Mount Rainier

National Park Service
U.S. Department of the Interior

Emmons-Winthrop

NPS/Scotty Barrier photo

Official In-Depth Route Description

Emmons-Winthrop

Stats	
Approximate Elevation Gain	10,300 ft, 3140 m
Approximate Length	9-10 miles, 15-16 km
Average Time to Climb Route	2-3 days
Typical Hazards	Crevasse Falls, Navigation Errors, Steep Icy Slopes
Attempts Per Year	1600 Climbers
Average Summit Success Rate	54.2%

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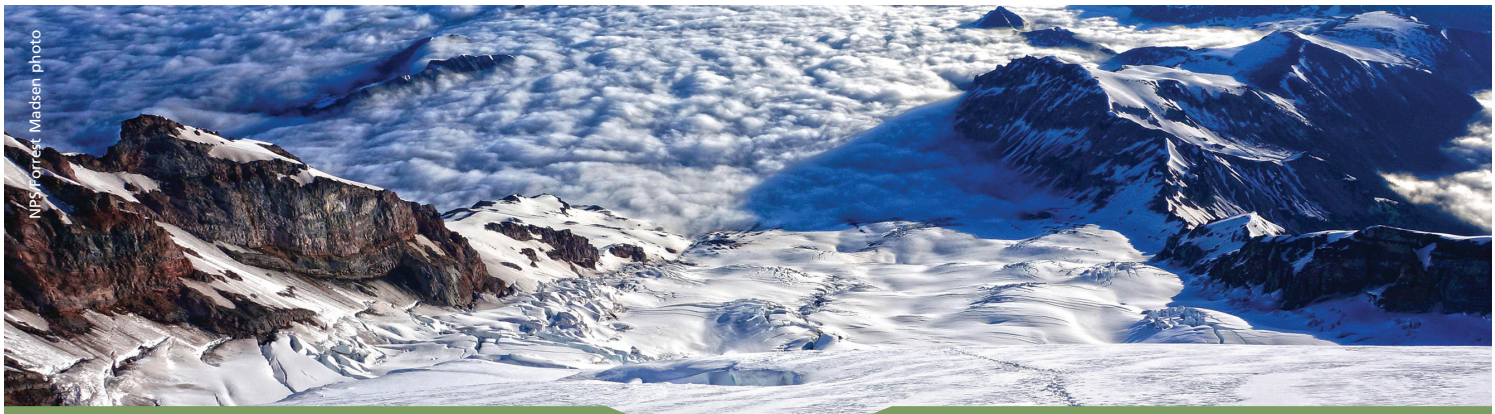
Produced by Mount Rainier National Park Climbing Rangers, 2017

NPS/Forrest Madsen photo


NPS/Forrest Madsen photo

The main climbing season for the Emmons-Winthrop Route starts in late-May when the White River Road opens and lasts through August when the snow on the surface of the glaciers melts enough to expose an unnavigable labyrinth of crevasses.

The Emmons-Winthrop route is the 'next step up' from the Disappointment Cleaver route. The character of climbing this route is more independent in nature. There is a greater need to be self-reliant and skilled in crevasse rescue, route finding, belay systems, and cramponing.

History

The massive Emmons and Winthrop glaciers cover approximately a quarter of the volcano's surface. Named after the geologist Samuel Emmons and writer Theodore Winthrop, the glaciers begin at the summit crater and spill down the upper mountain until they're split apart by Steamboat Prow. The Emmons-Winthrop was first climbed in August, 1884 (Warner Forbes, Jones, Wells).
The first known ski descent was in 1947 (Roberts, Bengtson, Welsh, Schmidtke).

Statistical Route Use

The Emmons-Winthrop Glacier route gets almost all its usage during the summer months. The main reason for this is that the White River road typically does not open until May 20th, or even later some years, due to snow removal and 'spring opening' priorities on the west side of the park.
From the first 'closing snowfall' around mid-November until at least March or April, SR410 is closed at the north park boundary. It is about six miles from the park entrance to White River Ranger Station and yet another six (totaling twelve) miles to the trailhead. April to late May, one may be able to park at the pull-out at "Mather Wye" opposite the beginning of the White River road on SR410. It is a total of seven and a half miles from here to the trailhead at White River Campground. This would add 15 miles round trip to the route. Snowmobiles are allowed inside the park and can be used to access the White River Campground in the winter, but they must stay on established roadways and cannot interfere with snow removal in the spring.

Guiding on this route is allowed on weekdays. Monday through Friday most climbers are associated with a guide service. Guiding is generally not permitted on the weekends to allow more space for non-guided use. Guided groups are limited to 12 people total and typically travel in four rope teams of three climbers per rope.

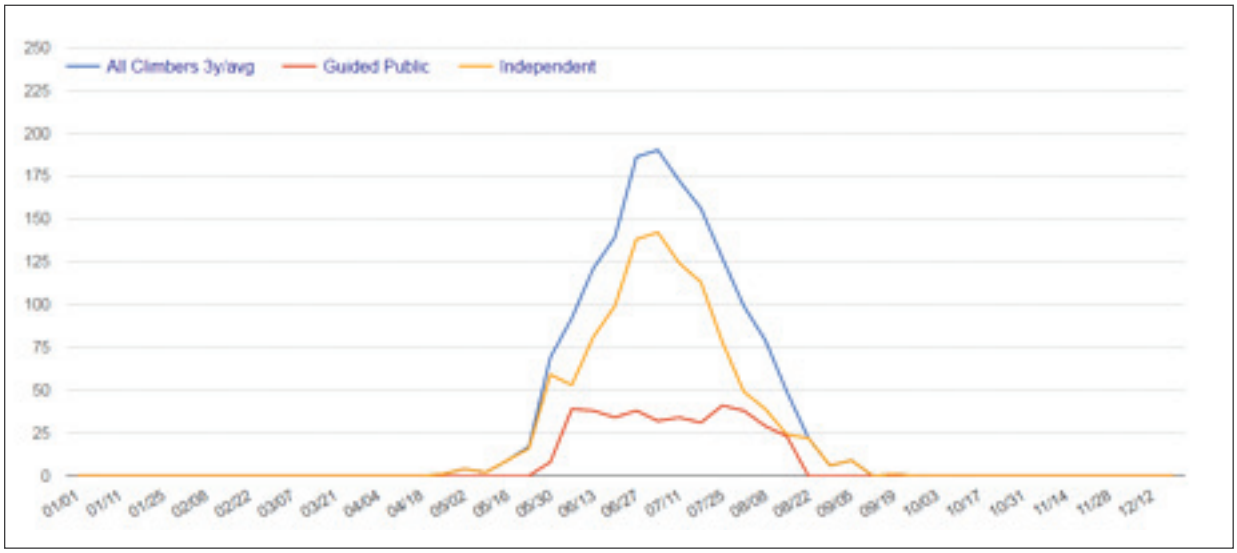
Skills Level and Experience

The Emmons-Winthrop route is classified as having a similar difficulty level as the Disappointment Cleaver, however, there are some key differences that require approaching this route with a different set of expectations.

