

# Best Practices Guide

For Rock Climbing Route Development  
in the Squamish Area Provincial Parks

Stawamus Chief, Shannon Falls, and Murrin

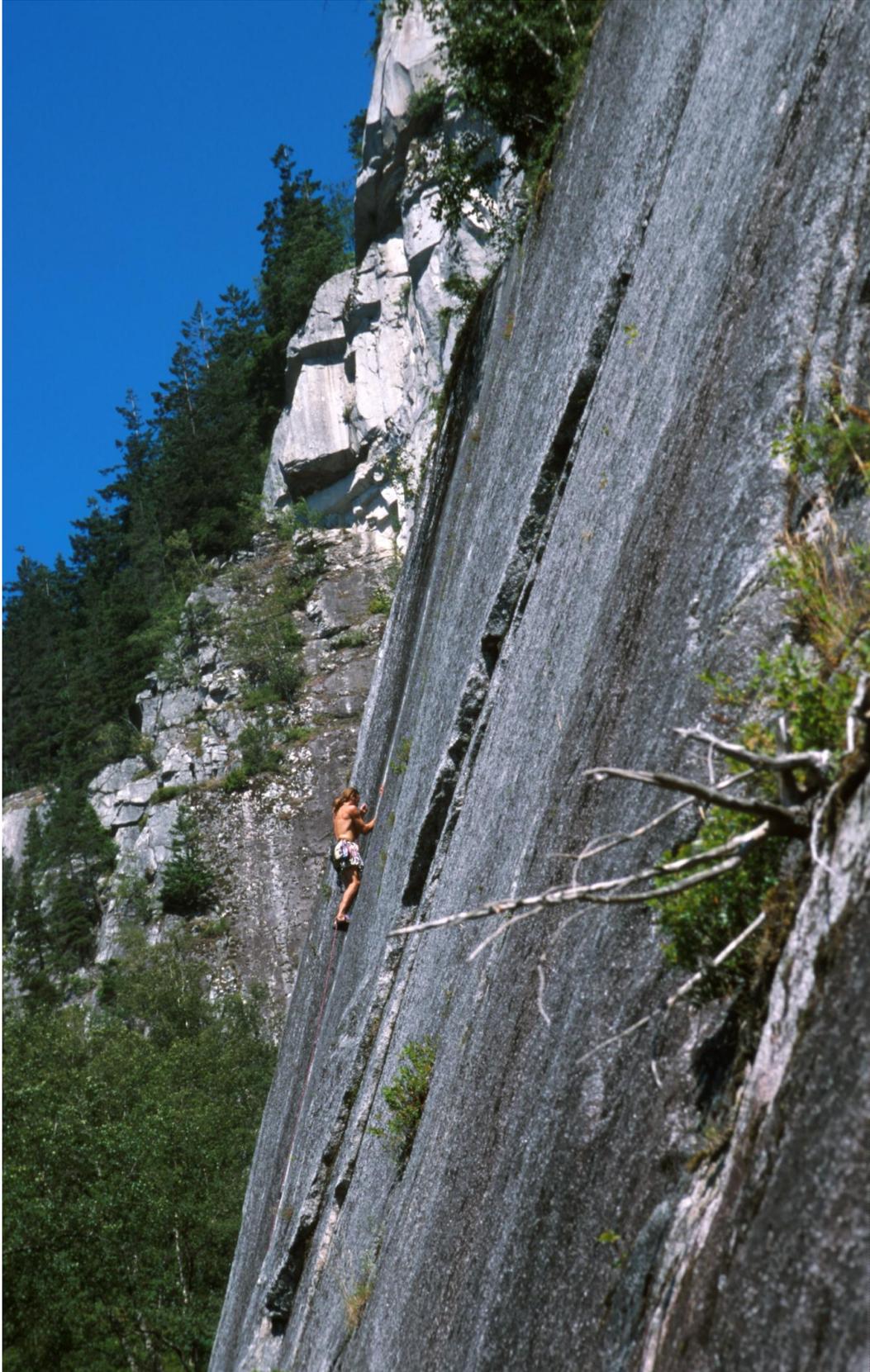
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# 1 Introduction

Squamish area Provincial Parks (also referred to as “the Parks”) – Stawamus Chief, Shannon Falls, and Murrin—offer exceptional recreational opportunities for hikers, climbers, and other user groups. Since well before the establishment of the Parks, individuals within the climbing community have independently initiated the development and maintenance of rock climbs in the three Parks for the general public’s enjoyment and recreation.

