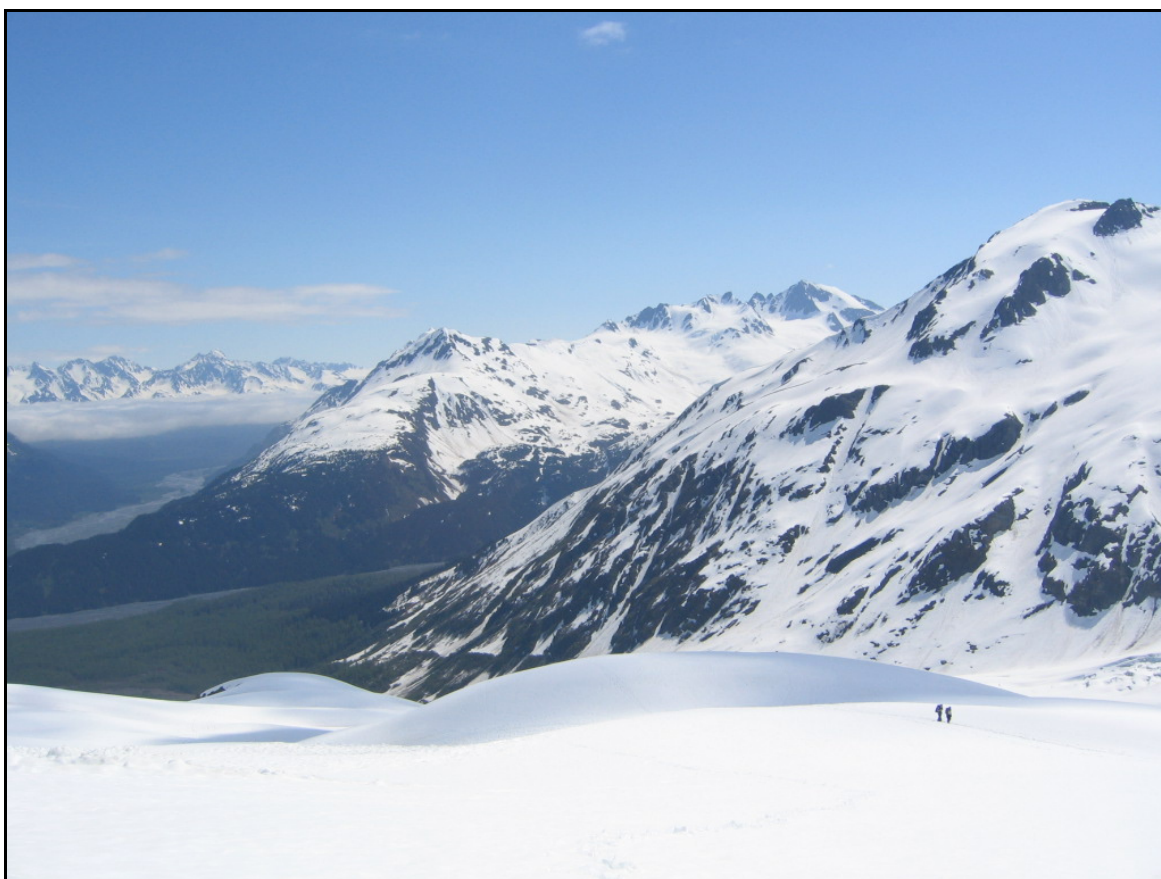




2008 Harding Icefield Trail Report

Kenai Fjords National Park

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Heavy snowfall during the 2007-2008 winter, followed by below average temperatures during the 2008 summer, resulted in persistent snow at higher elevations of the Harding Icefield Trail. Photo taken June 17, 2008.

