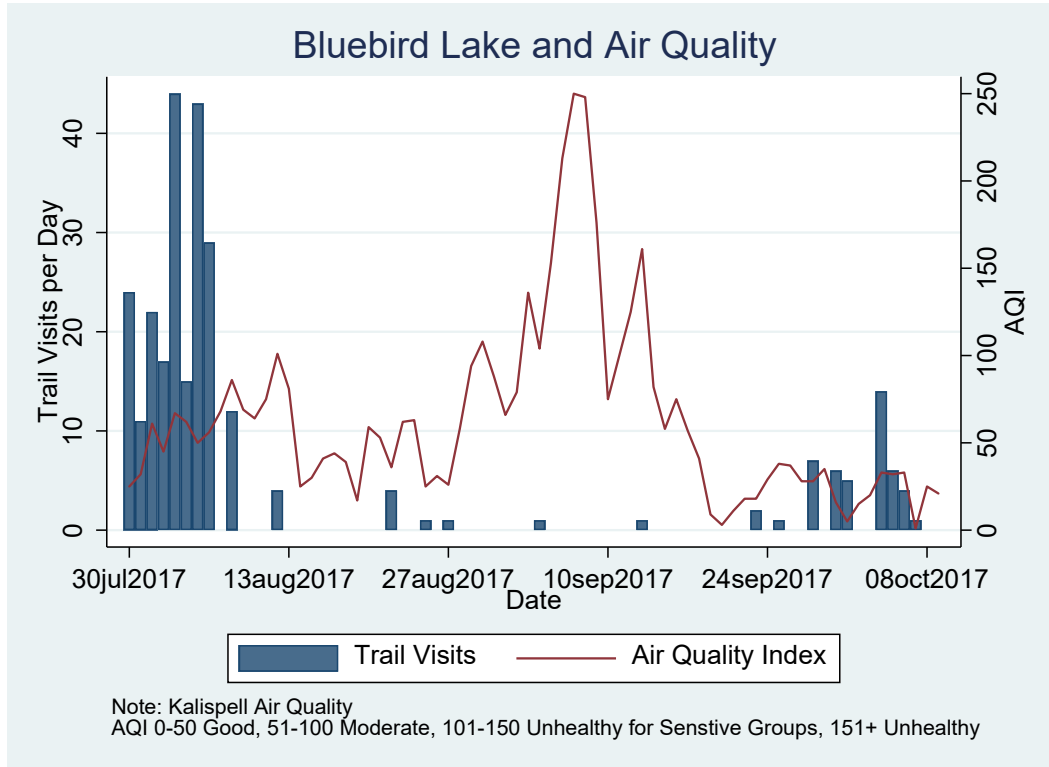
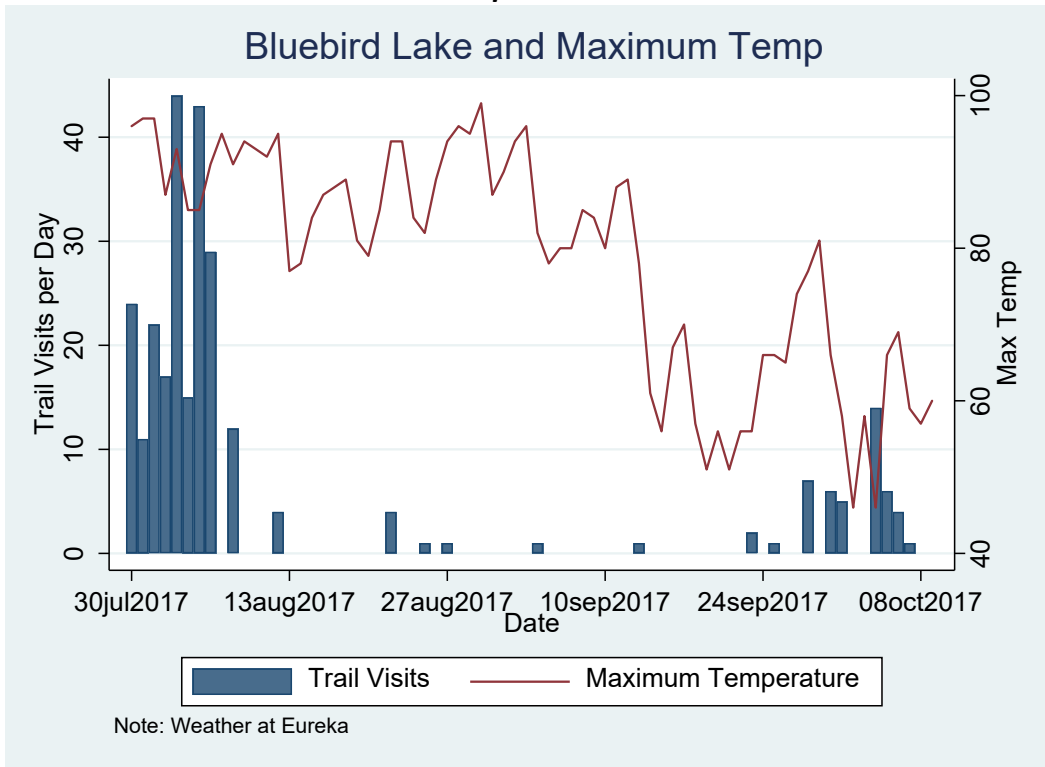


Figure 16: Bluebird Lake and Maximum Temperature



Green Mountain

The trail counter on the Green Mountain trail was set up on July 28 only 11 days before access to the trail was closed due to the Gibraltar Ridge Fire. The fire closure was effective from August 8 through September 25. The trail counter shows no data during the recorded time. This could be due to set-up error or counter failure. Due to the fire closure so soon after setup and the duration of the closure, the counter was not able to be checked or calibrated so there is no data available. Based on assumptions from nearby Bluebird Lakes, there was probably roughly one half or 807 trail visits this season. While data from this counter was unusable this season, I would recommend continuing to monitor this trail so that it could be compared to the counts from Bluebird Lakes which appears to have more day use than Green Mountain.

Image 4: Location of Green Mountain Trail Counter



Boulder Lake

Figure 17 contains the weekly counts from the trail counter at Boulder Lake. The week of August 21 to September 4 registered the most counts with 134 trail visits. This corresponds closely with the Labor Day holiday and the ease of access to the lake. Since the Ten Lakes area was closed, this could have directed traffic towards Boulder Lake during this season. An average of 44.7 trail users visited this trail during the time that it was monitored. Figure 18 contains the daily averages from the Boulder Lake trail counter. Saturday and Sunday experienced the most use, with averages 13.1 and 8.6 trail visits respectively. Figure 19 contains the daily counts from the highest use week recorded: August 19-26. The highest use days were August 20 and 22, a Sunday and Tuesday respectively. These dates do not correlate to any major holidays.

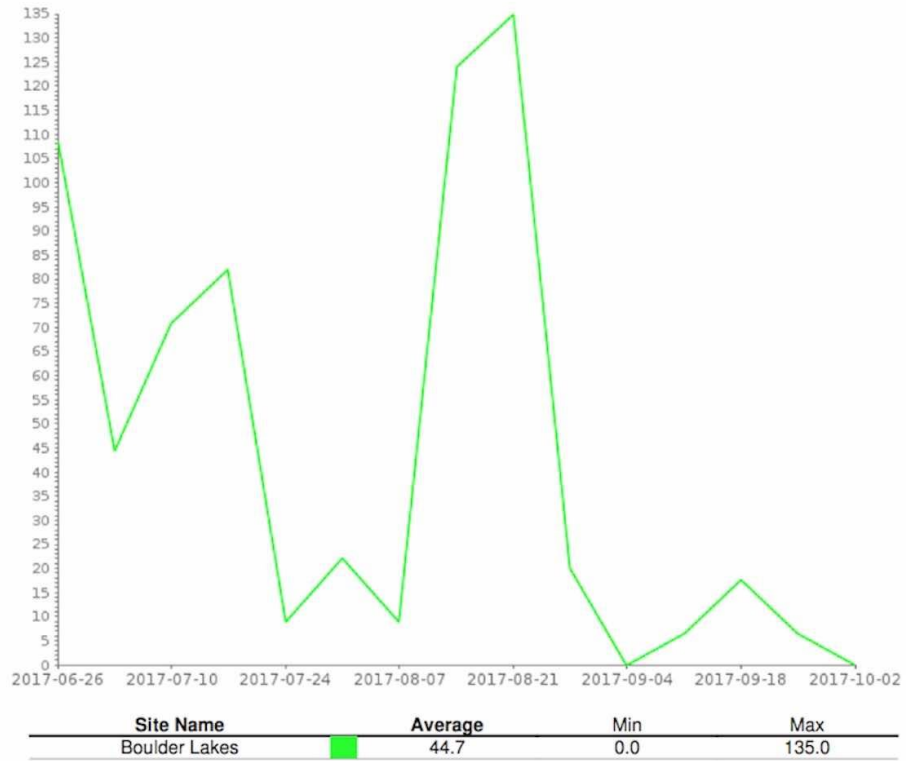
Figure 20 contains the counts from the Boulder Lake counter compared to the air quality in Eureka, Montana. During the large spike when the air quality rose to unhealthy levels, use at Boulder Lake was at its lowest, suggesting that users were potentially making decisions of whether or not to visit this trail based somewhat on air quality. Figure 21 contains the counts compared to the maximum temperature recorded in Eureka, Montana. Temperatures remained consistently high during most of the monitoring season and did not seem to have any effect on whether or not users chose to visit the trail.

Based on camera data and personal observations, this trail was frequented by people on horseback, which could cause over-counts. Also, because of ease of access to the lake, this trail was frequented by fishermen, which could account for increased weekend travel. During the time that the Boulder Lake trail was monitored, there were an estimated 593 trail visits on the trail. I would recommend continuing to monitor this trail, as it proved telling for both thru-hiker travel as well as day use.

Image 5: Location of the Boulder Lake Trail Counter



Figure 17: Boulder Lake Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 18: Boulder Lake Daily Averages