Already discussed in the Search and Rescue section is the fact that there is a higher incidence of rescue per climber on this route. Factors that contribute to this higher rate of rescue per climber are:

1) There are no guide services 'maintaining' a climbing route. There is no shoveled trail to walk on nor are there established fixed anchors, ladders, wands, and rope lines.
2) There are many fewer total climbers on any given day which results in less of an imprint on the climbing route, making it more difficult to follow.
3) The route is climbed less frequently and the current path is not

Weekly Distribution of Climbing Types (Total, Guided, and Independent Public)



Route: Emmons-Winthrop

necessarily the best or safest option. An example of this would be a route requiring climbers to leap across a crevasse instead of end-running the crevasse.

For these reasons, the Emmons-Winthrop route requires a substantial level of skill, experience, and *independence* in the climbing party.

All party members should be competent in crevasse rescue. This is always encouraged but may not be required on the Disappointment Cleaver route, but it should be viewed as mandatory on the Emmons-Winthrop. It is possible that there may only be a few other parties on the route and no one else may be able assist with your rescue.

Because there is less route maintenance and route finding, there may be no 'trail' established across steeper sections or no steps up steep faces over crevasses, so a higher level of skill in cramponing is required as well as a greater level of comfort with route finding and *pioneering* new routes.

The route is surprisingly steep near the top, possibly exceeding 35-40 degrees. Coupled with the lack of a trail, hard snow conditions and uncertain crevasse crossings, climbing parties must be prepared to quickly implement several techniques for increasing security. Running belays, snow anchors, and pitched out climbing techniques may need to be employed any time of year.

Key techniques:

- Roped travel/team arrest (keep the rope taught w/o slack between climbers)
- Crevasse rescue (escaping the self-arrest belay and rigging a haul system)
- Simultaneous climbing with running protection (appropriate in certain terrain)
- Boot axe/single anchor belays (when in doubt of self-arrest catching a fall)

Weather and Forecasts

Many climbers are preoccupied with the technical aspects of climbing Mount Rainier and overlook the biggest factor in their safety and success rate—the weather! Mount Rainier is a lightning rod for poor weather and storms can strike quickly and intensely. It is easy to forget about potential winter-like and blizzard conditions, especially in May, June, and July, when the weather lower down in the city is warm and summer-like.

For a brief overview on expected temperatures, wind speeds, and precipitation, start here: Mount Rainier Recreational Forecast. The weather service even added a daily "impacts" section to alert climbers to possible scenarios of venturing into the alpine zone in inclement weather.

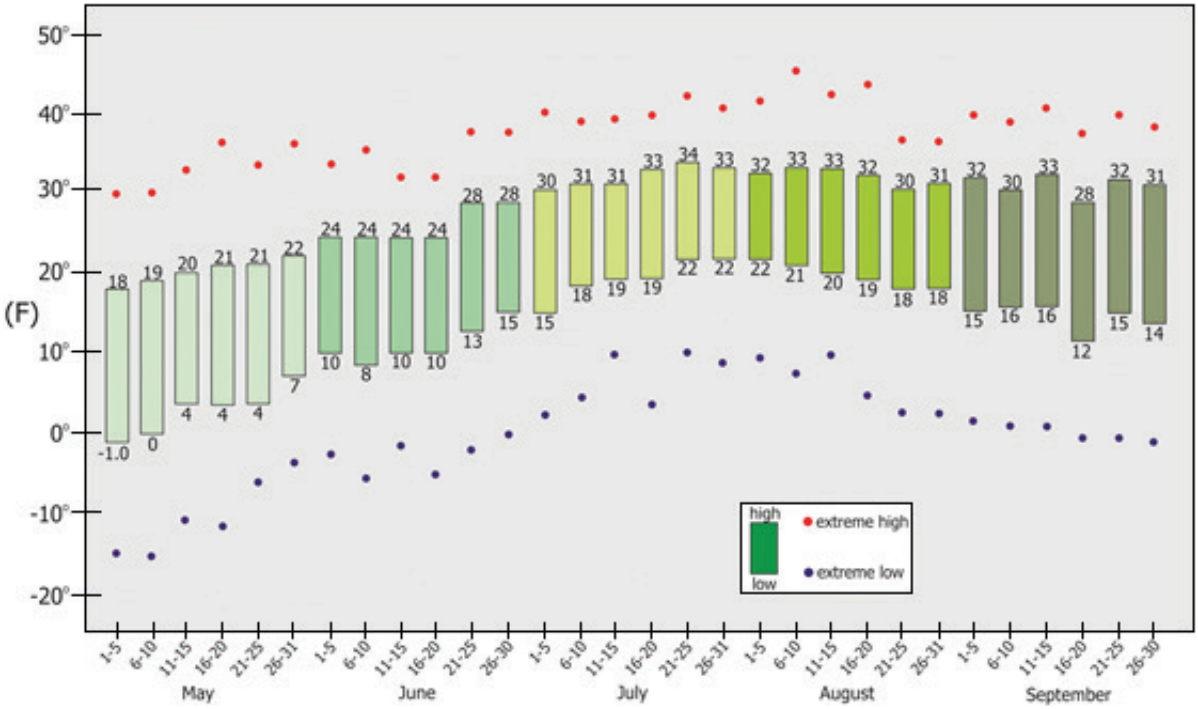
The graph on the next page shows May-September wind speeds. It shows climbers that they must be prepared for freezing temperatures and wind speeds averaging 20 miles per hour at all times, not just the early and late season months.

Using this wind chill calculator, *average* windchill conditions on a summer trip up Mount Rainier range from -5F to 10F. Extremities (hands and feet) are the first to get cold and succumb to frost-bite/nip. Climbers often underestimate the cold in June and find that their toes and hands are so cold that they cannot continue their climb and must turn around. Warm boots (not single layer, thin leather boots) are a must before July 4th.

Presence of moisture/condensation

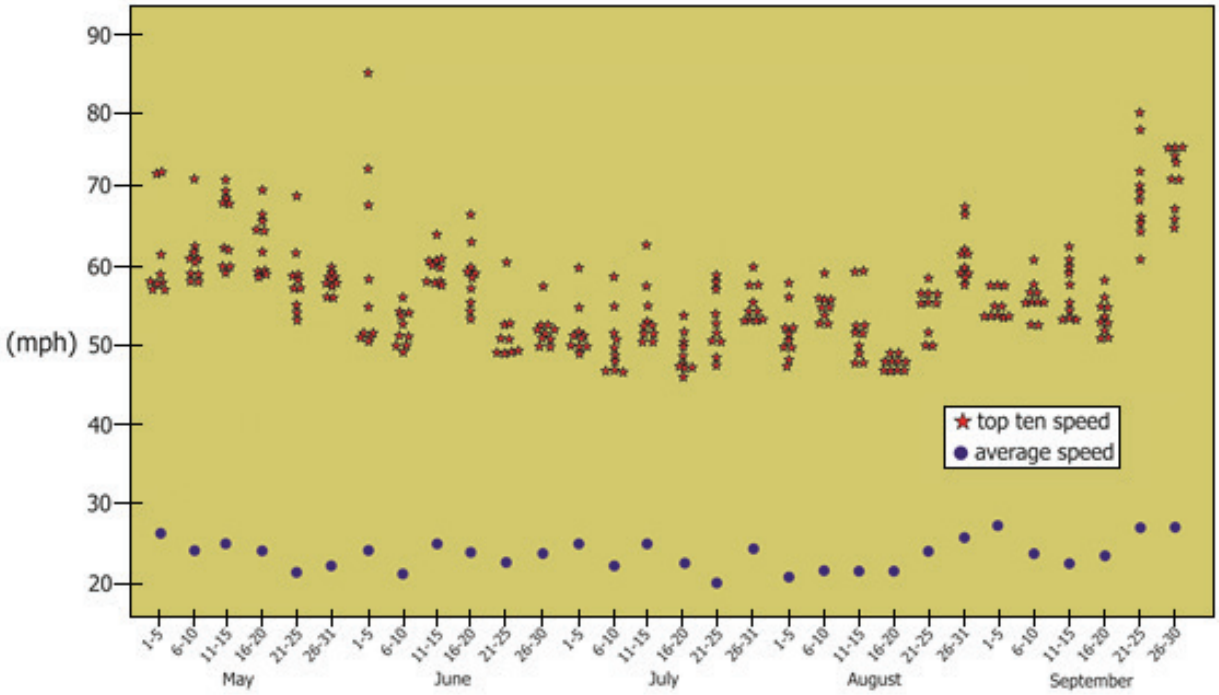
The presence of condensed moisture (surface clouds/fog) in