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Abstract

The Harding Icefield Trail is the longest maintained trail in Kenai Fjords National Park and is a popular day trip for visitors. The trail continued to receive heavy visitor use during the 2008 summer field season at Kenai Fjords National Park. The summer was unusual in that snow persisted on the trail throughout the entire season. The persistent snow during the summer season created muddy conditions and required extra attention from Resource Management staff to protect vegetation and minimize impacts on the trail as the snow melted. Work continued on the reroute along the first half mile of the trail, including completion of blasting in September. No new exotic plant infestations were observed along the trail.

Keywords

Kenai Fjords National Park, Harding Icefield Trail, Exit Glacier

Introduction

The Harding Icefield Trail (HIT), located next to Exit Glacier in Kenai Fjords National Park (KEFJ), continues to receive heavy summer use by hikers (Figure 1). From May 23 to September 10, 2008, 8,971 people signed in at the trail register (Figure 2). This is not a conclusive number because surveys have documented that many hikers do not sign in at the trail register thus, the number of hikers on the trail is most likely higher than the register numbers reflect. Management priorities for the summer 2008 field season were: preventing new vegetation damage, monitoring visitor use and visitor impacts, and conducting restoration work. Debbie Kurtz (Biological Technician), Brooke McFarland (Biological Technician), and Christina Kriedeman (SCEP Biologist) were involved in several trail projects that supported these priorities.

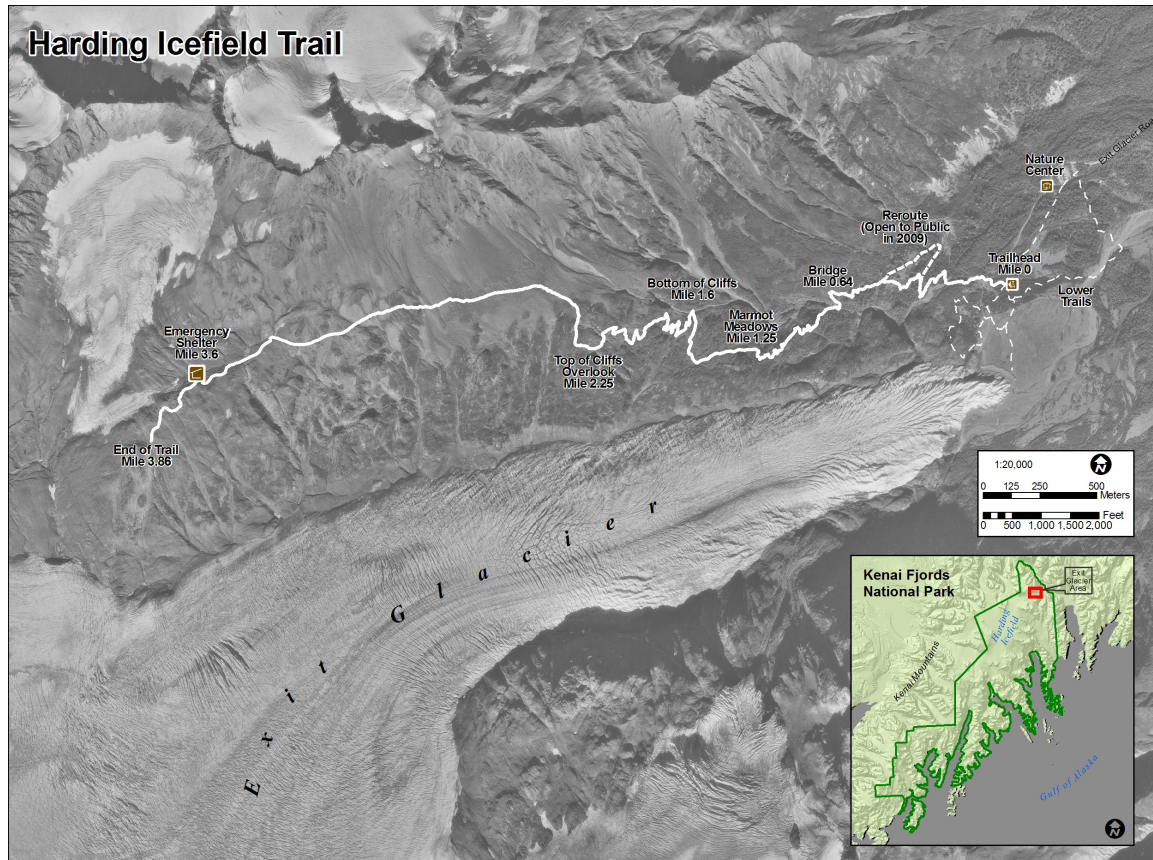


Figure 1. Map of the Harding Icefield Trail.