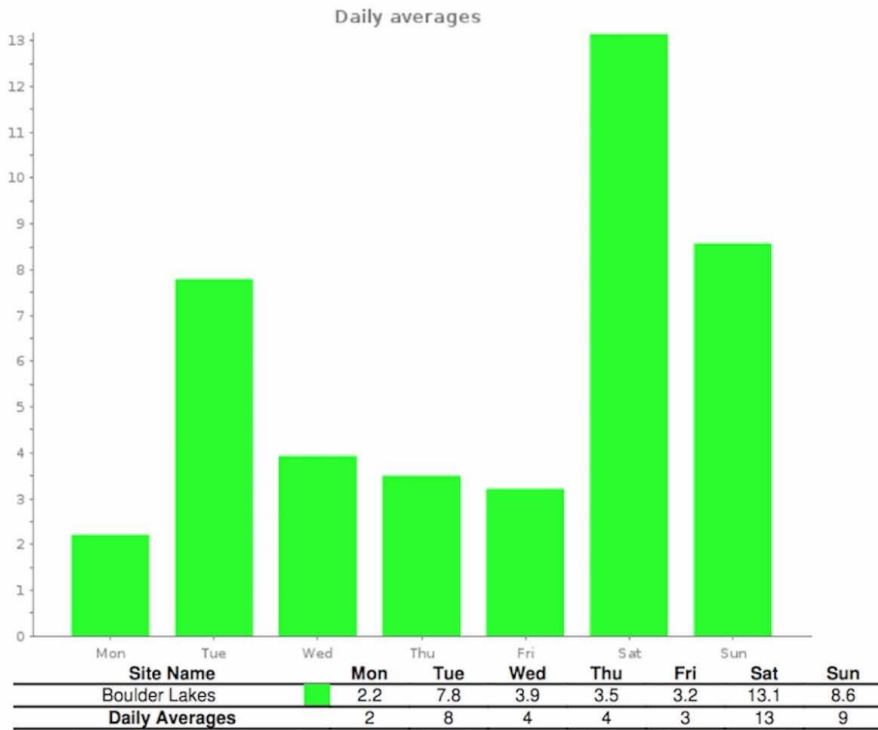


Figure 19: Boulder Lake Highest Use Week

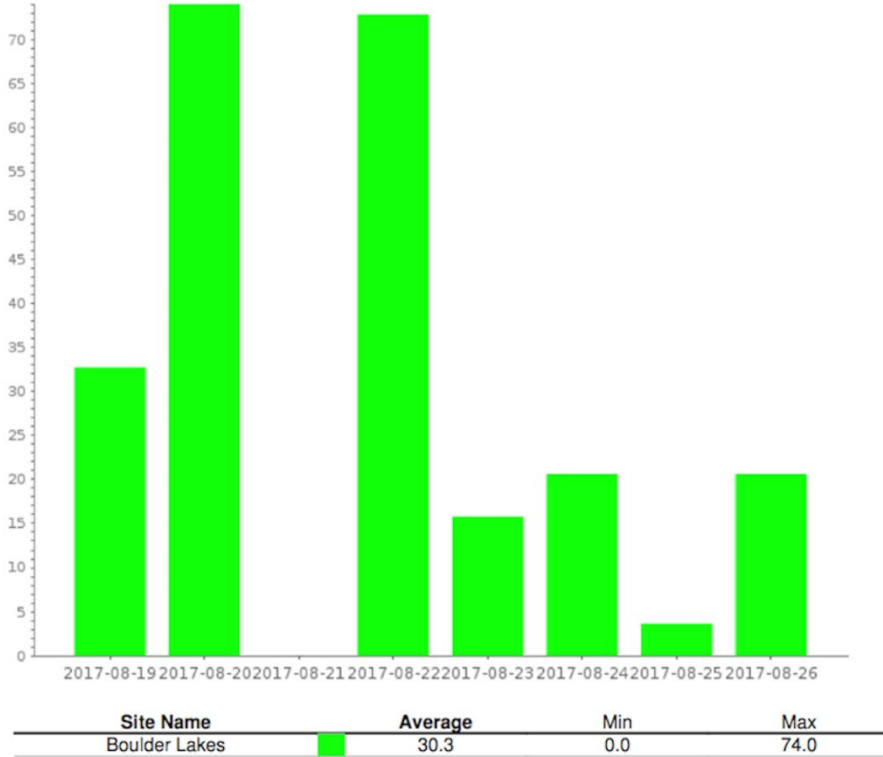


Figure 20: Boulder Lake and Air Quality

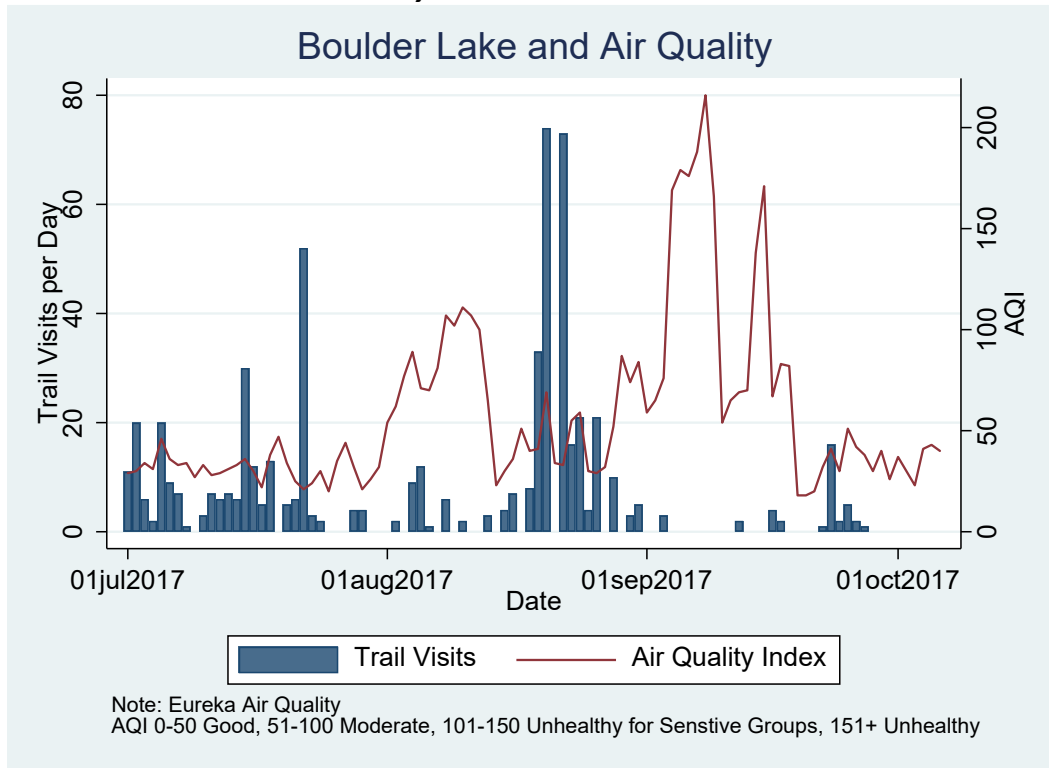
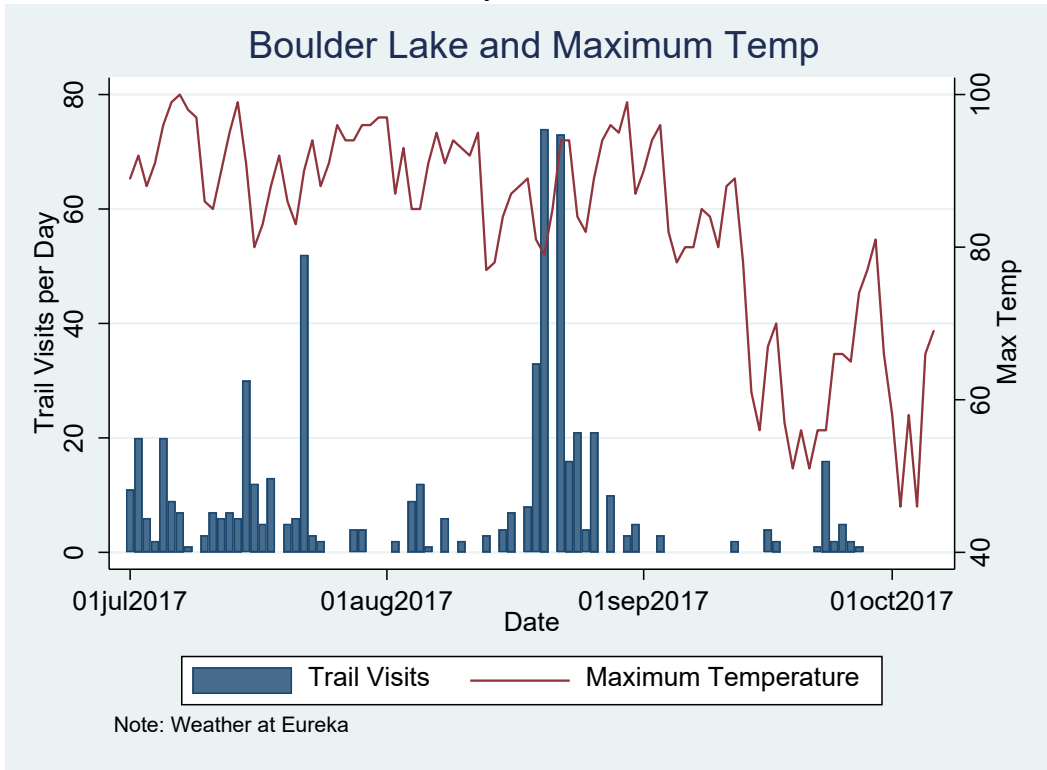


Figure 21: Boulder Lake and Maximum Temperature



Mt. Henry

Figure 22 contains the weekly counts from the trail counter at Mt. Henry. The week of August 25 to September 2 registered the most counts with 14 trail visits. The Mt. Henry trail averaged 4.5 trail visits per week during the time when it was monitored. However, from personal observation and camera data, this trail is heavily trafficked by wildlife including moose and bear. Thus, there is potential for a slight over-count for this trail in particular. Figure 23 contains the daily averages from the Mt. Henry trail counter. Monday was the highest use day with an average of 1.0 trail visits per day. The lowest use days were Thursday and Saturday, each averaging 0.3 trail visits per day.

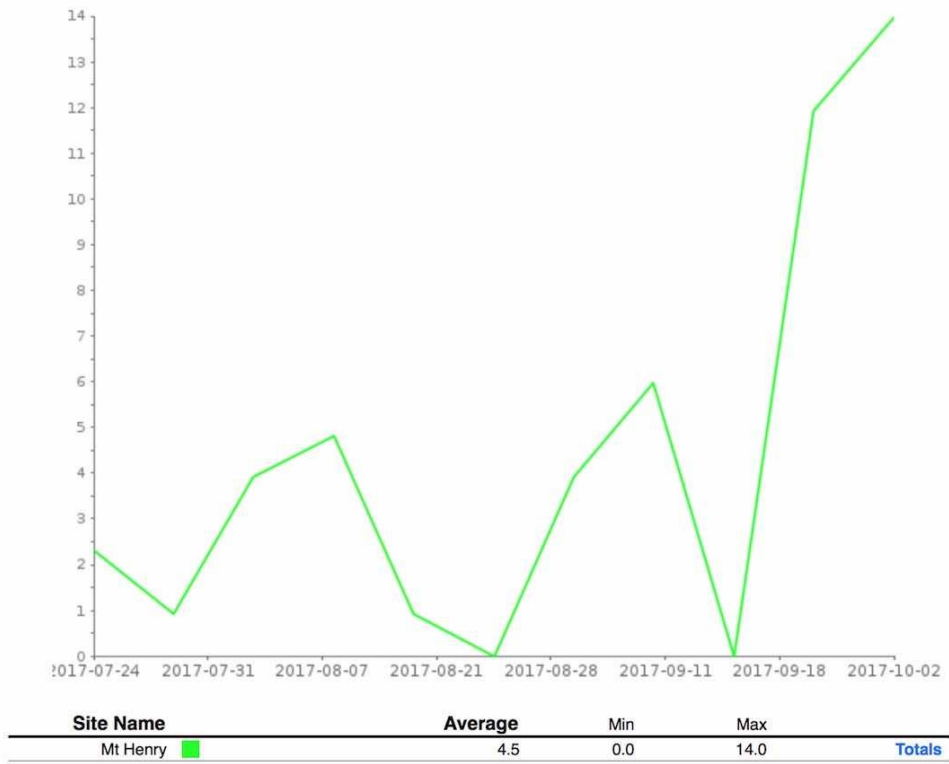
During the time that the Mt. Henry trail was monitored, there were an estimated 119 trail visits on the trail. Figure 24 contains the data from the highest use week recorded: September 8 to 15. Of that week, only September 11 and 15 recorded any counts. This was long after most thru hikers would have passed through this area. The wildlife activity in the area could be the cause of this spike week. Figure 25 contains the counts from the Mt. Henry trail compared to the air quality in Eureka, Montana. While the counts are low, they do seem to mimic the same spikes in worsening air quality. Figure 26 contains the counts compared to the maximum temperature recorded in Yaak, Montana. There appears to be lower counts during the hotter portion of the season.

I would not recommend continuing to monitor in this specific location. In original plans, a spur trail was discussed for the counter location but it was not able to be located after several attempts. While this counter was telling this season that PNT trail users are not using this section of the designated trail, continuing to monitor would not provide much information. From firsthand discussions, hikers are using unmaintained trail 161 instead to summit Mt. Henry.