Mount Rainier Air Temperatures: Near Summit

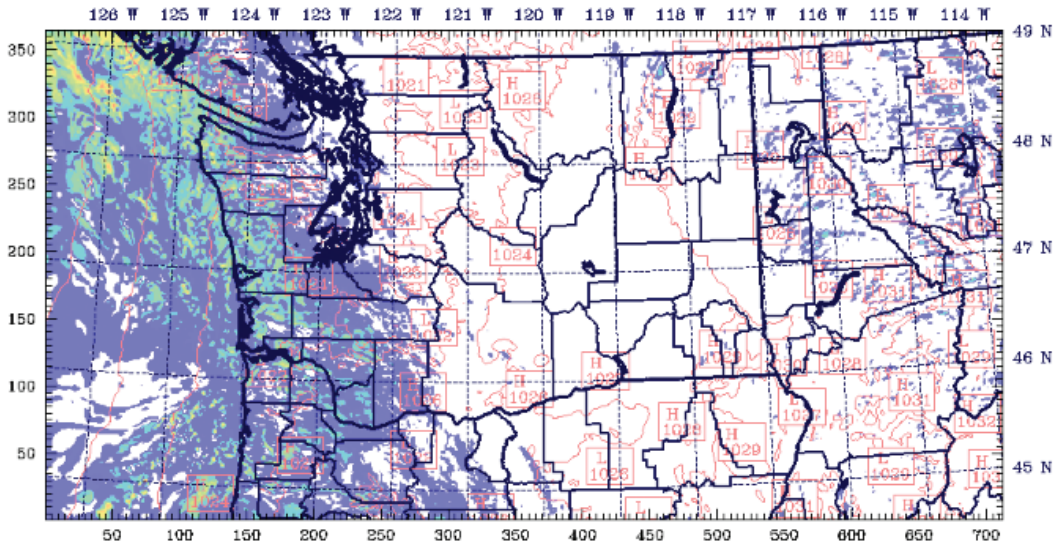


Averages and extremes in temperature during the summer season on Mount Rainier.

Mount Rainier: Windspeeds Near the Summit



The above is a graph for May-September wind speeds. These graphs show climbers that they must be prepared for sub-zero temperatures and wind speeds averaging 20 miles per hour.



Presence of clouds from 3000 to 1000 feet elevation.

alpine areas is a game-changer. Never underestimate the amount of information that is lost when visibility is restricted. Cold temperatures, high winds, and driving rain/snow can make the experience rather desperate, just because of the simple fact that you cannot see where to go. *The route* to the summit is often a thin corridor. If you stray just 10 feet this way or that way, you may wind up on a path that has no exit. Even a well established boot-pack can
disappear in minutes with drifting snow.

The following weather models are produced by the University of Washington and are tools climbers can use to predict moisture in the atmosphere. View these models and learn to understand the information in them in order to understand the possibility for obscuring moisture
present during your climb:

- UW MM5 4/3km Mount Rainier Atmospheric Profile
- UW MM5 4/3km Clouds 3-10K feet
- UW MM5 4/3km Clouds 10-20K feet

The Go/No Go Matrix (Weather)

Use the following matrix to help decide whether to attempt to climb after referencing the forecast. As always, choose to turn back if the weather looks to be deteriorating. It is also well-known that forecasts can be unreliable, but they are what we have to go on.

Start by going down the gray column on the left. First assess the wind component at either 1, 2, or 3. Then
proceed to the precipitation component, add 1 or 3 to your run-

NPS photo

ning total. Add all the factors from the four rows.
Consider the Emmons-Winthrop a moderately difficult route. You can see from the matrix below that precipitation and visibility can be show stoppers, even if the winds and temperatures are reasonable.

On the lower mountain, below 10,000', these weather factors can often be mitigated by equipment and exceptional experience, however, there are far narrower margins of error. On the upper mountain (above 10,000') the loss of a glove or getting snow inside one's goggles and having them fog up can spiral into a life-threatening situation.

Assessing and Managing Risk

There is nothing "safe" about mountaineering, however we can manage and mitigate risks by equipping and training sufficiently as well as making reasonable decisions. Real advancements in mountaineering safety won't come
from more specialized equipment, it's the study of human behavior and heuristics that offer more substantial gains for parties trying to manage their risk.

The US Coast Guard (USCG), often looked to as one of the United States' most respected rescue resources, has developed a system of risk mitigation called Crew Resource Management (CRM). The National Park Service has recently adopted a very close derivative of it. The USCG identified the core common denominators of tragedies, injuries, and near-misses that occurred during rescue operations. In one of its applications, CRM asks you to compare and assess your intended action to these common denominators and see how well your plan of action stacks up, then asks you to either fill the gaps or refuse the risk and discontinue the activity.

If you have no other framework of risk assessment and management, then try this one. The climbing rangers use it and have had great success even conducting simple operations. Use this framework to have the conversation within your group the night before you climb.

(P) lanning:

What is the overall plan? Departure time? Turnaround time? Return time? Predict expected mountaineering methods. Contingency plan for a sick climber (even if it's within yards of the summit)? Does someone outside the park know your plan?

(L) eadership:

What is the leadership structure in your group? Even on an independent summit attempt, we recommend identifying a leader. Many groups seem to be unwilling to do this, but this simple act can make the difference.

(E) quipment:

Do you have the correct equipment (ex. 2 pulleys, 2 prussiks, 2 anchors / person for crevasse rescue), what happens if a climber on your team loses their pack, their gloves, their sunglasses?

(T) raining:

Has everyone been trained to employ the skills needed for the activity? (Cramponing, team arrest, belaying, crevasse rescue)

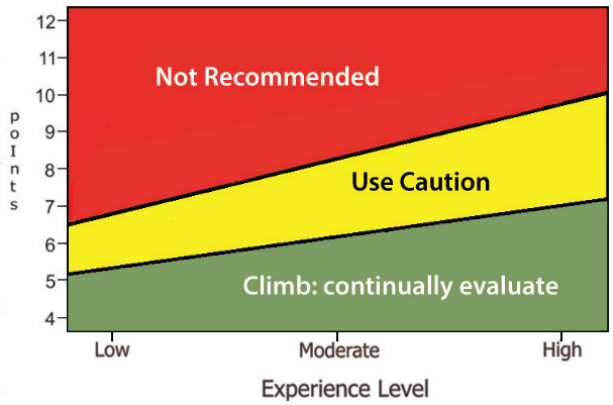
(T) eam fitness:

Go/No Go Weather Matrix

Points:	1	2	3
Wind	Low (<15 mph) +1	Moderate (15-25 mph) +2	High (>25 mph) +3
Precip	None +1	Light +2	Present +4
Visibility	Clear (unlimited) +1	Overcast or Scattered Clouds +2	Restricted +4
Summit Air Temp	Warmer (>30°F) +1	Moderate (20°-30°F) +2	Cold (<20°F) +3

• Wind, Precip and Visibility all as 3 or greater indicates that a climber should not attempt to climb

Weather Conditions and Team Experience Evaluator Tool



Are the right team members present? Do all feel up to the task? Is everyone in a healthy mental and physical state? Don't ascend with signs of Acute Mountain Sickness (AMS).