Flagging and Early Season Maintenance

The 2007-2008 winter was an exceptionally snowy one. According to the NRCS Basin-Wide Snowpack Summary for May 2008, the Exit Glacier Snow Course had 231% of the snowfall of the previous year and 186% of average snowfall (NRCS, 2008). On May 1, 2008 the snowpack at Exit Glacier measured 62" settled depth, and 24.7" snow water equivalence. In Seward, April-August was characterized by below-average monthly temperatures (1-5 degrees below normal). April, May, and August experienced below-average precipitation, while June and July experienced above-average precipitation. The combination of above-average snowpack, below-average temperature, and below-average to average precipitation resulted in a seasonal snowpack at high elevations (>1500 ft) that



Figure 2. Hikers on the snow-covered Harding Icefield Trail.

persisted longer than usual and a one month delay of green-up (and no green-up in places that experienced perpetual snow cover this summer).

The persistence of snow into the summer field season delayed all aspects of management in the Exit Glacier area (Figure 3). Access to the Exit Glacier area was limited to skiing or hiking until Memorial Day weekend (May 24, 2008) when Exit Glacier Road was plowed to the KEFJ welcome sign for the holiday weekend. One week later, on May 30th, the road was plowed all the way to the Nature Center which opened on June 1st.

The persistence of snow on the HIT did not seem to discourage visitors from hiking and accessing the views provided at the end of the trail. Unfortunately, early-season trail use in muddy conditions contributes to trail widening, vegetation trampling, and the creation of new social trails. Since the snow-melt was much later this year, the timing coincided with heavier trail use. This created a greater likelihood for trail widening and trampling of adjacent vegetation as there were more people hiking on the trail in muddy conditions and stepping to the side of the trail to avoid these conditions. At the same time, however, some between-trail social trails and shortcut trails seemed to have improved this summer because the extra cover provided by the snow protected the ground.

KEFJ resource management staff first ventured out on snowshoes on May 21st from the Resurrection River parking pullout to begin marking the HIT. Efforts to mark the trail were hindered by deep snow levels that made traveling slow. Each week KEFJ staff continued to flag the trail, stopping to fix problem areas and continuing up the trail as time allowed. A Trimble GeoXT GPS unit loaded with a data file of the Harding Icefield Trail and an aerial photo of the Exit Glacier area was used to locate the trail beneath the snow. Landmarks, breaks in the vegetation, and park staff familiar with the trail were



Figure 3. Deep snow levels during the winter 2007/2008 lead to a late spring in KEFJ. The Harding Icefield Trail register, located at 545 feet (166 meters) was still surrounded by snow on May 22, 2008.

also useful for identifying the route. Several paths that had already been established by early-season hikers were re-routed by flagging and shoveling snow. Snow remained on the trail throughout the summer, requiring shoveling and marking efforts to continue twice a week through late August (Figure 4).

It is typical for early-season hikers to take a more direct route up the cliffs because of the easy travel on snow. As the season progresses, these routes remain as tempting shortcuts cutting through trail switchbacks. Marking the trail with temporary flags helps keep visitors on the trail. It also significantly reduces unwanted impacts, especially as the snow melts and leaves wet soil and fragile seedlings exposed to foot traffic.



Figure 4. Deep snow persisted on the Harding Icefield Trail throughout the 2008 summer season. Notice the height of the trail sign in Marmot Meadows (mile 1.25) in this photo taken on June 19, 2008.