Image 6: Location of the Mt. Henry Trail Counter



Figure 22: Mt. Henry Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 23: Mt. Henry Daily Averages

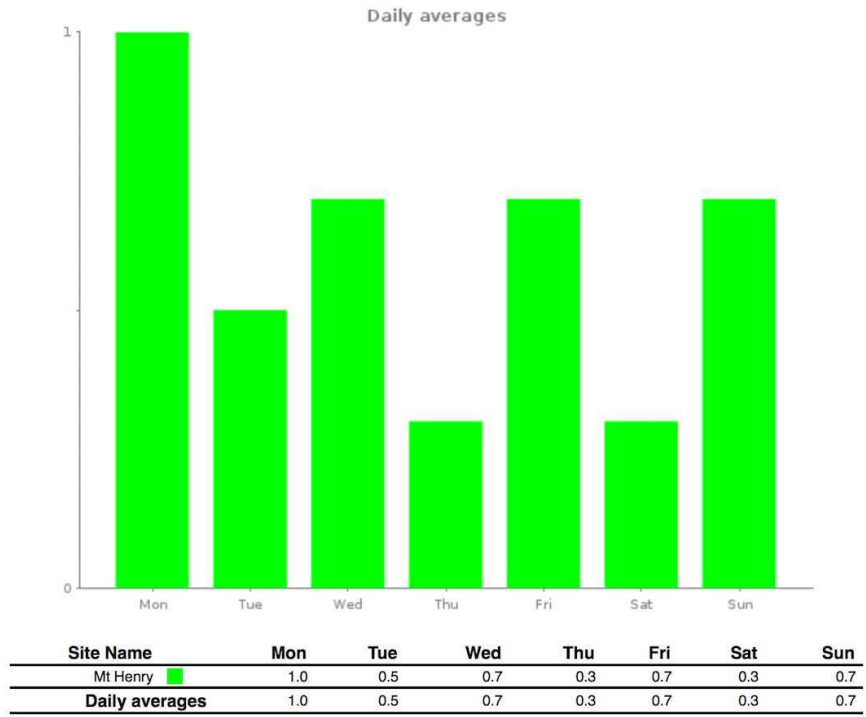


Figure 24: Mt. Henry Highest Use Week

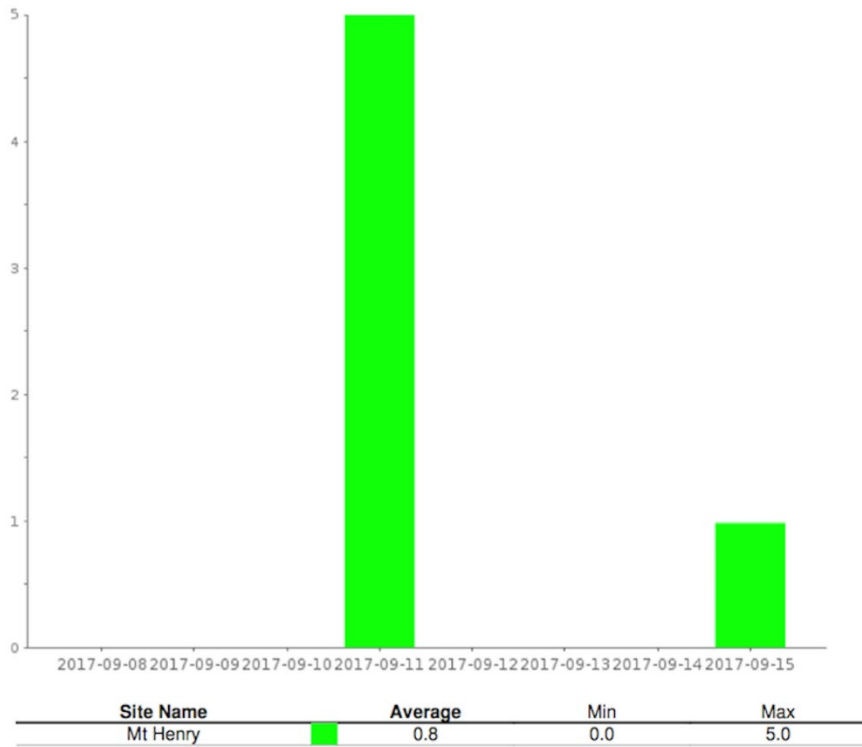


Figure 25: Mt. Henry and Air Quality

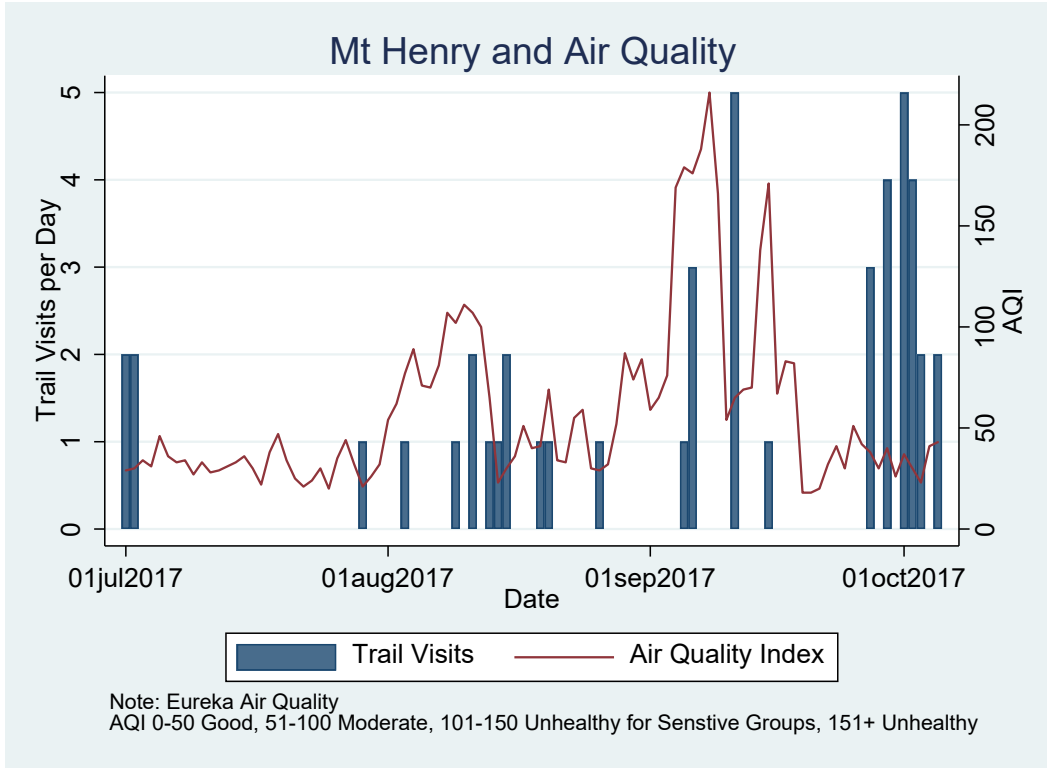
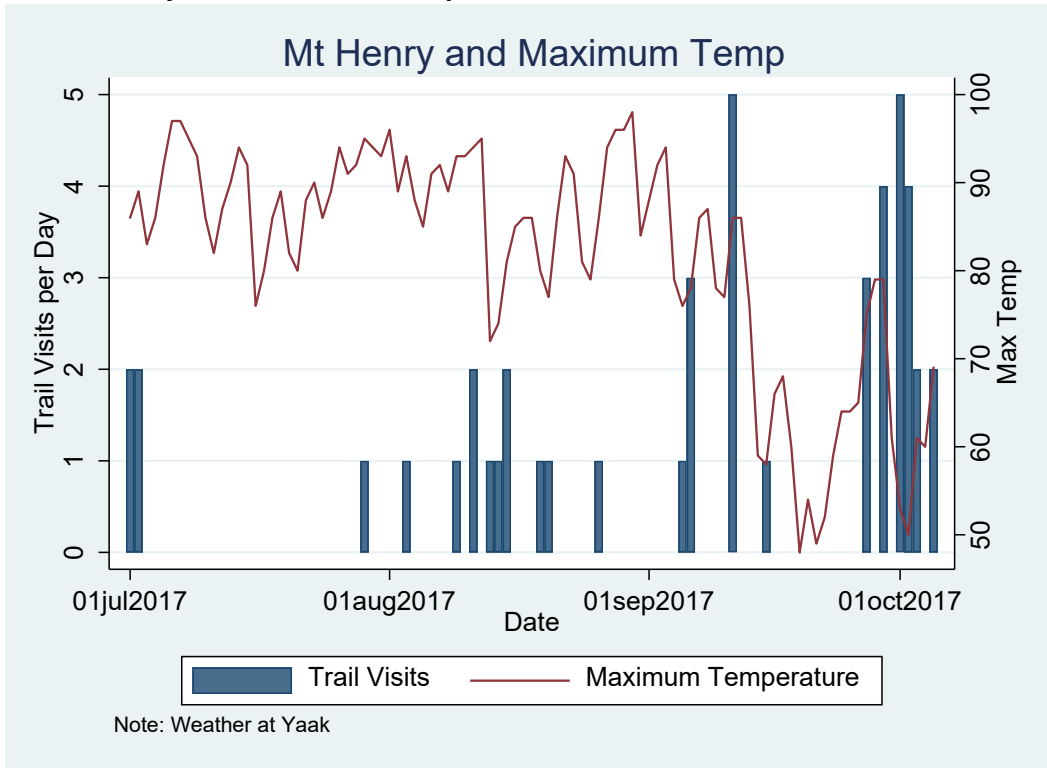


Figure 26: Mt. Henry and Maximum Temperature



Vinal Creek

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.

Figure 27 contains the weekly counts from the trail counter at Vinal Creek. The week of July 10 registered the most counts with 64 trail visits. This corresponds closely with the Fourth of July holiday and the ease of access to Fish Lakes. The Vinal Creek trail averaged 21.6 trail visits per week during this season. Figure 28 contains the daily averages from the Vinal Creek trail counter. Friday and Tuesday experienced the most use, with averages 5.8 and 4.3 trail visits respectively. The weekend traffic is potentially due to the fishing access in Fish Lakes. Figure 29 contains data for the highest use week recorded: July 5 through 12. By far, the highest use day of that week was Tuesday, July 11.

Figure 30 contains data from the Vinal Creek counter compared to the air quality in Eureka, Montana. This shows higher use on the trail while the air quality was at a lower, healthier level. When air quality rose and became unhealthy, use of this trail decreased significantly. Figure 31 contains the counts compared to the maximum temperature recorded in Yaak, Montana. The temperature appears to not have an effect on use of this trail.

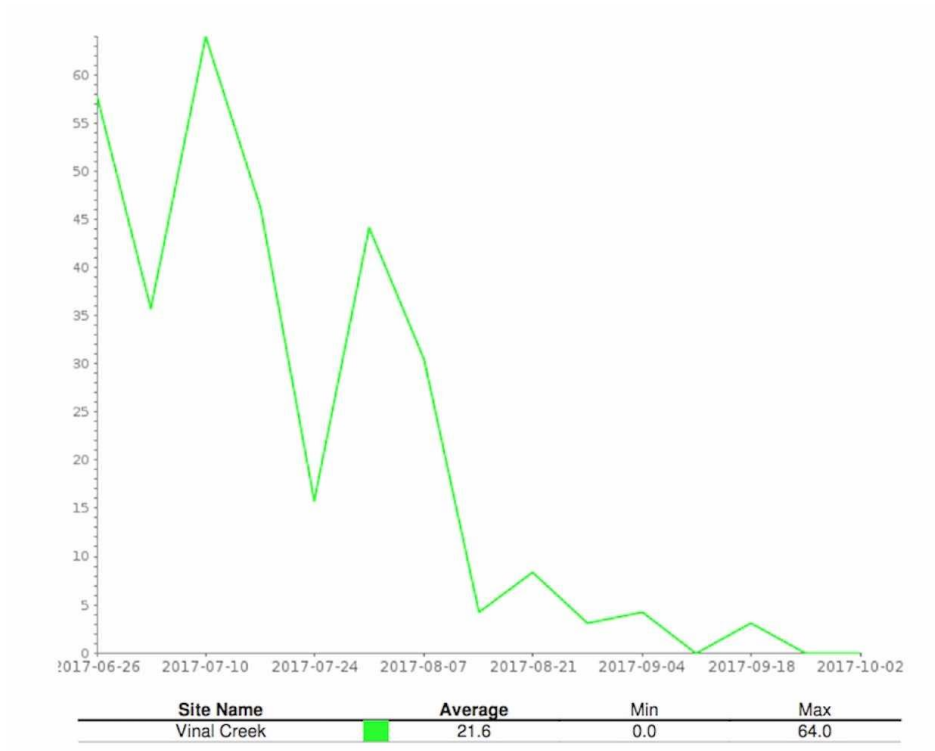
Based on personal and camera observations, the trail is frequented by people with their dogs, which could cause over-counts. During the time that the Vinal Creek trail was monitored, an estimated 407 trail users used the trail. I would recommend monitoring this trail in future years, as it is used by thru-hikers as well as heavily by day hikers. Another option would be to place the counter further down the trail past Fish Lakes to get a more accurate thru-hiker specific count.