(C) ommunication

How shall we communicate? What if the party must split up? (not recommended!) Do we have cell phones, group radios, PLB's, or SPOT devices? How's the communication comfort level in the group? Are the less-experienced
climbers able to share their concerns? Are the experienced climb-

NPS/Julian Hanna photo

Case Study: Multiple Events, June 2016

The 2016 climbing season highlighted the necessity of navigation skills for climbing the Emmons-Winthrop and for climbing Mount Rainier in general. On June 10th, two experienced climbers who had climbed Liberty Ridge hit the SOS button on their SPOT Device from the summit because visibility deteriorated and they couldn't descend the Emmons-Winthrop. On June 12th, just two days later, two more climbers ascended Liberty Ridge and called 911 because they became lost in a cloud on their descent of the Emmons-Winthrop route. Finally, on June 17th, climbers ascended the Disappointment Cleaver route and hit their SOS button because yet another storm rolled in quickly and they were unable to navigate back down the mountain. Fortunately, all three parties got assistance from rangers and guides to help them off the mountain and some of the climbers sustained only minor cold-related injuries. As one in need of a rescue, your future is not certain. Although all were rescued, their fates were not entirely secure. A proper track log with the current "track" in a GPS Device with a map overlay and backup batteries is required to descend the Emmons-Winthrop in a storm. Storms can roll in quickly and without warning on Mount Rainier year-round. It's alarming to see three parties all experience the same life-threatening situation within the span of a single week. Interestingly, all three parties gave the same advice after their experiences: "Come prepared to descend this mountain in all conditions and don't try to summit with a small weather window. Wait for a good forecast."

ers listening and providing valid reassurance?

(C) onditions:

What are the (snow and weather) conditions now? What is the forecast? Do we have reasonable margins of safety? Are we within our skill and equipment levels? What are the weather trigger points for turning around? Is your team able to assess avalanche conditions, and if not will you attempt to climb anyways?

(C) omplexity:

Are we trying to do "too much" with the resources (gear, training, skill) we have? What are our trigger points (weather, team, snow conditions, leadership, equipment) for turning back?

We recommend performing this risk management activity at natural breaks during the course of your trip, for example, 1) at the initial planning phases on the phone with your friends a few days before your climb, 2) at the trailhead before your packs are on, 3) at high camps the night before your climb, and 4) before you head down the mountain.

Encourage group participation. Lesser experienced team members may be silent in front of experienced and respected individuals. Reach out specifically to these silent team members. The discussion will pay off in spades.

Suggested Previous Climbs

Mount Rainier is the tallest and most heavily glaciated of all the Cascade Volcanoes. We suggest that you have made ascents of some of the more challenging routes on the smaller volcanoes or have significant experience in technical terrain. Due to the complex glaciation and high elevation of Mount Rainier it is difficult to approximate the challenge on other mountains. Some similar routes would be:

1. Hotlum Glacier, Mt. Shasta
2. Easton Glacier, Mt. Baker
3. Leuthold Couloir, Mt. Hood

If you are new to this style of climbing, one *possible* progression of climbs to complete, at a minimum before attempting the DC route on Mount Rainier would be:

1. Mt. St. Helens, Monitor Ridge or Worm Flows
2. Mt. Hood, Hogback Glacier
3. Mt. Adams, South Side Climb
4. Mt. Shasta, Avalanche Gulch
5. Mt. Baker, Easton Glacier

Current Conditions

Conditions change rapidly on the mountain. Reporting the changing conditions is difficult and it's also hard to gauge how to report the conditions to an audience with a varying degree of skill. So take all conditions reports with a healthy amount of skepticism.

There are a couple of decent sources for information out there. First and foremost is the Mount Rainier Climbing Blog that the Mount Rainier National Park climbing rangers maintain. Be sure to check out the archive from previous years; there are a lot of good route photos as well as other pertinent information depending on the time of year the conditions report was made.

Another handy resource is the Cascade Climbers online forum including trip reports, route advice, and gear recommendations.

Lastly, there's a skier's forum called Turns All Year which has plenty of conditions updates from a "mostly" skier's perspective. They organize the reports via date and location. Lots of videos are also posted here.

What to Bring

There is no list of *required* gear to bring. The list of gear can vary based on the climbing party's skill and experience level, and by season. However, we can generally say there are common denominators to any climber's gear choices for this route.

Climbing rangers are often frustrated by the lack of crucial gear items they see in parties at Camp Schurman. Parties with only one or two pickets, no pulleys, no prussiks, lack of leash for their ice axe, etc., are occasionally observed. In rare cases, extremely experienced climbers have developed systems and techniques to mitigate the absence of this gear, but for the vast majority of climbers, the lack of gear is a strong indicator of lack of experience.

Clothes:
❑ Fleece Hat
❑ Balaclava/Bandana (winter/summer)
❑ Sunglasses
❑ Goggles (winter)
❑ Dexterous Thinner Gloves
❑ Insulated Warmer Gloves/Mittens
❑ Hooded Base Layer
❑ Softshell/Fleece Mid Layer
❑ Waterproof Hooded Shell
❑ Insulated Jacket w/ Hood
❑ Softshell Pants
❑ Waterproof Pants
❑ Insulated Pants
❑ 2 x Socks (non-cotton)
❑ Mountaineering Boots

Personal Gear:
❑ Ice Axe w/ Leash
❑ Crampons
❑ Helmet
❑ Pickets
❑ Ice Screw
❑ Harness
❑ Belay & Rappel Device
❑ Pulleys
❑ Carabiners
❑ Cordelette
❑ Prussiks
❑ Water Bottles
❑ Food
❑ Multi-tool
❑ Headlamp (full charge)
❑ GPS w/ Topo Map Loaded
❑ Sleeping Pad
❑ Sleeping Bag
❑ Prescriptions/Medications
❑ Sunscreen
❑ Backpack

Group Gear:
❑ Shovel
❑ Stove, Lighter, Fuel
❑ Tent
❑ Med Kit
❑ Stove, Lighter, Fuel

For your summit attempt

Remember that the Emmons-Winthrop route is more remote, there are fewer climbers, and help may be much farther away. Here are a few things that climbing rangers often see climbers omitting, even on fair weather days in July, for emergency purposes:

1. Shovel/party - (to dig a snow cave or tent platform)
2. Sleeping Bag/party - (for emergency/patient purposes)
3. Sleeping Pad/party - (pretty important if you employ a sleeping bag!)
4. Down Jacket/Warm Pants/climber
5. Extra food and water/climber

Search and Rescue

The Disappointment Cleaver averages three major Search and Rescue (SAR) events and one fatality per year. Accidents occur due to a wide range of reasons on this route. Acute Mountain Sickness (AMS), High Altitude pulmonary edema (HAPE), other respiratory issues, and cold exposure injuries are the most prevalent, but falling on icy terrain as well as contact with rock (whether from falling into or being hit from above) are also common. Often poor decision making and overconfidence in climber's' ability to handle poor weather are major contributing factors to climbing accidents on this route as well.