By the time KEFJ staff was able to mark the trail in steeper sections, like the area referred to as The Cliffs (miles 1.6-2.25), hikers had already established half-pipes in the snow from sitting and sliding down the slopes on their behinds, rather than hiking. Even after the trail was marked with orange flags this activity did not cease. Unfortunately, as the



season progressed, hikers not only continued to slide in these tracks, but they also used them to hike up the slopes as well, as they provided a more direct route than the flagged switchbacks. As the snow pack got thinner, the underlying vegetation was trampled by both the hiking up and the sliding down. Short of standing next to the resultant half-pipes that formed and patrolling this activity, it seemed impossible to convince visitors to refrain from using these paths and stay on the trail (Figure 5).

Figure 5. One of several half-pipe features that resulted from hikers cutting switchbacks and sliding down the slopes rather than hiking on the trail. In addition to sliding down, hikers were also choosing to hike up this particular path, located at the Bottom of the Cliffs. Once this shoot became overly muddy, the sliding ceased, but the damage to the vegetation was apparent. This photo was taken on July 8, 2008.

Cutting steps into hard-packed snow encouraged hikers to use the correct trail. We placed small, wire flags at intervals necessary to direct foot traffic to the correct trail (Figure 6). We adjusted the flag positions as the snow melted out and revealed trail features.

Relying on the GPS unit and map to find the trail location can be challenging. Accuracy depends on satellite coverage, which can be spotty next to the cliffs. The portion of trail in the upper moraine area near the warming hut is substantially different from the GPS map. Trail flagging in the upper area can only be done when parts of the trail appear or when the permanent Carsonite stakes melt out because there are no small-scale landmarks.



Figure 6. Orange flags marking the trail in an area of the HIT where hikers were making their own way. Photo taken 07/08/2008.

Figure 7 illustrates the challenges of precisely marking the trail with the GPS. The combinations of errors in the original trail data that is used to navigate, and errors that may be introduced on the day of marking make it very difficult to mark the trail with accuracy and precision. This deems it necessary to continually monitor the trail as the snow melts and make adjustments by shoveling and reflagging to prevent trail-widening and/or the creation of social trails.

In an effort to more effectively and efficiently locate and mark the HIT in the early-season, resource management staff installed and buried seven metal pins in the center of the HIT to facilitate locating the trail with a metal detector. These pins were installed in areas of low satellite coverage or where there were no good landmarks to assist with trail location. Based on the success of this trial, more pins will be placed along the upper sections of the trail in the future.



Figure 7. It can be nearly impossible to accurately locate and flag the HIT in the exact location for the entire extent of the trail as demonstrated by these three paths above the Top of the Cliffs Overlook (mile 2.25). Photo taken 8/15/2008.

Snow levels on the trail this summer made it more imperative than usual to inform visitors of trail conditions. Snowy, muddy conditions made for more challenging hiking and may have increased the possibility of hikers slipping and injuring themselves. However, based on casual conversations with hikers on the trail, many expressed that their Alaska experience was enhanced by hiking in snow in summer.

Weekly e-mails regarding trail conditions were sent to all KEFJ employees to help provide accurate information to visitors. The KEFJ public website was also updated weekly with this information.

Compilation of Weekly Trail Condition Updates

Harding Icefield Trail Report May 21, 2008

Debbie and I started flagging the Icefield Trail today. We marked above the handrail, but not much further. There is still lots of snow on the trail most of the way up. There are a few bare stops as you hike through the woods, but from the handrail and beyond there is snow the rest of the way. Hikers should be prepared to posthole and to get wet feet and that is after they hike in from the entrance sign to the trailhead! No signs of hikers feet, but we did see bear tracks in the snow and two snowshoe hare in their summer brown coats.