Image 7: Location of the Vinal Creek Trail Counter²



² The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

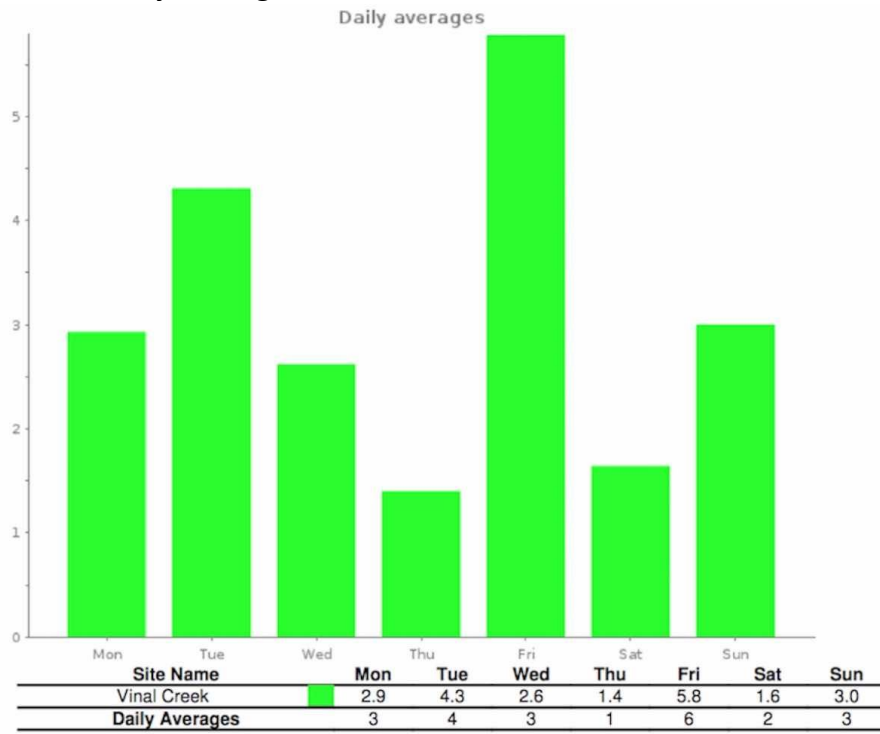
Figure 27: Vinal Creek Weekly Counts¹



* Based on Average Daily Traffic (ADT)

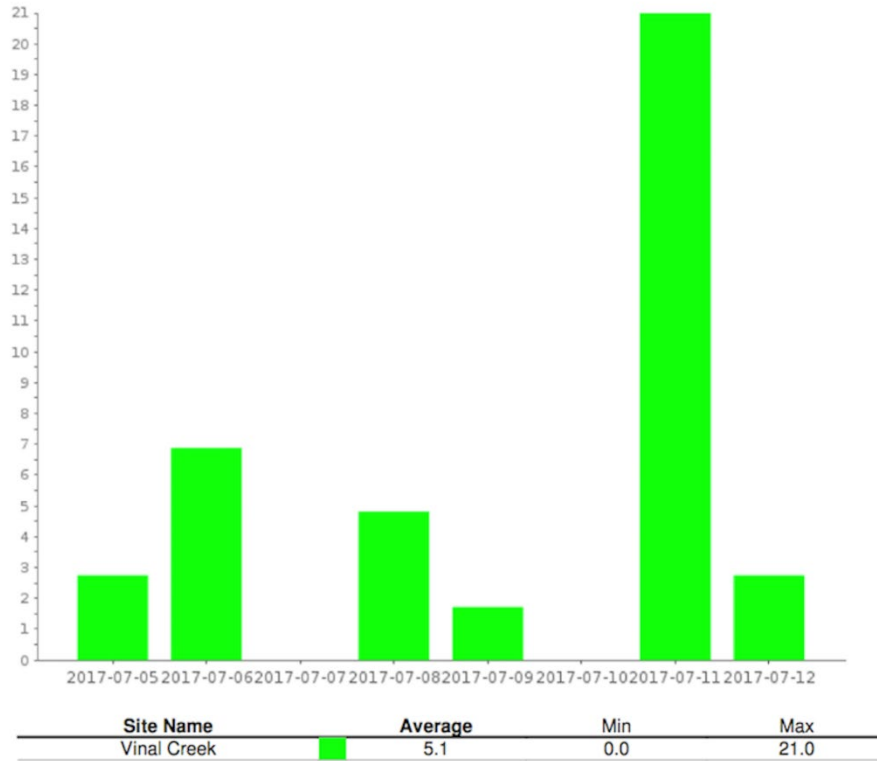
¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Figure 28: Vinal Creek Daily Averages¹



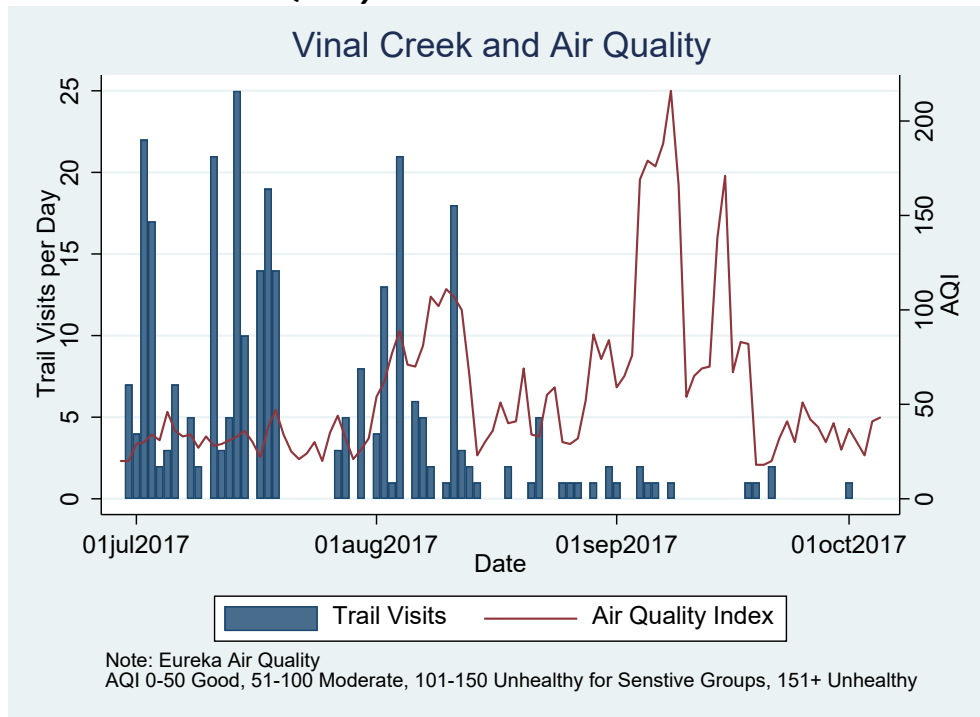
¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Figure 29: Vinal Creek Highest Use Week¹



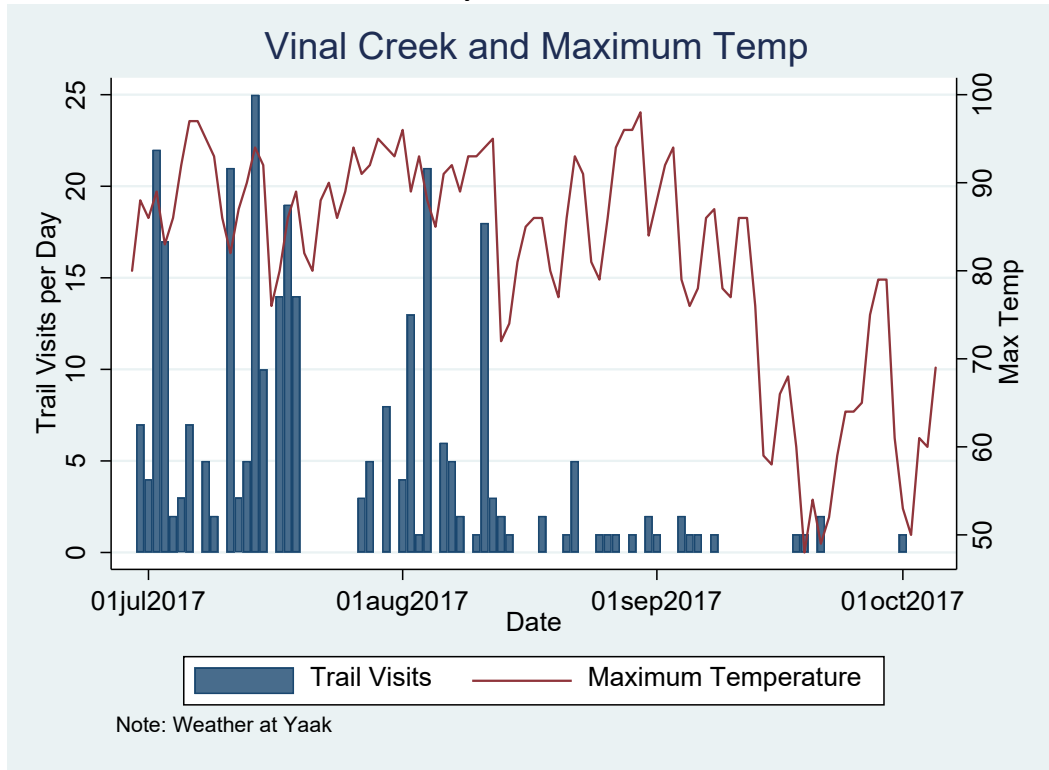
¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Figure 30: Vinal Creek and Air Quality¹



¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

Figure 31: Vinal Creek and Maximum Temperature¹



¹ The Vinal Creek monitoring site is not located on the PNNST and data is not PNNST use.

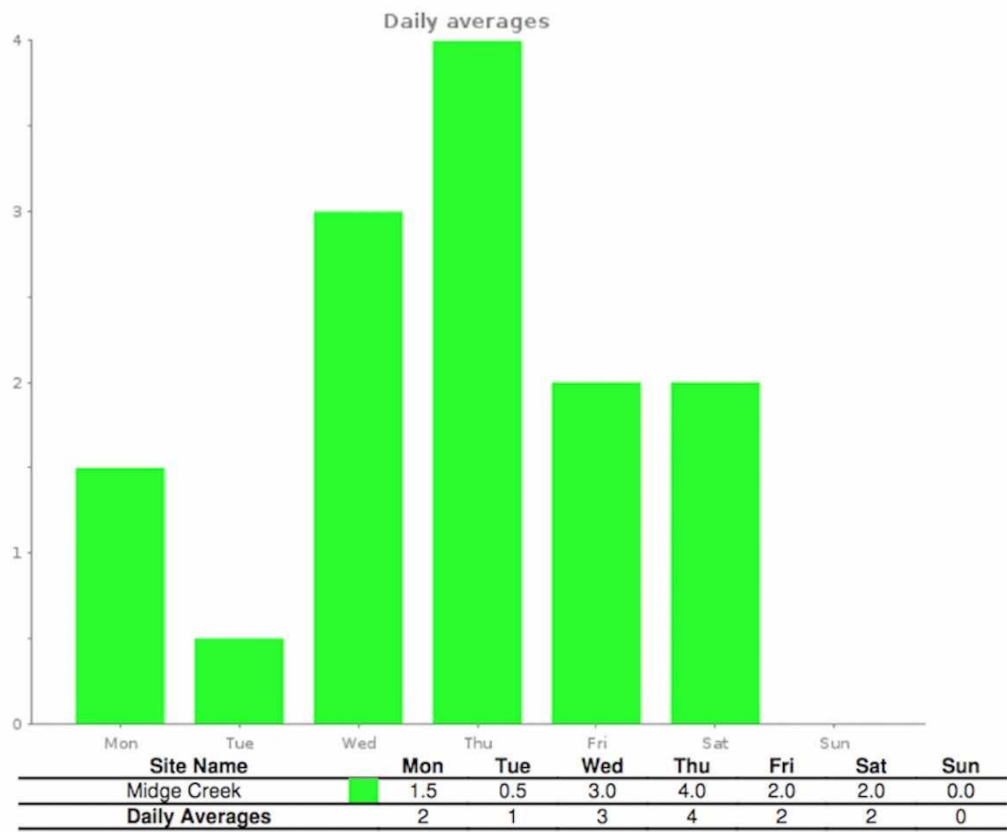
Midge Creek

Table 14 contains the daily averages from the trail counter at Midge Creek. This trail counter and the camera that was with it were lost due to suspected vandalism, and only 13 days of data in July were recorded in 2016. Due to the short duration that the counter was up, weekly data is not relevant for this site. Wednesday and Thursday were the highest use days, with 3.0 and 4.0 trail visits per day respectively. Because of the access to Midge Creek and the lack of any big destination from the trailhead, it is reasonable to assume that most counts from this counter account for thru-hikers. During the time that the Midge Creek trail was monitored, there were 57 trail visits counted. I would continue to monitor this trail, especially because the equipment was taken. However, I would caution the researcher should choose a location with vegetative cover for the camera as that appears to have been the giveaway of the location.