The NPS does not charge for search and rescue services. However, if private ambulances and air ambulances are required, fees are rapidly accrued. A large portion of the climbing cost recovery fee goes toward preparing for search and rescue incidents by hiring, equipping, and training climbing rangers. Rescues that result in a cost of more than five hundred dollars in overtime for personnel or in helicopter costs are not paid for by Mount Rainier funds. The National Park Service maintains a contingency account held regionally to pay for unprogrammed costs such as SAR.

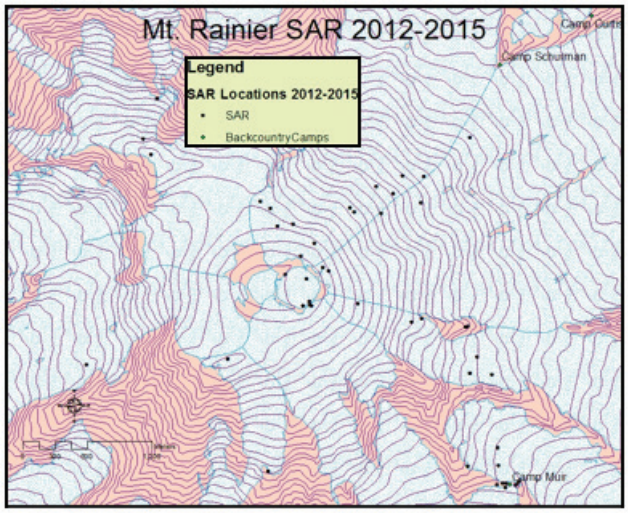
SAR Helicopter

The park has a staffed contract exclusive use helicopter on duty each day between May 15 and September 15. However, due to funding and other cost saving measures, the helicopter must be assigned out on regional wildfires and other incidents and projects. Nevertheless, since the inception of this exclusive use contract, the time it takes to get the helicopter to the incident base has decreased from 2-4 hours to 1-3 hours, depending on the location of the helicopter at the time of the incident. In addition, this exclusive use helicopter also has a dedicated crew who know the capabilities of the helicopter and thus operate it more safely.

Resource Protection

Blue Bags

Before you leave a ranger station, pick up a few blue bags for your trip. How many? There is a toilet in Glacier Basin and at Camp Schurman. For a three day trip, bring at least two per person and a couple extras for the group. There are blue bag barrels at Camp Schurman and White River Campground to deposit the used blue



bags. Please don't throw blue bags in the park's trash cans or into the toilet vaults.

Wands

Wands are the main source of trash climbing rangers collect during the summer. Climbers believe they are 'helping' others out by leaving the wands they placed on their ascent. Please do not do this. You could actually be sending other climbers into harm's way because the route may have changed. Rangers and guides end up picking up all the stray wands. We encourage the use of wands if you need them for navigation, but only if you agree to pull them. In The modern standard for navigation is the GPS. Practice using it and don't forget an extra set of batteries.

Rocky Fellfields

Areas above treeline where certain freeze/thaw and winds conditions allow for plant growth are called fellfields. This is an extremely fragile environment. Social trails can rapidly develop and new campsites (rock rings) are always popping up. Plants in this micro-habitat depend on rocks for protection from wind and ice. Climbing rangers survey these campsites as the years go by and deconstruct the new ones when they develop. Please camp on snow and perform all your camp activity on snow.

Wilderness

The Mount Rainier Wilderness Area is part of the National Wilderness Preservation System. The five qualities of wilderness are: Natural, Undeveloped, Untrammeled, Solitude, and Primitive and Unconfined. We strive to protect these qualities in our wilderness while at the same time providing for the people who want to climb Mount Rainier. Do your part to protect these qualities by observing the seven tenets of Leave No Trace.

Leave No Trace

The five qualities of wilderness can be most fully protected by practicing Leave No Trace techniques.

- Plan Ahead and Prepare
- Travel and Camp on Durable Surfaces
- Dispose of Waste Properly (Pack It In, Pack It Out)
- Leave What You Find
- Minimize Campfire Impacts
- Respect Wildlife
- Be Considerate of Other Visitors

For more on Leave No Trace, please visit www.lnt.org.

NPS/Scotty Barrier photo

Fees and Permits

For current information on ranger station locations and open hours please visit the park facilities page. For climbing permit, climbing fee, and reservation information please visit the park climbing page.

There are four terms we use in relation to fees and permits (required by 36 CFR 7.5):

Climbing Cost Recovery Fee

a. Purchase at any ranger station or self-registration kiosk

i. Beginning in 2017, you can pay the cost recovery fee online before you come to the park on PAY.GOV. Current information can be found on the NPS Climbing web page.

ii. In order to speed the registration process, we recommend paying the climbing cost recovery fee before you come to the park.

b. Revenue goes toward the National Park Service Climbing Program

c. Valid for unlimited climbs in the calendar year purchased

d. Required by each individual climbing team member

e. Climbers must pay the climbing cost recovery fee before they register to obtain a permit

Climbing Permit

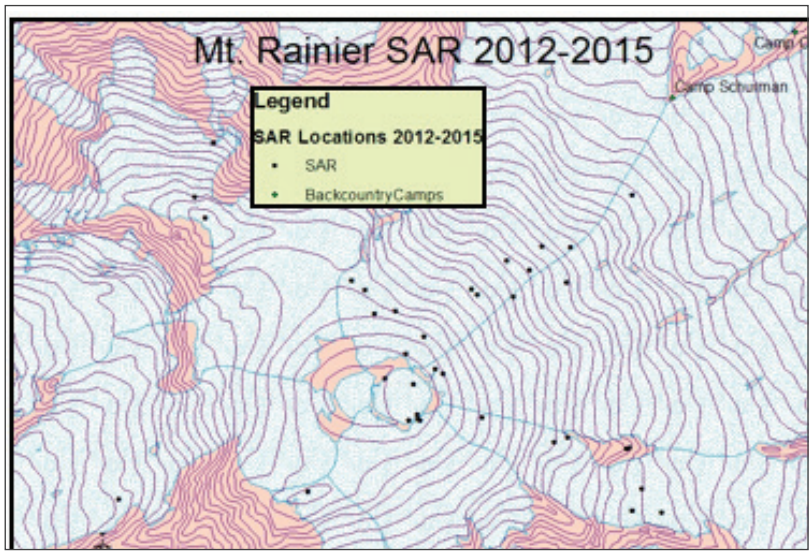
a. Only one permit per party is required

b. The permit is free and required for climbing and camping

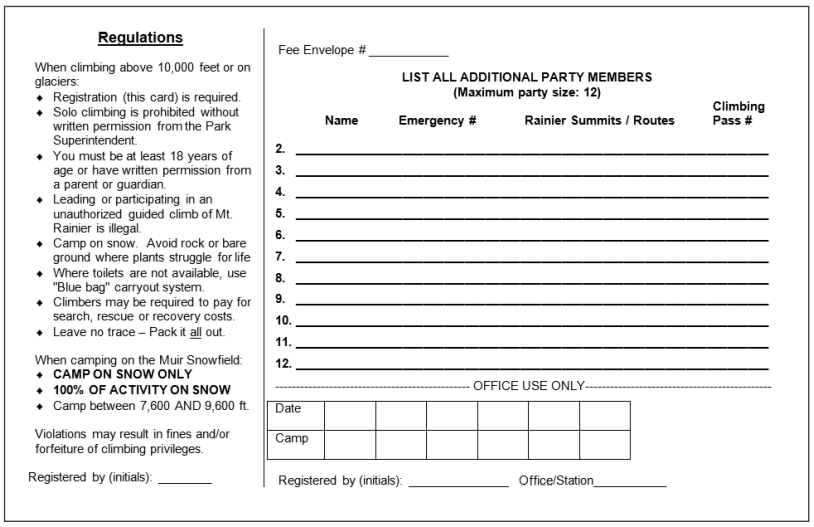
c. Can be issued as a walk-up on the day of the climb or up to 24 hours ahead of the climb.

d. Print your climbing permit out and pre-fill this form to save time.