Harding Icefield Trail Report May 28, 2008

This is the second trip up the Icefield Trail and we didn't get far. It was the RM YCCs Matt and Jessica's first trip up. Since the Park road just opened up to vehicles, not many folks have been up the trail. There is still LOTS of snow on the trail above the bridge and

still covering the bridge, at about mile .64. Hikers should expect to get their feet wet from all the melt water running down the trail. We only made it up about a mile because of the amount of snow on the steep slopes made it a bit dangerous and we couldn't continue hiking on the trail until more snow melts. We saw a pair of willow ptarmigan along the trail. They are still in the middle of changing from white to brown plumage.

Harding Icefield Trail Report June 6, 2008

The Harding Icefield Trail is slowly starting to reveal itself as the winter's snow cover creeps back up the mountains. There are a few patches of snow at the beginning of the trail but then it is relatively snow-free until the bridge (mile 0.64). Most hikers seem to be stopping at this point as the trail is completely snow-covered from this point on. Hikers wishing to reach this point can expect to get their feet wet as portions of the trail are covered in meltwater. Please encourage visitors to grin and bear their wet feet and stay on the trail in an effort to avoid trampling vegetation and widening the trail.

We were able to shovel snow off half the bridge, but there is still about three feet of snow on the other half. The trail is flagged from this point on until the lower part of the cliffs (just above Marmot Meadows). Marmot Meadows appears to have 4-5 feet of snow and, yes folks, we saw a marmot! There were plenty of late spring snow slides in the upper mountains this morning and a couple bears in the recently active avalanche paths.

We saw another willow ptarmigan along the trail and, of all things, a red squirrel scampering along the edge of Marmot Meadows! We also spotted a yellow-rumped warbler in the trees and a hermit thrush escaping its nest tucked in a bank along the trail.

Harding Icefield Trail Report June 13, 2008

The Harding Icefield Trail is still covered in a deep blanket of snow beyond the bridge (at mile 0.64). Melting is slow due to a high snow year. Hikers should be aware that they could experience deep post-holing in some locations along the trail and should take care. Hikers can continue to expect to get wet and muddy feet on the lower part of the trail. Please advise hikers to stay on the trail to avoid trampling vegetation.

The trail is flagged to the Cliffs and will hopefully be flagged to the Top of the Cliffs this week. Hikers should follow the orange flags where they are available. It is fine for hikers to walk on snow above the flagging, but they should avoid walking on alpine vegetation because it is especially susceptible to impacts in wet conditions and can take years to recover.

Harding Icefield Trail Report June 20, 2008

Although, we are gaining more stretches of bare trail every day, the Harding Icefield Trail is still covered in sections of patchy snow beyond the bridge (at mile 0.64), and in continuous snow from Marmot Meadows and above. Hikers can continue to expect to get wet and muddy feet on the lower part of the trail. Please advise hikers to stay on the trail to avoid trampling vegetation. Above the bridge, hikers should be aware that they could experience deep post-holing and slushy, slippery snow conditions and should hike with caution.

The trail is flagged to the Top of the Cliffs and will hopefully be flagged all the way to the end of the trail by the end of next week. Hikers should follow the orange flags where

they are available. It is fine for hikers to walk on snow above the flagging, but they should avoid walking on alpine vegetation because it is especially susceptible to impacts in wet conditions and can take years to recover.

Harding Icefield Trail Report June 25, 2008

The Harding Icefield Trail is melting quickly and the result is a wet, muddy, slick hike! Although the lower section of the trail has some dry spots, there are several sections of running meltwater on the trail. Please remain on the trail and walk through the water to avoid trampling vegetation on the edges resulting in widening of the trail.

A similar combination of some dry and some wet, muddy conditions are found beyond the bridge (mile 0.64) until approximately the 1 mile mark at which point you will encounter patches of snow that increase into continuous snow coverage. At this point, the trail is marked with orange flags. Please resist the temptation to follow other, seemingly more direct routes and follow the orange flags that mark the trail. As the snow melts out, staying on the trail prevents fragile alpine vegetation from being trampled.