Image 8: Location of the Midge Creek Trail Counter



Figure 32: Midge Creek Daily Averages



Garver Mountain

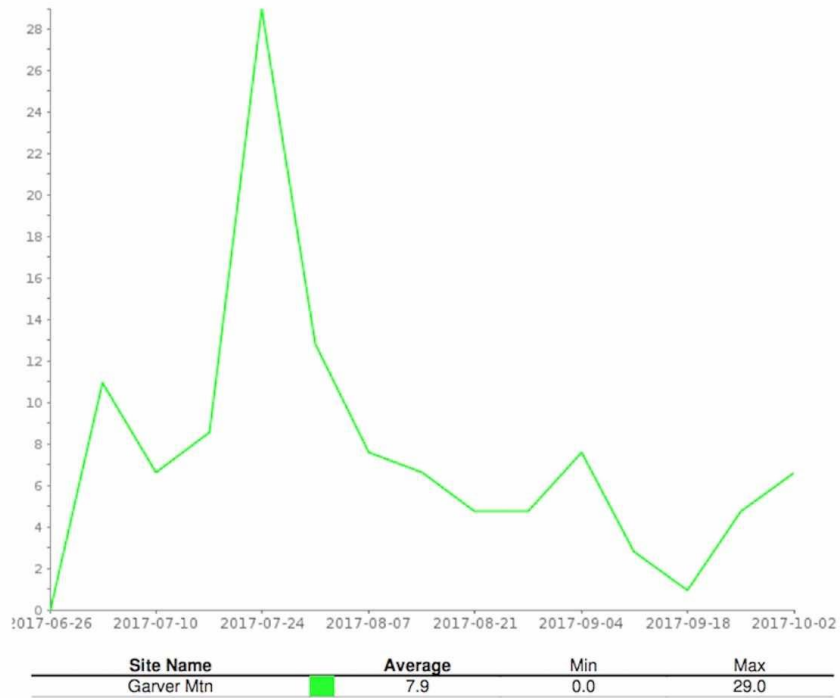
Figure 33 contains the weekly counts from the trail counter at Garver Mountain. The week of July 24 registered the most counts with 29 trail visits. There was an average of 7.9 trail visits counted per week. Figure 34 contains the daily averages from the Garver Mountain trail counter. Saturday experienced the most use, with an average of 2.2 trail visits per day. The use of the Garver Mountain trail could potentially experience higher weekend use due to the fire lookout for rent, although that is a far distance from the counter location. Figure 35 contains the daily counts from the highest recorded use week: July 26-August 2.

Figure 36 contains the counts from the Garver Mountain counter compared to the air quality in Eureka, Montana. Use remains relatively consistent throughout the monitoring season, but does decrease slightly during the time when air quality became unhealthy. Figure 37 contains the counts compared to the maximum temperature in Yaak, Montana. Counts remained generally stable throughout the monitoring season despite the high temperatures. Since this is the first season of monitoring, it is impossible to tell whether the low counts throughout the season are due in part to the high temperatures. During the time that the Garver Mountain trail was monitored, there were an estimated 137 trail visits on the trail. I would recommend continuing to monitor this trail as it is far enough from the lookout to avoid most day use traffic.

Image 9: Location of the Garver Mountain Trail Counter



Figure 33: Garver Mountain Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 34: Garver Mountain Daily Averages

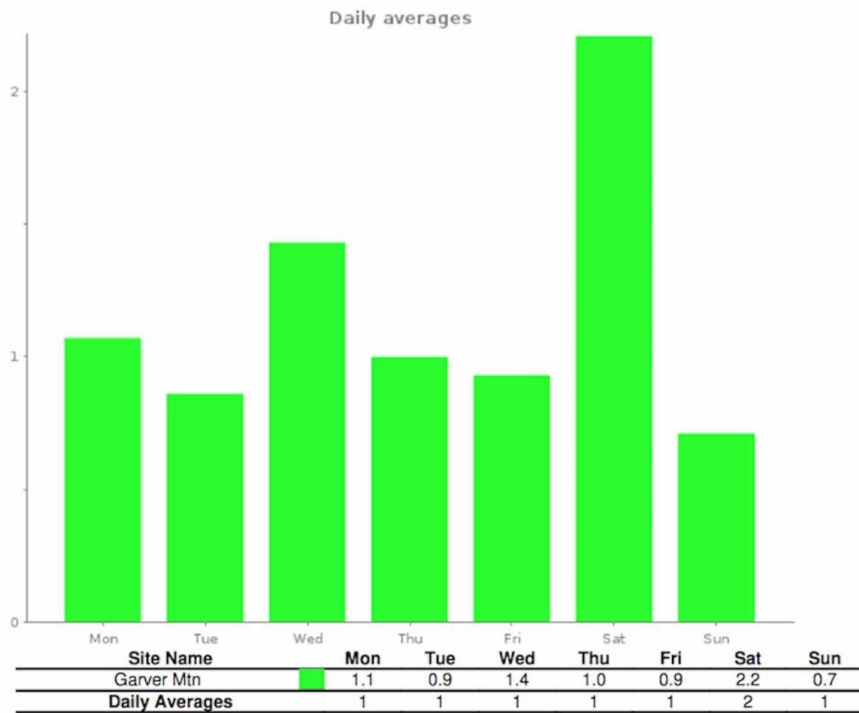


Figure 35: Garver Mountain Highest Use Week

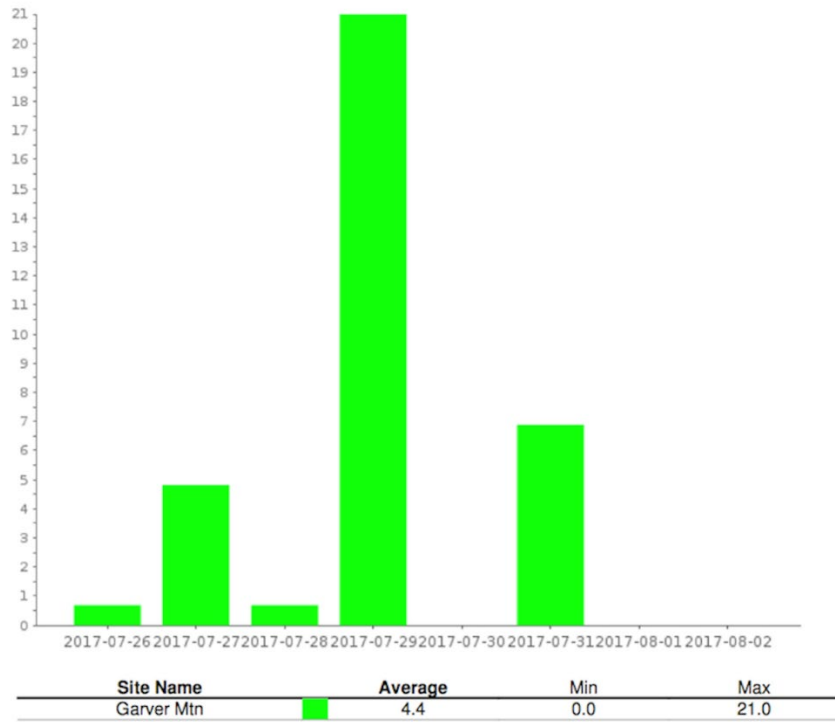


Figure 36: Garver Mountain and Air Quality

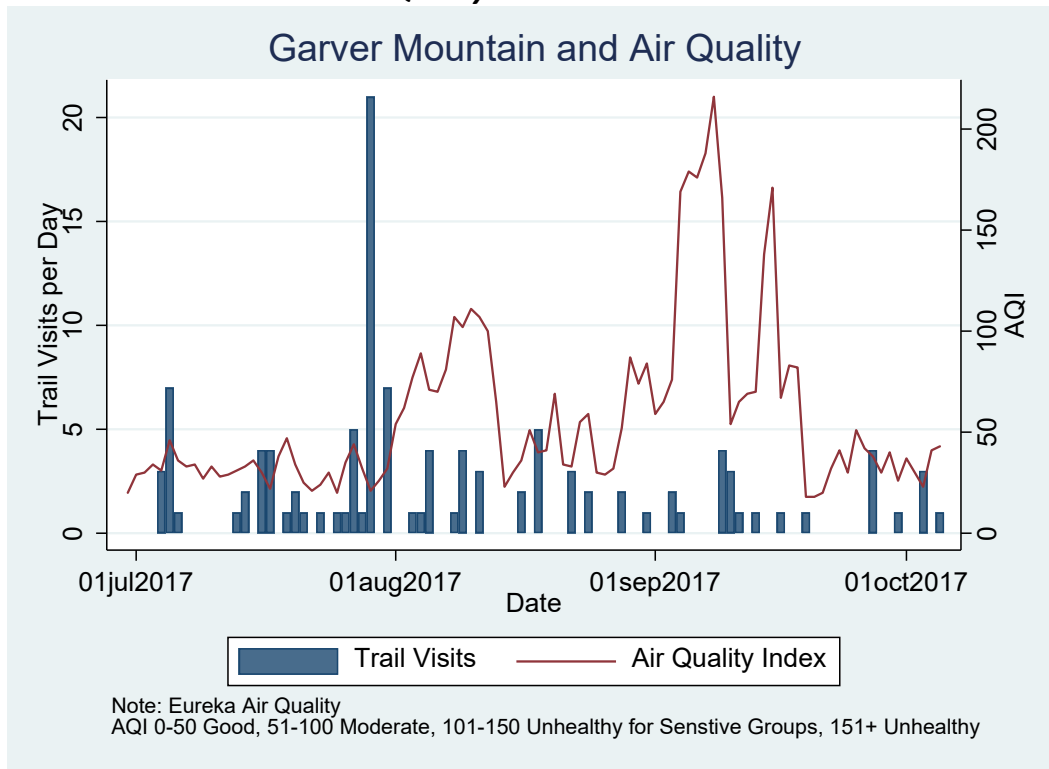
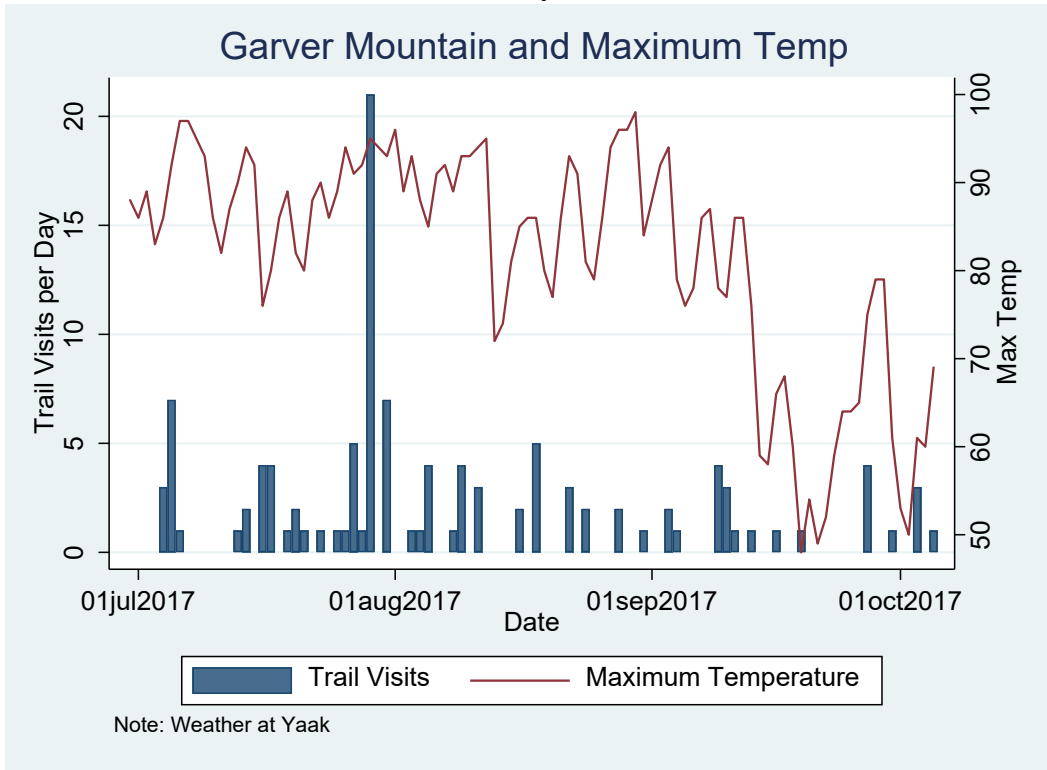


Figure 37: Garver Mountain and Maximum Temperature



Canuck Peak

Figure 38 contains the weekly counts from the trail counter at Canuck Peak. The week of August 21 to August 28 registered the most counts with 31 trail visits. An average of 9.8 trail visits per week used the Canuck Peak trail while it was monitored. Figure 39 contains the daily averages from the Canuck Peak trail counter. Saturdays experienced the most use, with an average 2.4 trail visits. Figure 39 contains the daily counts from the highest use week: August 21 to 28.