Remember to do one thing when you get back to the trail head. Turn in your climbing permit. You are required to check out of your climb by U.S. Code 36 CFR 7.5. We also track specifics including what route you actually climbed and how many of your party made it to the summit.



Climbing Permit (front). Be sure to completely fill this out. It will used as reference if your party ends up needing help.



Regulations

When climbing above 10,000 feet or on glaciers:
- Registration (this card) is required.
- Solo climbing is prohibited without written permission from the Park Superintendent.
- You must be at least 18 years of age or have written permission from a parent or guardian.
- Leading or participating in an unauthorized guided climb of Mt. Rainier is illegal.
- Camp on snow. Avoid rock or bare ground where plants struggle for life
- Where toilets are not available, use "Blue bag" carryout system.
- Climbers may be required to pay for search, rescue or recovery costs.
- Leave no trace – Pack it all out.

When camping on the Muir Snowfield:
- **CAMP ON SNOW ONLY**
- **100% OF ACTIVITY ON SNOW**
- Camp between 7,600 AND 9,600 ft.

Violations may result in fines and/or forfeiture of climbing privileges.

Registered by (initials): _____

Fee Envelope # _____

LIST ALL ADDITIONAL PARTY MEMBERS
(Maximum party size: 12)

	Name	Emergency #	Rainier Summits / Routes	Climbing Pass #
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

---------- OFFICE USE ONLY----------

Date						
Camp						

Registered by (initials): _____ Office/Station_____

Climbing Permit (back). Be sure to add all of your other party member's names on the backside and an emergency contact number for them if it's different from the party leader's which is written on the front side.

Reservation

a. Reserve your permit so that you can be assured there is space for your climbing team for specific dates

b. A convenience fee of $20.00 is charged per reservation (not individual)

c. Though not required, reservations are recommended for larger climbing parties especially if the intended dates include a weekend.

Solo Permit

a. Climbing solo is prohibited unless granted special permission

b. The superintendent delegates the issuance of solo permits to the climbing rangers

c. Beginning in 2017 the solo permit application process will need to be completed online. Check the **Mount Rainier climbing page** for more information.

d. The application is either declined or approved based a combination of experience, skill, the plan, the weather, proposed route and dates, and the applicants equipment list relative to these factors

e. It can take up to two weeks for the approval process, so plan ahead

f. Requesting a Solo Permit is free, and if issued, good for the calendar year

The Climbing Cost Recovery Fee: An Explanation

Registration with the superintendent is required by law (U.S. Code 36 CFR 7.5) before climbing Mount Rainier. It is considered a special park use. NPS management policies provide the definition and the framework on how to manage special park uses. A special park use is defined as any use that:

a) provides a benefit to an individual, group, or organization rather than the public at large (so a small overall user group compared to the total number of park visitors);

b) requires written authorization and some degree of management control in order to protect park resources and the public interest;

c) is not prohibited by law or regulation;

d) is not initiated, sponsored, or conducted by the Service;

e) and is not managed under a concession contract, a recreation activity for which the NPS charges a fee, or a lease.

The climbing cost recovery fee pays for the majority of the climbing program, its rangers, their equipment, training, and supervision, as well as several resource protection measures such as the collection and processing of human waste, the construction and maintenance of high camp toilets, and other minor resource protection efforts. Overall it's a fee to help the NPS facilitate and mitigate the impact that 10,000 climbers have on Mount Rainier every year.

SKI MOUNTAINEERING

The Emmons-Winthrop is Mount Rainier's most obvious route for ski mountaineering. Situated on the leeward side of the mountain, these two glaciers usually receive the best snow for skiing and can be protected from the prevailing winds. Also, since it's primarily a glaciated route, there's no rocky cleaver or bare ridge tops to pick through.

Skis are chosen as a method for travel due to these and other factors:

1) Floatation in snow - on skis, one isn't going to sink up to their knees in a fresh June snowpack. Skiing is generally easier.

2) Weight distribution over crevasses - a ski's 'stress-bulb' does not penetrate as deeply into the snow as a foot's stress bulb

3) Sliding down is easier than walking - by lots.

The first factor is very straight forward. A lightweight ski mountaineering outfit is exceptionally nimble. However factors 2 and 3 can be misjudged. It turns out that there IS NO safe way to cross certain crevasses. A particular crevasse may collapse whether you walk over it or ski over it and not all crevasses provide clues that they exist. This should cause exceptional alarm to those ascending (or descending) a glacier on skis unroped. A number of ski mountaineers have met their end in this way. Because of this, ski mountaineers who do not rope up will need a tremendous background of experience "reading" glaciers—gaining experience in judging where and how crevasses are likely to appear (or be hidden).

And yes, skiing down is much, much easier and faster than walking. However, when skiing turns into sliding uncontrollably, whether upright on your skis or worse, tumbling down the hill, easier and faster yield to traumatic and injurious. More skiers have been killed or injured in this way.

A ski descent on Mount Rainier requires more technical skill and expertise than skiing black diamond runs at a ski area and/or skiing in the backcountry at lower elevations. It is an activity that should be undertaken only by expert skiers who are already experienced alpine and glacier mountaineers. Ski mountaineering anywhere on the upper mountain requires commitment in remote terrain. There's no ski patrol sitting in a hut with a toboggan ready to scoop you up after a wreck. A common ski injury at a ski area, like a boot-top fracture, can be life-threatening on Mount Rainier. Prepare for the worst by pre-rigging a harness with a top-clip option and having multiple skiers carry a substantial amount of rope and equipment to access and extract a skier wedged in a crevasse.

Unlike ski areas with groomed runs and manicured slopes which are skiable in a variety of conditions, Mount Rainier is rarely easily skiable. Poor visibility, unusual (sastrugi) or

Case Study: Alpine Meadow SAR

In July of 2013, a ski-mountaineering party of nine ascended the Emmons-Winthrop with the intention of skiing the route after summiting. Some of the climbing party stashed their skis along the route, while a few kept their skis with them all the way to the summit. On the descent, one of the skiers appeared to "catch an edge" near the summit and began to tumble. Though the skiers had waited until three o'clock in the afternoon for the sun to soften the snow, surface conditions were just firm enough and the angle steep enough that the skier couldn't regain control or arrest the fall. The skier came to a stop at a flat area at around 13,500 feet after sustaining multiple long-bone fractures and head trauma. It took six and a half hours to notify the National Park Service, insert rescuers to stabilize and package the patient, and fly the injured skier to the hospital. This rescue highlights the serious nature of skiing on the upper mountain. A common error or tumble (which happens to even the most skilled skiers) can have very serious consequences. In this case, after multiple days in the hospital, the skier died from the head trauma.

icy conditions, and avalanche danger usually shut teams down. Even if conditions are skiable at some elevations, it's rare to have the entire 10,000 foot descent be in good shape. There is generally a thousand feet or more of "survival" skiing. Often skiers will stash their skis at a point on the route where they feel comfortable skiing down from and continue up to the summit on foot.