Above Marmot Meadows (mile 1.25), hikers should be aware that they could experience deep post-holing and slushy, slippery snow conditions and should hike with caution. The slick snow makes for difficult hiking, particularly on the way back down. Sturdy boots with good traction are strongly recommended! Please stay on the flagged switchbacks and resist the urge to slide down on your bottom as there are hidden rocks that could injure you and sections of wet, saturated ground where vegetation is being damaged by the impacts of this sliding. These damaged areas will take years to recover. Please help us prevent this damage from occurring!

The trail is flagged to the Emergency Shelter (mile 3.6) where there is still at least 4 feet of snow on the ground (see attached photos). The trail will be flagged all the way to the end of the trail (mile 3.86) by the end of this week.

Harding Icefield Trail Report July 3, 2008

Although the Harding Icefield Trail is still snowy in the upper reaches, it is free of snow for the first 1.25 miles. Snow melt and recent rain have resulted in water flowing down the lower trail. Please remain on the trail, walk through any water instead of around it, and avoid trampling the vegetation alongside the trail.

Beyond Marmot Meadows (at 1.25 miles) the trail is covered with snow (except for some areas where it has melted out and is muddy). The snow-covered portion of the trail is marked with orange flags. Please resist the temptation to follow other, seemingly more direct routes and follow the orange flags that mark the trail. As the snow melts, staying on the trail will help prevent fragile alpine vegetation from being trampled.

Harding Icefield Trail Report July 11, 2008

It's finally looking like summer on the Harding Icefield Trail! The lower reaches of the trail are snow-free and the meltwater is drying up. Wildflowers are blooming and the birds are singing. This week several hikers were treated to the sights and frolics of a mother black bear with a single cub of the year. Today the duo was seen several times as they made their way along the Harding Icefield Trail from the Top of the Cliffs down to

the middle section of the trail. Other black bears have also been observed in the avalanche paths above the trail.

Beyond the Top of the Cliffs Overlook (at 2.25 miles) the trail is covered with snow (except for some areas where it has melted out and is muddy). The snow-covered portion of the trail is marked with orange flags. Please resist the temptation to follow other, seemingly more direct routes and follow the orange flags that mark the trail. As the snow melts, staying on the trail will help prevent fragile alpine vegetation from being trampled.

Harding Icefield Trail Report July 18, 2008

It's summer in Alaska and it's a great time to hike up the Harding Icefield Trail! The first 1.25 miles of the trail leading to the meadows are in good condition and, despite recent rains, fairly dry. Good job, Kenai Fjords Trail Crew for keeping rainwater from channeling down the trail! If you see a little rust-colored rodent scurry across the trail in front of you or rustling vegetation next to you, don't fear; it's just a red-backed vole making it's living along the trail. And just so you know...I was really glad to have my bug spray today as I had a flock of mosquitoes traveling with me!

Once you arrive to Marmot Meadows (mile 1.25) you will encounter patches of snow on the trail. In these areas the trail is marked with orange flags to keep hikers on the trail so that once the snow melts out they are not trampling fragile alpine vegetation. Please remain on the trail, whether it is melted out or snowy and flagged, and do not cut switchbacks unless, of course, you are a bear. Black bears have been regularly observed in the slopes above the trail, on the trail, and in or near Marmot Meadows. Don't forget to look for marmots sunning themselves on rocky outcrops. If you hear a high pitched whistle, look around for this critter warning others of your presence or, possibly, the presence of a nearby bear.

If you are hiking beyond Marmot Meadows, it is best to have good footwear for hiking in mud and snow. Once you sweep around Marmot Meadows you will begin ascending a series of switchbacks through an area referred to as The Cliffs (mile 1.6). Most of the snow has melted from this area and has left behind some slick, muddy conditions. Be careful as you hike these switchbacks but, again, please stay on the trail to minimize impacts to vegetation. At the top of The Cliffs you will encounter more patchy snow that increases until it forms continuous snow cover. This snow is very slippery and can create challenging hiking, especially on the way down. This does not mean you have to turn around if you don't want to, but please be careful and expect to get your feet wet! From the Top of the Cliffs Overlook (mile 2.25) to the End of the Trail (mile 3.86) the trail is completely covered with snow. Please follow the orange flags that mark the trail and avoid cutting switchbacks.