Figure 40 contains the daily counts from the Canuck Peak counter compared to the air quality in Eureka, Montana. Use of this trail appears to rise when air quality is at healthier levels. Figure 41 contains the counts compared to the maximum temperature recorded in Yaak, Montana. There appears to be no change in use based on temperature. Based on personal observations, the Canuck Peak trail is frequented by wildlife, particularly bears. This could cause a slight over-count in the data. During the time that the Canuck Peak trail was monitored, there were an estimated 319 trail visits on the trail.

I would recommend that this trail continue to be monitored since it is primarily thru-hikers and results could be compared to the nearby trail register. However, based on personal experience, this trail is frequently visited by bears, so there may be miscounts especially during evening or night hours.

Image 10: Location of the Canuck Peak Trail Counter

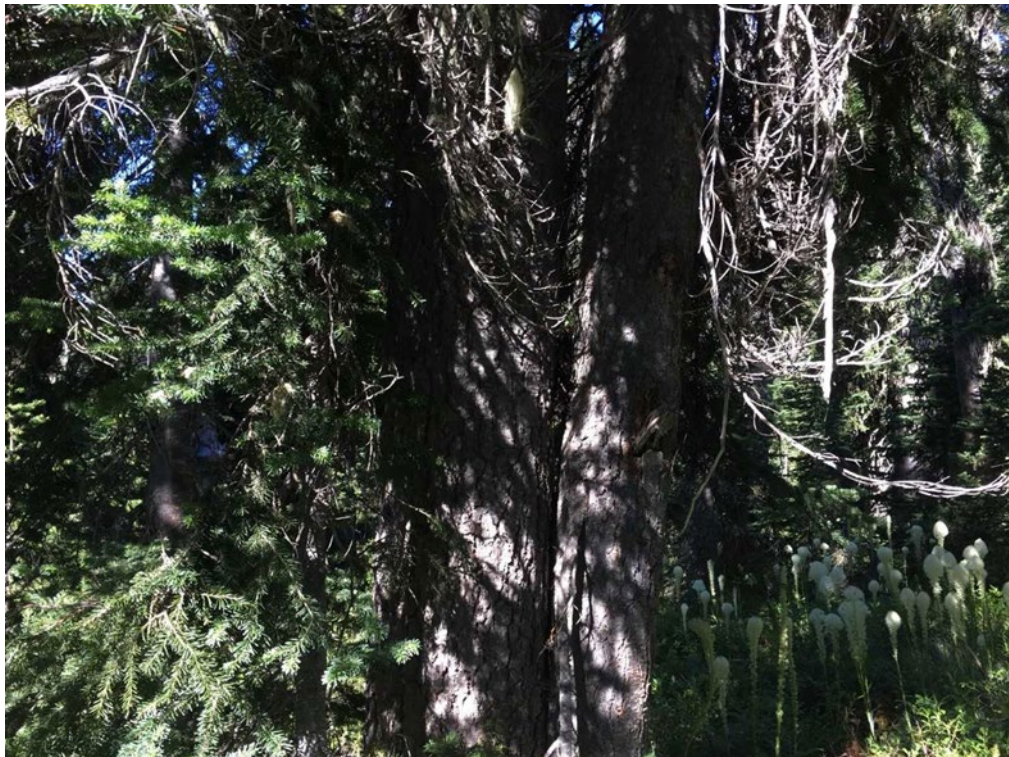
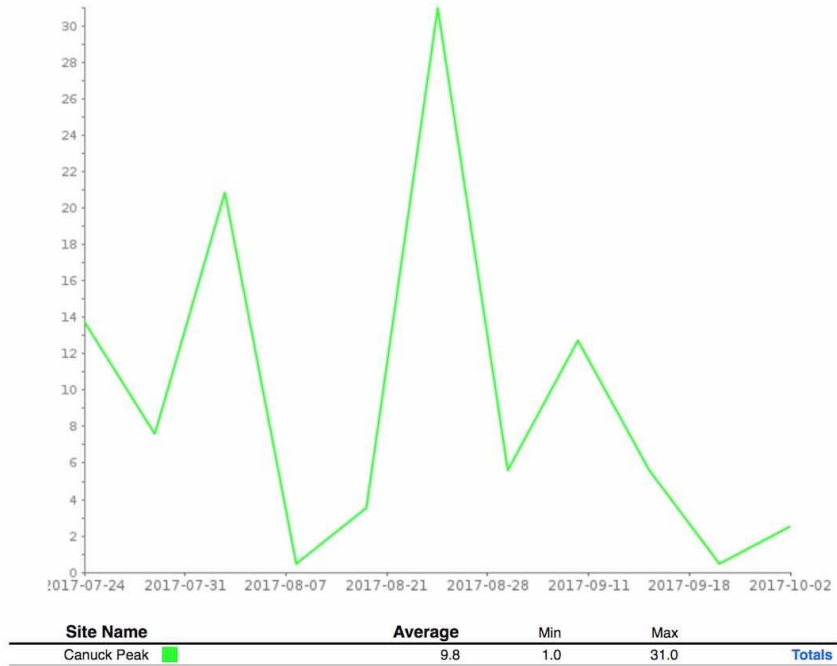


Figure 38: Canuck Peak Weekly Counts



* Based on Average Daily Traffic (ADT)