One of the biggest temptations and risks is "skiing through" areas of exposure. One may think it's too much trouble to put the skis on the pack and rope up for a short section. One may think that, "if I can just ski through this small area, I'll be good." These small decisions often have severe consequences associated with them and should trigger you to consider increasing your security. This is most commonly done by applying the rope as a belay or to rappel.

Matching the snow surface conditions with your level of skiing skill, degree of fatigue, slope steepness, fall exposure, and team experience is the art of ski mountaineering and should continually be reassessed every 50 feet from the bottom up and top down.

Required Skill: Navigation

Navigation is a critical skill all year long on Mount Rainier. Snow and blizzard-like conditions can occur on any day of the year. Of the 72 search and rescue operations conducted for climbers on the Muir Snowfield or Disappointment Cleaver Route since 2012, 38 have had navigation errors as the root or significant contributing cause.

A solid foundation in map and compass navigation should be part of every mountaineer's repertoire of skills along with the use of a GPS device for precision navigation. The lower snowfields should not be underestimated in terms of their navigation difficulty in white out conditions as they are often the site of fatalities and rescues.

Map and compass navigation is a necessary foundational skill but cannot be relied upon for navigating the heavily crevassed terrain above Camp Schurmann. It also cannot be initiated in a white out once the climbing party has lost their current position. So if it is the primary means for a parties' navigation plan then their position must be known and tracked constantly by having physical landmarks to help identify their location.

GPS navigation is the modern standard and has many advantages over map and compass. The limitations of battery life and exposure of electronics to weather are possibly the only risks associated with relying on a GPS unit as a primary form of navigation, so always take an extra set of batteries. Know at least these functions: how to record waypoints and track logs and how to navigate to waypoints and follow track logs back. Practice before you need the skill.

Even more important: Know that in a white out or storm, it is nearly impossible for anyone, no matter how experienced, to use 'dead reckoning' to find their way down from the top of Mount Rainier.

Timing and Self Assessment

How long does it take to get to the summit? This is one of the most common questions that climbers have when they first embark on a climb. There is no set answer for everyone and every team. There are several methods for estimating travel times with the most popular being the Munter Method for time planning. This calculation gives a time estimate of 7 to 8 hours from Camp Schurman to Columbia Crest in average conditions. Consider this to be the bare minimum for a benchmark on fitness. When factoring in descent time this makes for an extremely long day and carrying enough food and water to support a climb of that duration is very difficult. When assessing yourself for fitness and competence there are three main factors to consider:

- **Climbing in Balance:** Are you able to safely and securely climb under your own power or are you struggling to maintain a steady rate of ascent? Are you stumbling and tripping over the terrain? An honest assessment can prevent a serious accident.
- **Take care of yourself:** Are you able to eat, drink, change clothing, etc., on your own or are your teammates assisting with this basic skill? If you are having trouble with these minor mental and motor functions, can you successfully self-arrest, team arrest? Can you help rescue an injured partner?
- **Pacing:** How long have you been out? Are you maintaining a steady and effective rate of ascent? Redo your time calculation. Are you setting yourself up for a 12 hour day, 14 hours, longer?

Climber's Briefing

Climbing rangers routinely make "evening rounds" at high camps during the summer at about 5:30. Each ranger has developed their own system of key points to relay and how to talk about them, but here we give a few examples of what's important.

Stefan's Key Points of Alpine Physiology

Breathing

Breathing has the most immediate effect on how you feel. A climber who is breathing appropriately can stave off headaches, stomach aches, dizziness, nausea, vomiting, and other symptoms of acute mountain sickness. To breathe effectively, inhale deeply. Suddenly and forcefully breathe out through tightened lips—almost creating a whistling sound. Just as you think you've exhaled completely, force more out. Let the air rapidly refill your lungs. This is called a 'pressure breath'. Do this often, even every breath, as you ascend higher during your climb.

Pace

Let your breathing rhythm control your pace. Too often, climbers will sprint and stop, sprint and stop. This exacerbates symptoms of AMS and can lead to a worsening condition. It also increases fatigue rapidly. Slow Down. Go at a pace that you can sustain without break, pause, or stopping for at least 45 minutes at a time. As the route gets flatter, you can increase your speed to maintain your breathing rhythm. As the route gets steeper you must slow down to maintain your breathing rhythm.

Hydration

A properly hydrated body will perform better in the cold by providing better perfusion to tissues. It will keep you warmer when it is cold because there is more volume in your system. When it gets hot, sufficient hydration will keep you cooler and allow you to sweat. Being well hydrated also helps you metabolize what you eat and get it into your system. Drink, then eat. Water is the most important thing so only supplement slightly with electrolytes. Warm liquids are always nice. Bladder bags (with tube insulators!) make drinking more accessible and convenient.

Be Early

Leave early to return early. During the summer season, the afternoon heat is a surprising contrast between nighttime chill. Anyone who has worked on Mount Rainier as a guide or ranger knows that the longer one is out on the upper mountain, the more fatigue plays a factor in the likelihood of becoming injured and making significant errors in judgement. Twelve hours is a LONG time to be out above high camp—for anyone. If you are descending on a glacier at 4:00 pm after a long time, the chances of rockfall, crevasse fall, slips, trips, falls, and other things going wrong increase. Should a rescue be needed, it is likely to go all night and into the next day, which will lead to a very prolonged period of unpleasantness!

Thomas's Evening Rounds Key Points:

- DON'T SPLIT UP. That means stick together. Don't send one person back down because they're not feeling well. Don't leave someone on route in a sleeping bag and try to find them on the descent.
- Keep rope team spacing to 10 meters or less between climbers. Using an entire 60 meter rope will make communication between climbers nearly impossible and also allow climbers to develop dangerous amounts of slack in the rope. It also makes passing other rope teams inefficient and dangerous. If there's more than five people on a rope team, consider forming an additional rope team.
- Have a turn-around time and stick to it.

Route Description

The Emmons-Winthrop Glacier Route starts at White River Campground (4,200 ft) and ascends to Columbia Crest (14,410 ft) on the northeast side of the mountain. Primary difficulties include steep snow and alpine ice (40-50 degrees in places) and complex glacier travel without any 'handrails' to help climbers navigate.

The first section of the route follows the Glacier Basin Trail (3.5 miles) to the base of the Inter Glacier at 6,800 ft. Most of the trail is under the forest canopy and follows the Inter Fork of the White River staying on the north side of the valley. There are many creek crossings and slide paths along the well-used trail. The maintained trail ends at Glacier Basin Campground. There are six sites available at the camp, a camp toilet, and a bear-proof food storage container.