Harding Icefield Trail Report August 8, 2008

It's a wildflower-lovers paradise on the Harding Icefield Trail! Although the flowers were late this season, they were worth the wait. The first 1.25 miles of the trail leading to and through Marmot Meadows are dry and in good condition. The flowers are beautiful and the salmonberries are starting to develop. It's a great time to hike the Harding Icefield Trail!

On the far side of Marmot Meadows at the Bottom of the Cliffs (mile 1.6) you will encounter the first remaining patch of snow on the trail. In snow-covered areas the trail is marked with orange flags to help hikers remain on the trail in an effort to prevent fragile alpine vegetation from being trampled. Please follow the orange flags and do not cut switchbacks. If vegetation is poking out from beneath the snow on or along the trail, please step around it to prevent damaging it.

The trail is still mostly snow-covered from the Top of the Cliffs Overlook (mile 2.25) until the end of the trail. This snow is very slippery and can create challenging hiking, especially on the way down. This does not mean you have to turn around if you don't want to, but please be careful and expect to get your feet wet!

Harding Icefield Trail Report August 15, 2008

It's a little wet, muddy, and slick on the Harding Icefield Trail, but the views of Exit Glacier, surrounding mountains, and the Harding Icefield are well worth it.

The lower section of the trail is in good condition all the way to Marmot Meadows (1.25 miles), and the wildflowers are beautiful. As you ascend The Cliffs (beginning at 1.6 miles) in the middle section of the hike, the trail is a little muddier due to recent rains. Enjoy the wildflowers along here, too, and look for black bears that frequent the area. Once you reach the Top of the Cliffs Overlook (2.25 miles), you will encounter snow remaining from last winter and trail conditions become muddy, snowy, and slick. Please follow the orange flags that mark the trail in snow-covered areas to help prevent fragile alpine vegetation from being trampled as the snow melts. If vegetation is poking out from beneath the snow on or along the trail, please step around it to prevent damaging it.

On cooler cloud-covered days the snow on the trail is remaining frozen to form solid ice and is very slick. On sunny days the snow is melting, creating slippery slush. Either way, the snow is creating challenging hiking conditions, especially for the hike down. This does not mean you have to turn around if you don't want to, but please be prepared with sturdy footwear and hike with care.

Harding Icefield Trail Report August 22, 2008

The Harding Icefield Trail is free of snow to the Top of the Cliffs Overlook (2.25 miles), and the wildflowers are beautiful. Beyond the Overlook expect intermittent patches of snow that become continuous until you reach the shelter (3.6 miles). Depending on weather conditions, this snow can be very slick and difficult to walk on. Sturdy footwear is recommended. Please follow the orange flags that mark the trail in snow-covered areas to help prevent fragile alpine vegetation from being trampled as the snow melts. If vegetation is poking out from beneath the snow on or along the trail, please step around it to prevent damaging it.

Harding Icefield Trail Report August 27, 2008

Although August is almost over it's still a great time to hike the Harding Icefield Trail. The first half of the trail is a little muddy and slippery from recent rain, but overall it's in good condition and the wildflowers are beautiful. Slightly beyond the Top of the Cliffs Overlook (2.25 miles), you will encounter a couple short stretches of snow interspersed with dry trail. After that there is about a quarter mile of continuous snow cover on the

trail until you reach the Shelter (3.6 miles). Depending on weather conditions, this snow can be very slick and difficult to walk on. Sturdy footwear is recommended. Please follow the orange flags that mark the trail in snow-covered areas to help prevent fragile alpine vegetation from being trampled as the snow melts. If vegetation is poking out from beneath the snow on or along the trail, please step around it to prevent damaging it.