Figure 39: Canuck Peak Daily Averages

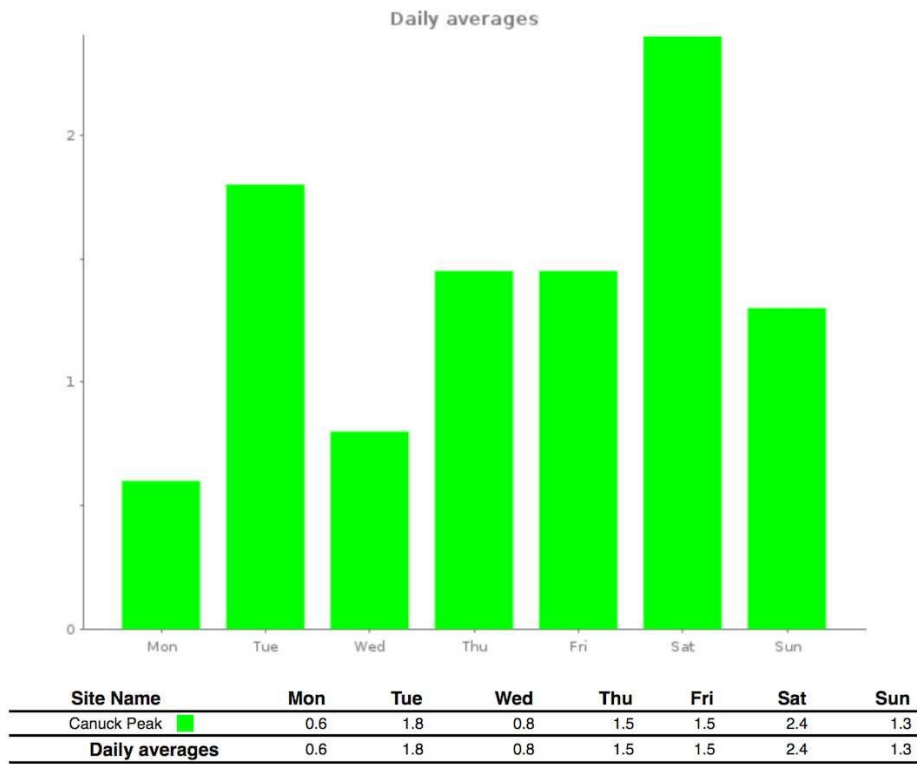


Figure 40: Canuck Peak Highest Use Week

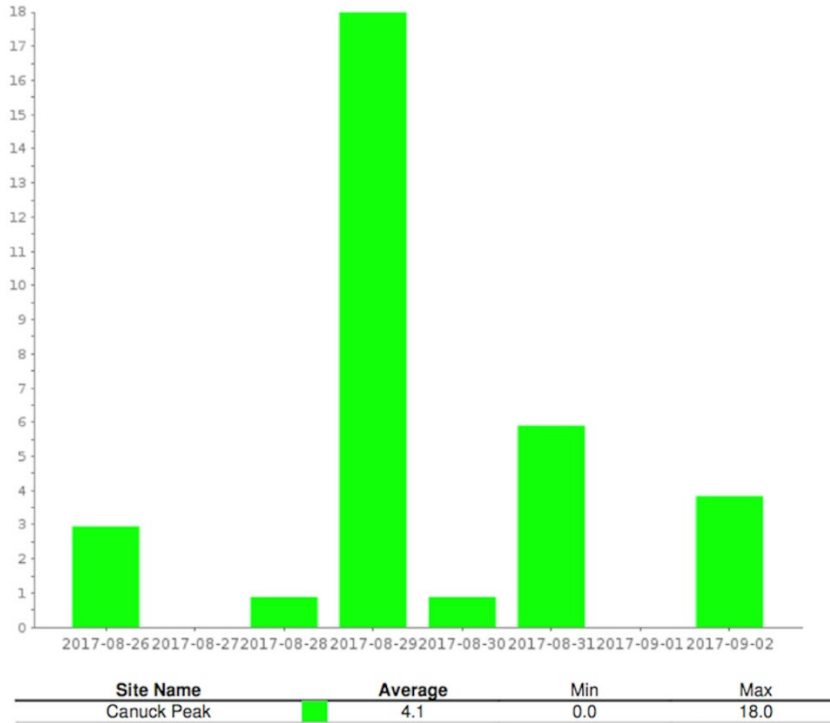


Figure 41: Canuck Peak and Air Quality

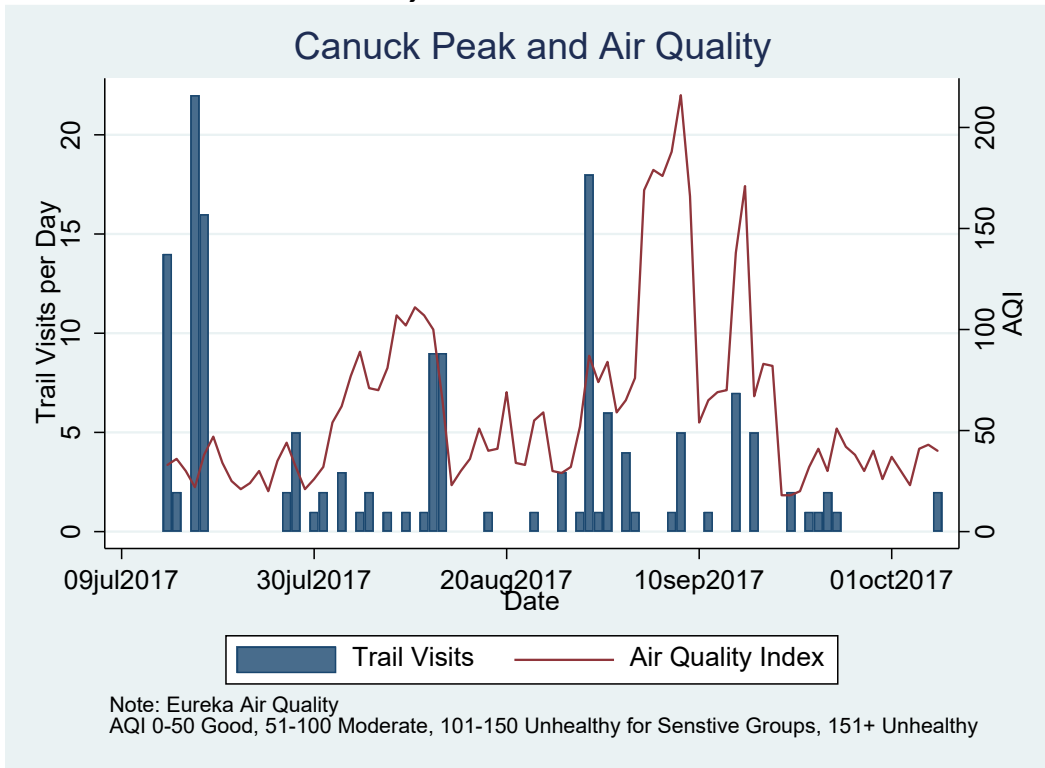
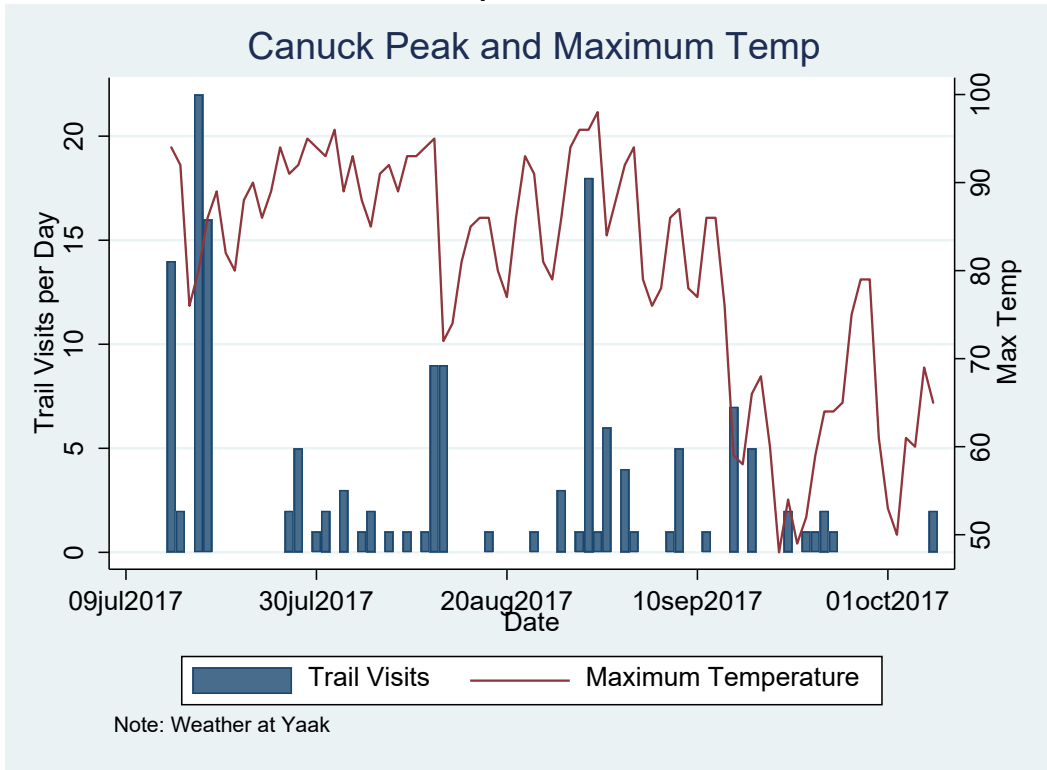


Figure 42: Canuck Peak and Maximum Temperature



Recommendations for Future PNNST Monitoring

Based on the experiences of the researcher, there are six recommendations to aid future data collection. First, the researcher should have a partner. This would ease concerns of safety and add increased reliability and judgment for trail counter location. Second, the researcher should be provided access to a GPS unit. There was an incident this year where a counter needed to be pulled due to fire danger and the researcher did not have approximate coordinates. A third recommendation would be for the researcher to be equipped with a SPOT device or some sort of radio so that they could communicate if something were to go wrong. There is no cell phone service at any of the locations monitored. Fourth, game cameras with night-vision capabilities should be considered for use. The researcher was informed by hikers that they were hiking at night due to the extreme heat of the summer, but was unable to verify counts when looking at camera data. Fifth, the researcher requires a four wheel drive vehicle since many of the roads offered poor driving conditions and using inadequate vehicles compromised the accessibility of the trailheads and ultimately delayed the installation of some counters. Finally, a lock to prevent theft or damage should accompany the counters and cameras.

Field Notes

Having spent a large amount of time in the field, I was able to gain significant insights based on my own observations and discussions with thru-hikers and locals. While attempting to set up a trail counter on 'a spur trail' off of Vinal Creek near the Mt. Henry lookout, this spur appears to have disappeared. In the attempts to find the trail, I walked to the junction to trail 161, upon which was a sign saying that it was unmaintained. I also found a note from a thru-hiker saying that the trail was horrible and that people should not use it. After talking with many hikers, it seems that despite the warnings from the Forest Service and the thru-hiker that many continue to utilize trail 161 to reach the summit of Mt. Henry. Also through discussions with hikers I was informed that many chose to hike in the early morning or evening/night hours in order to avoid the harsh heat that plagued Montana this summer. This could potentially affect counts that may otherwise be discarded as potential animal counts since the cameras were not equipped with night vision. By the time that thru-hikers reached the Western portion of Kootenai National Forest, many were tired of walking on roads and were eager to accept rides or water from me, potentially due to the intense heat and exposure of the road.

The majority of the counters were located in and around the Yaak region of Kootenai National Forest, so I spent the most time in the town of Yaak. While there I spoke to the owners of both the Yaak Mercantile/Tavern and the Dirty Shame Saloon, both of which are very enthusiastic about having thru-hikers. Both business owners offer hikers opportunities to camp in their yards for free. The Mercantile serves as a nice resupply opportunity and the Dirty Shame offers hikers showers and laundry services. Outside of business owners, the majority of people are supportive of the idea of the PNT going through the region, as it supports businesses and could incentivize maintenance of the nearby trails. This included members of the Yaak Valley Forest Council, a group that publicly opposes the PNT. Only one person expressed that PNT hikers were using "their trails" and that they thought that the presence of thru-hikers was off-putting.

Online presence

There is an increase in the technological use and reliance by thru-hikers. For many long distance trails, including the PNNST, there are several Facebook groups that allow for personal connection, communication, and information sharing. The PNNST has three main groups on Facebook for hikers to communicate in this way: 'PNT Hikers', 'PNT Class of 2017', and 'Pacific Northwest Trail Thru-Hikers'. From interviews with hikers from 2017, a large majority of them utilized these groups for updates, questions, and as a way to stay in contact with others.

Recommendations for other PNNST work

Trail monitoring on the PNNST is necessary for understanding the overall use of the trail, not just by thru-hikers but by day hikers as well. There needs to be more studies done on the other sections to monitor those use levels as well. Some limitations do arise in when using this style of monitoring. Animals are also using these trails. It is impossible to distinguish a count from a bear from a thru-hiker. This is unavoidable unless we were to use constant camera monitoring to verify every count. Another limitation of using trail counters on the PNNST is that these locations are very remote and time intensive to access for the researcher. Weather conditions also pose a challenge for trail counter work, as they cannot be set up when there is significant snowpack due to the later melting and they cannot be checked when it is raining or risk damaging the equipment.

Document Review

Communication Plan: Forest Plan Direction for the Continental Divide National Scenic Trail

USDA (2016). *Communication Plan: Forest Plan Direction for the Continental Divide National Scenic Trail*. Forest Service Rocky Mountain Region. http://continentaldividetrail.org/wp-content/uploads/2016/10/FINAL_CDT_Communication_Plan.pdf

This summary report by the USDA includes a template for management decisions about the Continental Divide National Scenic Trail (CDNST) as well as an action plan with deadlines for accomplishing tasks. The report also addresses several frequently asked questions concerning the actions surrounding trail management. The goal of this document is to lay structure for the CDNST to be consistently managed, well-marked, and sustainable.

The benefits of this report is that it accomplishes getting the various management groups for each region united in their goals and expectations concerning the CDNST. The timetable and checklist demonstrate how the tasks have been broken down and tackled in manageable amounts of time. There are both succinct and lengthy answers to each of the identified frequently asked questions, providing all readers an opportunity to understand to their desired level. The goal of the plan is to unite all management groups in maintaining the CDNST to “National Scenic Trail standards”.

This document is important when looking at the formation of the PNNST management plan for several reasons. First, this serves as an example of a clear and digestible briefing which is how all future PNNST briefings should be. Second, this document brings forward the idea of a standard for how National Scenic Trails should be maintained. The PNNST should adhere to similar standards or develop a unique system of values that can be applied to all management areas that the trail crosses through. Finally, the timetable and checklist demonstrate a clear and understandable way to accomplish tasks. All official PNNST tasks should be clearly stated within a manageable timetable.

Continental Divide National Scenic Trail Planning Handbook

Greg Warren (2018). *Continental Divide National Scenic Trail Planning Handbook*. NTS.org. http://nstrail.com/management/cdnst_planning_handbook.pdf

The purpose of this document is to understand the varying areas included in National Scenic Trail planning and to address how the Continental Divide National Scenic Trail plan needs to incorporate all of these areas. This report is divided into eight chapters which cover an introduction, nature and purposes of the CDNST, land management planning, legislative history and policy, comprehensive planning relationship to NEPA,

completing the CDNST, glossary, and disclosure (p. 3). The overall goal of this report is to establish the basic guidelines for the planning of the CDNST that are established by the various legal documents and proceedings that the trail must adhere to.

The key findings for this document lie in the organization of the document and the decision making within the third chapter. The overall organization of the CDNST Planning Handbook is a great example of how to display the myriad of concepts that go into the creation of a management plan. The third chapter includes segments on “Rights-of-Way and National Trail Management Corridor”, “Carrying Capacity”, “Establishing the CDNST Travel Route” and more. Each of these land management challenges require decisions to be made decisively and followed. The CDNST Planning Handbook succeeds in creating an easier path for planners to follow to a successful, less contentious, and unambiguous plan.

The CDNST planning handbook will prove very useful in preparing for the PNNST management plan. The creation of a similar document for the PNNST would be very helpful in aiding the creation of the management plan, ensuring that it meets all pre-established requirements. Much of this CDNST planning handbook can be directly referenced, especially in regards to more generally applicable documents such as the National Trails System Act and NEPA. A planning handbook for the PNNST management proceedings would eventually aid in accuracy and efficiency.

Landscapes of Movement: Exploring a Contemporary Approach to Long-Distance Non-Motorized Backcountry Recreation Trail Planning

Binder, C. M. (2015). *Landscapes of Movement: Exploring a Contemporary Approach to Long-Distance Non-Motorized Backcountry Recreation Trail Planning*.

<https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1489&context=gradreports>

This study, conducted at Utah State University, examines the planning failures of other long trails and creates a framework that the author hopes to be applicable to the long-distance trails that traverse through the Wasatch Range of Utah. This report establishes proposed routes through the mountain range as well as performance outcomes, environmental outcomes, economic outcomes, social outcomes, and aesthetic outcomes.

The key findings within this document lie in the framework suggested compared with the framework of existing trails. There are issues in the current planning of long distance trails and they do need to be addressed in some way. The suggestion by Binder is an untested framework that may be of some use if examined and adapted to the specific needs of a trail in question.

The PNNST could benefit from this study by examining the planning techniques and framework described. This model could be examined to determine whether or not it is a good fit versus traditional planning models. The disclaimer is that this methodology and planning has not been concretely tested on the landscape, so to follow this plan blindly may lead to some unforeseeable issues.