The route ascends the Inter Glacier from Glacier Basin Campground between two prominent nunataks and then traverses toward a rocky ridge to the climber's left. Camp Curtis (8,700 ft) is a small group of rock rings on the ridge crest. From Camp Curtis there is a traverse down and right from the ridge and onto Emmons Glacier. The exact trail in the talus varies due to the crevasses on Emmons Glacier opening in different locations throughout the year. In the later part of the season it can be easier to ascend all the way up the ridge from Camp Curtis to the top of Steamboat Prow and down the rocky slope into Camp Schurman (9500 ft). Either way, Camp Schurman is about 0.5 miles from Camp Curtis.

Camp Schurman has two permanent structures, the ranger hut and bathroom. Climbers typically camp on the Winthrop Glacier on the north side of the rocky mound and dig platforms into the snow for tents. There is a 48 person limit at Camp Schurman each night, of which, 60%, or about 30, are reservable.

The upper mountain climbing route varies as the crevasses open and snow bridges collapse throughout the year. Most years it ascends directly out of Camp Schurman and up to Emmons Flats (9800 feet). Emmons Flats is a flat bench on the Emmons Glacier just above the Steamboat Prow. There is usually no visible crevasses running in the camp during the main part of the season. There is room for 24 people to camp each night at Emmons Flats.

Above Emmons Flats, the route continues straight up toward the crater rim (visible when it's not cloudy) avoiding crevasses until a ramp of snow between crevasses enables climbers to traverse left (usually near 10,200 feet) and onto 'the Corridor'. The Corridor feature on the Emmons Glacier is a longitudinal ridge of glacier snow that runs from 10,200 feet to 11,600 feet and offers fairly straightforward route finding.

At the top of the corridor, a series of crevasses and large seracs forms and blocks direct travel towards the crater. Most of the time the route angles to the climber's right into a broad, apron-like feature of glacier snow that starts near the saddle between Liberty Cap and the summit crater. This feature is typically called the "alpine meadow." Climbers ascend through the alpine meadow, end running crevasses in large switchbacks, until finding a ramp that spans the final bergschrund. Some years the best ramp has been clear out near Liberty Cap which adds lots of time and distance to the route. Other years, a ramp is found directly above the alpine meadow and allows climbers to ascend directly to the crater rim.

The true summit, Columbia Crest (14,410 feet), is reached by traversing around the crater rim to its high point on the northwest side. When the route is in good shape, it is about two and a half miles from Camp Schurman to the summit. Later in the season it can be over four miles long as the crevasses force the route to meander more.

Guides use a tool called the "Munter Method" to estimate climbing and descent times in the mountains. Using this method, the estimated time to ascend to the summit from Camp Schurman is five and a half hours. This would be considered a fast pace. An observed average is somewhere between six and seven hours. Considering the effects of altitude and the weight of summit packs, a good goal is around 1000 feet per hour. Climbing at a rate slower than 500 feet per hour will make it hard to stay warm and hydrated for the duration of the climb.

The descent from Columbia Crest back to Camp Schurman typically takes parties two thirds the time it took to ascend the route. Keep a track log on a GPS on the ascent so that a descent in a storm is possible. Clouds and snow storms can build quickly preventing any descent without a current track log of the route.

The route up the Emmons-Winthrop can change drastically week to week (and even hour to hour when snow bridges collapse and crevasses widen). Due to the changing nature of the route there are only a few key GPS waypoints that are useful—mostly the summit and Camp Schurman. Two others, Liberty Saddle and the top of The Corridor are also frequently passed on the route, but not always. Use these points with caution; it's always better to create a track log and current waypoints as you ascend.

❑ **Columbia Crest**	**46 51.180, -121 45.615**
❑ **Liberty Saddle**	**46 51.550, -121 45.720**
❑ **Top of the Corridor**	**46 51.680, -121 44.500**
❑ **Camp Schurman**	**46 52.210, -121 44.000**

Authorized Guiding Activity

Guiding a person or a party on a climb of Mount Rainier in exchange for any type of fee is considered a commercial use of the national park. Federal regulations prohibit engaging in or soliciting any business in the park areas, except in accordance with the provisions of a written agreement with the United States. As in other National Park Service areas, commercial visitor services may be provided only by those holding an authorization from the United States. The National Park Service uses the following principles to guide our policy and program development in regards to any commercial use in the park and mountaineering guiding in particular:

1. Concession services are important to our visitors
    a. A major responsibility of park management is to ensure that adequate services are provided in the national park.
2. Quality services should be provided at reasonable prices
    a. When commercial services are available we verify that they are provided at prices comparable to those outside the park.
3. The National Park Service must remain the primary controller of park visitor services
    a. To assure that the visitor services aspects of the operation are consistent with park resource management, the NPS must continue to strictly control most aspects of the concessions operation.
4. The National Park Service Concessions Program is a partnership with private enterprise
    a. The partnership concept has worked out well because it has allowed the NPS to oversee the private operators, and in turn has allowed the private sector to provide the necessary capital while receiving the privileges of profitable businesses providing services to park visitors.

NPS photo

NPS/Cameron Reade photo

There are three categories of legal commercial 'Summit Climb' guiding in Mount Rainier National Park:

Concessionaire

There are three concessionaire guide services in Mount Rainier National Park. The contract for each concessionaire lasts for a ten year term. At the end of the contract term the companies must reapply for the following term. There is a competitive process for awarding the contracts.

The three concessionaires are:

- **Alpine Ascents International**
- **International Mountain Guides**
- **Rainier Mountaineering, Inc**

Commercial Use Authorization - Single Use Permit

If the NPS determines that there is a need it is able to issue commercial use authorizations (CUA's) to persons (referring to individuals, corporations, and other entities) to provide commercial services to park visitors in limited circumstances. CUAs, although used to authorize commercial services to park visitors, are not concession contracts. They are intended to provide a simple means to authorize suitable commercial services to visitors in the park in the limited circumstances in the legislation.

A current list of CUA Single Trip Summit Climb providers can be found **here.**

Commercial Non-profit - Single Use Permit

A **Commercial Non-profit SUP** is issued to organizations that have 501c (3) non-profit status and in-park activities that are commercial in nature. Examples of criteria used to determine if a non-profit organization falls into the Commercial Non-Profit category are:

1) Rates charged to participants – Is the fee greater than direct expenses?
2) Donations similar to for-profit fee rates for a climb or activity.
3) Leaders/Guides paid above stipend.
4) No taxable income is received by company or organization.

The application form for a Commercial Non-profit permit can be found **here.**

Outside of either of these three criteria all exchanges of money or goods for a guided summit climb is considered illegal.

Checking Out

Remember to do one thing when you get back to the trailhead. Turn in your climbing permit. You are required to check out of your climb by 36 CFR 7.5. We also track specifics including what route you actually climbed and how many of your party made it to the summit.

It is a $250 fine to leave the park without checking out.

Supplemental Reading

For more information on mountaineering skills and techniques, check out:

- *Mountaineering: Freedom of the Hills,* Mountaineers Books
- *Extreme Alpinism: Climbing Light, High, and Fast,* Mark Twight

For a thorough introduction to the mountain and it's major features and routes, check out:

- *Cascade Alpine Guide, Vol 1: Columbia River to Stevens Pass,* Fred Beckey

The most comprehensive and detailed guide book for Mount Rainier is:

- *Mount Rainier A Climbing Guide; 2nd Edition,* Mike Gauthier

National Park Service
U.S. Department of the Interior

Mount Rainier National Park
55210 238th Avenue East
Ashford, WA 98304

www.nps.gov

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