Restoration Work Completed

Restoration efforts this year were limited due to the late snowpack and the extra effort required to keep up with snow melt in places where the trail was not marked accurately. Heavy, persistent snow damaged many of the stakes, signs, and plastic fencing requiring most of them to be replaced throughout the season.

Exit Glacier Access Route

The success of local commercial guiding companies leading hikes onto Exit Glacier has lead to the creating of social trails through Marmot Meadows (mile 1.25) on the way to the glacier access trail. Guides were asked to have clients spread out and bushwack from the main trail to the out-of-view trail where they access the glacier for guided hikes. An increase in clients has started to create social trails. In an effort to minimize impacts and reduce usage by unguided visitors, KEFJ resource management and law enforcement staff relocated and reconstructed this route with strategically placed rocks. This effort was completed in September and will be evaluated for effectiveness in 2009.



Natural Impacts

In addition to human impacts from trampling, the HIT is also subject to natural impacts such as slumping from saturated soil (Figure 8) and scouring from spring avalanche activities (Figure 9). Although the result of natural processes, these impacts can also lead to trail widening and increased damage to vegetation as hikers find new routes in response to these events.

Figure 8. Saturated soils resulted in vegetation slumping onto the HIT beyond the Top of the Cliffs Overlook (mile 2.25). Photo taken 8/15/2008.



Figure 9. Spring avalanches plowed topsoil and vegetation right over the top of the HIT between the Top of the Cliffs Overlook (mile 2.25) and the Emergency Shelter (mile 3.6). Photo taken 8/15/2008.

Exotic Plants

Two species of exotic plants grow along the Harding Icefield Trail: common dandelions (*Taraxacum officinale*) and common plantain (*Plantago major*). These species are spreading further up the trail each year, but manually removing the plants as they are found is slowing the spread. One large patch of common dandelion appears each year at the corner across from the metal handrail (.25 miles) although the density of this patch is steadily decreasing with consistent control efforts. Several common plantain plants were found and controlled along the trail between the Trail Register and the bridge at 0.6 miles. One common dandelion was found at Marmot Meadows (1.25 miles) in 2007 and reappeared and was re-pulled in 2008. This is the furthest up the trail that exotics have been found so far.

Harding Icefield Trail Reroute

Work on the Harding Icefield Trail reroute continued throughout the 2008 season, culminating in blasting in September 2008. The reroute, scheduled to be completed in 2009, will bypass the section of the trail between the trail register and the bridge at .64 miles containing steep, cliffy sections and muddy areas with poor drainage issues.

The old trail section will become a rehabilitation site and should be monitored for progress. The sections of old trail that connect with the new trail may require revegetation fences and/or plantings to hide the old trail and prevent hikers from using the obsolete trail sections.

Recommendations for 2009

Maintain revegetation signs, stakes, and fencing as needed.

Heavy erosion and destruction of fragile tundra vegetation have worsened at the Top of the Cliffs Overlook (mile 2.25). This will persist until efforts are coordinated and executed to improve the trail and clearly designate boundaries and walking paths at the overlook area (Figure 10 and 11).



Figure 10. Persistent snow cover and muddy conditions result in widening of the trail and reduced vegetation on the trail at the Top of the Cliffs Overlook (mile 2.25). Photo taken 8/15/2008.



Figure 11. The spider web of trails at the Top of the Cliffs Overlook was a muddy mess most of the summer of 2008. Photo taken 8/15/2008.

The “Proposal for Management of Two Heavily Impacted Areas on the Harding Icefield Trail” (Tetreau 2005) is still relevant and should be implemented to prevent further damage of the fragile tundra ecosystem at the top of the cliffs. The long-term considerations addressed in the proposal, such as plant restoration and construction of durable trails and viewing pads should be included in both resource management and maintenance projects. A maintenance project is identified in PMIS for this project and will begin when funding becomes available.

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