Arizona Trail Strategic Plan

Arizona Trail Association. Strategic Plan 2016-2020. <http://www.aztrail.org/StrategicPlan.pdf>

The Strategic Plan for the Arizona Trail Association (ATA) is a brief 10 page document detailing the workings of the ATA for those five years. The mission and vision for the ATA is described as well background on how the organization has operated so far. The Strategic Plan also includes a page describing the functions that the ATA serves and why it needs to continue to operate. Finally, this document includes five 'mission responsibilities', each with a multitude strategic goals that have unique deadlines.

One of the critical findings from this document is the identification of the "Functional Needs" of the trail and how any why those needs should be met. The creation of clear "Mission Responsibilities" and the goals and steps to complying with the responsibility is also a notable feature of this report. By stating clear and feasible needs and goals for the trail, the AZT will have an obvious path to success.

For the PNNST, it would be useful to create a similar document for the Pacific Northwest Trail Association (PNTA) so that the mission, vision, functions, and responsibilities could be aligned exactly with those of the trail management plan. By unifying these aspects, the completion of the trail could be easier and more efficient.

Public Engagement Report for the Arizona National Scenic Trail Comprehensive Management Plan

Titre and Sharp (2012). Public Engagement Report for the Arizona National Scenic Trail Comprehensive Management Plan. For the United States Forest Service Southwestern Region. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd567374.pdf

The public engagement report for the Arizona National Scenic Trail (AZT) is a detailed result of the public engagement process that included trail users and stakeholders. The process included utilizing sensing techniques, public workshops, and e-collaboration to collect unique findings to be included in the impending management plan. The report also includes the management plan process which involves 10 action steps to completion.

The key finding of this document lies in the variety of outreach methods utilized. There are many stakeholders involved in a long distance trail, from community members to users, and it is vital that all are able to provide input and feel heard and acknowledged in the trail's creation. This document outlines a great framework and example of how best to go about accessing the public for input and what the identified concerns are so that they can be addressed in the impending management plan.

This report for the AZT is very important when considering the creation of the PNNST comprehensive management plan. There will need to be a public engagement process, and this model seems to have done a very thorough and effective job of reaching the stakeholders and trail users of the AZT. The greatest takeaway from this report is that all trail users and stakeholders need to be reached in order to get an accurate and adequate understanding of how the public regards the National Scenic Trail in question. The action steps and the implementation of the public input could serve as a model for the future actions of the PNNST.

Appalachian National Scenic Trail Resource Management Plan

National Parks Service (2008). Appalachian National Scenic Trail Resource Management Plan. https://www.nps.gov/appa/learn/management/upload/Appalachian_Trail_Resource_Management_Plan.pdf

The purpose of this plan is “to document the Appalachian National Scenic Trail’s natural and cultural resources and describe and set priorities for management, monitoring, and research programs to ensure that these resources are properly protected and cared for” and to create a 10 year strategy to guide resource management by the Appalachian Trail (AT) as well as the Appalachian Trail Conservancy (ATC). All objectives within the resource management plan are consistent with those of the comprehensive plan and strategic plan for the AT. This plan consists of 5 major chapters: introduction to the AT, present resource status, cultural resources, the AT resource management program, and comprehensive program and project statements.

The Resource Management Plan is significant because it outlines the resources of the trail, both cultural and physical, as well as how to adequately manage and protect them. The AT is travelled by thousands of hikers each year and there is an immediate need to manage the resources of the corridor.

Preparation for the Resource Management Plan began in 2001, discussed in public meetings, and held 2 scoping meetings in 2001. The preliminary draft distributed Oct. 2004. There would need to be a similar process completed for the PNNST when possible. How the agency determined the resources of the trail and set about their scoping process will prove helpful when the PNNST is ready to undertake a similar inventory process.

Monitoring Natural Resources on the Appalachian Trail

Odell and Belleville. Monitoring Natural Resources on the Appalachian Trail. The Appalachian Trail Conservancy. <http://www.pnts.org/wp-content/uploads/2010/06/Resource-Monitoring-on-the-AT-Presented-by-Laura-Belleville-ATC.pdf>

This presentation by the ATC focuses on monitoring natural resources on the AT, particularly invasive exotic plants, natural heritage, and phenology. The presentation also describes the Appalachian Trail corridor, its biological makeup and hotspots as well as how to involve citizen scientists in the monitoring process. The process for monitoring natural resources on the AT is stated to be an adaptive cycle.

The presentation on monitoring natural resources on the AT brings forward the important concepts of identifying and monitoring the natural resources available along this National Scenic Trail. Monitoring can be labor and time intensive, so it is important to utilize motivated citizen scientists in the ongoing process.

The PNNST should begin to make decisions about what resources they are concerned about monitoring and how they will go about that monitoring process. There need to be consistent designations throughout all management planning documents about how and what is managed.

Camping Management Practices for the AT Visitor Use Management Plan

Marion, Jeffrey L. (2003). Camping Impact Management on the Appalachian National Scenic Trail. Appalachian Trail Conference, Harpers Ferry, WV. 109pp.

This document is Appendix 2 of the Marion (2003) document concerning management of camping along the AT. This appendix details strategies and tactics for managing issues with camping as well as criteria for campsite selection. All of the strategies suggested are relevant to the AT visitor use management plan.

The key takeaways from this are the two tables on page 86 and 96 respectively. Page 86 includes the graphic entitled 'Strategies and tactics for managing camping-related resource and social impacts'. Within this table, there are seven major categories which include: reduce use of problem areas, modify the location of the use within problem areas, modify the timing of use, modify type of use and visitor behavior, modify visitor expectations, increase the resistance of the resource, and maintain or rehabilitate the resource. Each of these major categories include several listed strategies. The table on page 96 is titled 'Campsite selection criteria' and includes heading about campsite location, expansion potential, campsite slope, and vegetation groundcover. Each of these categories also have appropriate criteria listed beneath them.

This information is relevant to the PNNST especially as use continues to rise. With increased numbers of thru-hikers, managers will need to specifically dictate how best to approach camping and the potential degradation of resources that accompanies frequent use of an area.

Appalachian National Scenic Trail Pilot Survey

Zarnoch et al. (2011). Appalachian National Scenic Trail Pilot Study. For the National Park Service US Forest Service Southern Research Station.
https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs143.pdf

This report discusses the development of a prototype survey intended to be used to estimate visitation along long, linear trails and its implementation on a major portion of the AT. The study also intended to create a preliminary estimate of the resources required to survey the entire AT for one year.

The key takeaway from this study is how they developed and tested this pilot survey as well as the successes and failures that came out in the results. Of the three research objectives, this pilot study was at least partly, if not completely satisfying in all categories.

While there would need to be adjustments made, the PNNST could adopt this pilot survey to better estimate visitation on the trail. By utilizing this report, managers could potentially glean more ideas into how best to understand visitor use along the PNNST corridor. Through understanding visitation patterns, the PNNST could create a more comprehensive management plan.

Pacific Crest National Scenic Trail 1982 Comprehensive Management Plan

US Forest Service (1982). Comprehensive Management Plan for the Pacific Crest National Scenic Trail. Pacific Northwest Region.
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5311111.pdf

This document is the 1982 Comprehensive Management Plan for the Pacific Crest National Scenic Trail (PCT). Comprehensive management plans are intended to provide overall guidance and outline objectives for the development and management of the trail. The PCT is managed by the US Forest Service despite crossing through a variety of jurisdictions.

One of the greatest takeaways from this document is that it has not been updated since 1982. While this may be caused by a variety of logistical reasons, planners for National

Scenic Trails need to consider that these management plans will be in place for long stretches of time. Also, it is important to note the various 'specific plan objectives' set forth and how those are later addressed.

The PNNST should closely examine this plan, as it was created at a similar phase in the lifetime of the trail. The PCT has experienced exponential growth since the implementation of this plan, and the PNNST should recognize the areas in which this plan has succeeded and struggled in the past years.

Pacific Crest Trail Association Trail and Land Management Page

Pacific Crest Trail Association. Trail and Land Management Webpage.
<https://www.pcta.org/our-work/trail-and-land-management/>

This page is located on the Pacific Crest Trail Association (PCTA) website, an organization that assists in maintaining and improving the PCT. This particular page on the website includes a description of how the PCTA assists in trail and land management by utilizing an all-lands approach with the hopes to help inform future management plans. The PCTA describes how they conduct trail assessments and optimal location reviews. The site also includes some sample projects as examples of their work.

The key finding from this document is how the PCTA views the landscape as one unit and adopts an inclusive, almost boundary-less approach to management. The PCT crosses through a multitude of land jurisdictions, so to attempt to manage without the imposed rules of each distinct land mandate requires a unique mindset for planning.

The PNNST could utilize this page when deciding how to best manage the land and trail within their corridor. While the PCT and PNNST do intersect, there are differences in the character of the two trails. The PNNST will need to determine the characteristics to manage for before conducting their own trail assessments and optimal location reviews.

Pacific Crest Trail Association 2007-2009 Strategic Plan

Pacific Crest Trail Association (2016). Pacific Crest Trail Association 2007-2009 Strategic Plan.
<https://caves.org/committee/planning/documents/PacificCrestTrailAssociationStrategicPlan.pdf>

This document is the Strategic Plan for the PCTA for 2007 to 2009. Included in this plan are conclusions and focus, a vision statement, a mission statement, the values of the PCTA, and six specific goals for the organization. Each of the goals include specific strategies as well as benchmarks and the statuses of each of those benchmarks.

The PNNST could utilize the information from this plan when creating its own management plan. Since a management plan is lengthy, it can be a daunting task. By clearly establishing goals and the strategies and benchmarks to reach those goals, the PNNST could tackle their impending tasks easier and more efficiently.

Response Letter from USDA about user conflict on the Pacific Crest Trail

US Department of Agriculture (2013). <http://www.sharingthepct.org/wp-content/uploads/2013/12/PCTRI-name-and-address-redacted-1.pdf>

This letter is addressing a previous and meeting concerning allowing mountain bikes on the PCT. The USDA makes the statement that the PCT is to be exclusively used for hiking and equestrian travel. Randy Moore of the USDA is concerned by the user conflicts on National Scenic Trails and promotes having different user groups developing a dialogue to create a solution.

The critical takeaway here is that there is a potential for user conflict on National Scenic Trails, especially because the policy on bicycle use is not uniform. While there is truth that unifying user groups in a dialogue may develop into a solution, it is also necessary for trails that prohibit certain activities to make that information public as well as their reasoning behind the decision.

There is uncertainty on this front for the PNNST. On the first page, there is mention of the PNNST: "The Arizona and Pacific Northwest National Scenic Trails are currently developing Advisory Councils and CMPs and in the interim allow bicycle use outside of designated wilderness". As the PNNST moves forward with these plans, they will need to make an informed decision and make that decision and reasoning publicly known whether or not bicycle travel will be permitted on the trail so that the public is not upset by the outcome.

California Recreational Trails System: Collaborative Lessons from the Pacific Crest National Scenic Trail, California Coast Trail and Juan Bautista De Anza National Historic Trail

California State Parks (2013). California Recreational Trails System: Collaborative Lessons from the Pacific Crest National Scenic Trail, California Coast Trail and Juan Bautista de Anza National Historic Trail.

http://www.parks.ca.gov/pages/1008/files/california_recreational_trails_system_collaborative_lessons_3.27.15_redu.pdf

This report was created by California State Parks and examines the recreational trail system within the state based primarily off of case studies from the three longer trails in the state: the PCT, the California Coast Trail, and the Juan Bautista De Anza National

Historic Trail. The purpose of this report is to learn lessons from the successes and failures of these trails and to then improve the trail system as a whole within California.

The critical lessons gleaned from this report are the interactions at play between jurisdictions on long distance trails and how these long distance trails fit into the California trail system. This report suggests a multitude of collaborative tool recommendations to facilitate trail partnerships as well as to maintain existing partnerships. Without functional partnerships, long distance trails would not exist in their current capacity.

The PNNST also has much to gain from examining this report. Various opportunities and challenges to success are outlined on pages 11-12 and these should be examined and evaluated as they pertain to the PNNST. The PNNST also should examine their current and potential opportunities for partnerships, as this would facilitate smoother growth going into the future. There also needs to be recognition of the multijurisdictional nature of the PNNST, and examining this document will assist in understanding how other long distance trail systems have approached those challenges.