Essentially, rock climbs are manicured vertical trails. These trails are built and maintained pro bono and add considerable recreational value to the three Parks. BC Parks recognizes the importance of climbing and route development within the Parks and has identified this through several BC Parks initiatives, including the *Stawamus Chief Master Plan*, the *Rock Climbing Strategy* (1999), and now this *Best Practices Guide*. These initiatives are highly cooperative efforts between BC Parks, climber access groups, and climbers, which evolved from shared concerns and interests in the Parks.

Since roughly 2005, BC Parks, the Squamish Access Society, and many members of the climbing community have become increasingly aware and concerned about occasional conflicts between climbing and/or route development with other interests within the Parks, particularly in the Stawamus Chief Park (also referred to as “the Chief”.)

A key interest is protecting falcons and their habitat, especially their nesting sites during nesting season. This BC Parks mandate is implemented in part through climbing bans in designated areas of the Chief when falcons are considered at their greatest risk—generally from the end of March to early-mid July. These closures limit climbing access on the Chief and can adversely affect climbing activities, thus motivating climbers and BC Parks to jointly review the falcon closure process from both a scientific and practical perspective in order to exchange knowledge, gain insights and minimize negative impacts on the natural environment and its recreational users. Climbers often have firsthand, practical knowledge of conditions which might impact falcons and their habitats and regularly report falcon sightings to BC Parks. Further details concerning falcons are found in section 3.1.

Additionally, public safety is a serious concern in the three Parks. Increasingly, the number of park users grows each season. Thus, the potential for route development to directly cause harm to persons within the Parks has also grown. In 2009 near misses between route developers and hikers below made it clear that guideline needed to be put in place to safeguard park users and the environment. Short of closing the park to route development or initiating a cumbersome permitting system the authors feel that voluntary compliance through the use of these guidelines is the best way of achieving these objectives. Safety is discussed throughout the *Best Practices Guide*, and is the focus of section 5 “Fixed Protection: Materials”, 6 “Liability and Due Diligence”, 7 “Rock”, and 8 “Mitigation Options”.

In 1999, BC Parks in cooperation with climbers developed a rock climbing strategy to address the issues arising from the two main objectives of the *Stawamus Chief Master Plan* concerning rock climbing:

- To provide a variety of climbing opportunities; and
- To minimize the impact [of climbing] on the environment.

The *Rock Climbing Strategy* has directed BC Parks' management of climbing activities within the Parks. The strategy called for refining its cleaning guidelines as more information became available. This *Best Practices Guide* recommends new guidelines and considerations for cleaning, including route development, and intends to balance climber's needs with protecting the environment and public safety.

This *Best Practices Guide* offers tools to assist individuals reach the objective of sustainable route development. Sustainable development is reached when climbers are cleaning and developing new routes without compromising BC Parks' ability to protect the natural and cultural resources—and promote both public safety and recreational opportunities within the Parks. This *Best Practices Guide* is just that—a document outlining the existing, accepted standards within the climbing community of Squamish, **it is not intended to create new standards but simply to explain existing standards of conduct.**

## 1.1 Process

This *Best Practices Guide* came about through an intensive process initiated by the Squamish Access Society (SAS) and BC Parks, with participation from the Climbers Access Society of BC (CASBC), members of the Association of Canadian Mountain Guides (ACMG), Squamish Rock Guides (SRG), Squamish Search and Rescue (SAR), local climbing guidebook authors, and climbing community members at large.

To create this document, the SAS in collaboration with BC Parks created the Climbers Advisory Group (CAG). At BC Parks' request, the SAS appointed representatives of the rock-climbing community to join the CAG. Initially, the CAG membership included representation from the SAS, BC Parks, CASBC, ACMG, SAR, guidebook authors, as well as climbing community members at large. The final CAG membership who completed authoring the *Best Practices Guide* includes—Charlie Harrison (SAS; Chair of CAG), Colin Moorhead (SRG), Andre Ike (ACMG), John Howe (SAR), Peter Winter (CASBC), Marc Bourdon, Jeremy Smith, Katy Holm, and Jeremy Frimer. Kevin McLane and Andrew Boyd were part of the original group but resigned during the process. Dave Zevick, Area Supervisor Howe Sound, from BC Parks organized and attended meetings and served as Vice Chair. He contributed the sections and information specific to BC Parks in consultation with other BC Park staff, specialists and representatives, including Wildlife Biologist Brent Gurd. Some BC Parks information is directly derived from the BC Parks section on the Province's website for the Ministry of Environment: <http://www.env.gov.bc.ca/bcparks/> (and related pages.)

To help meet their mandate BC Parks prepares management plans. These plans are written with a high degree of public involvement. The general public and interest groups have opportunities to provide input during the planning process. The *Stawamus Chief Master Plan*, the *Rock Climbing Strategy* (1999), and now this *Best Practices Guide* are primary examples of this collaborative type of effort where BC Parks fulfills its responsibility by working with the advisory group, climbers and the general public to ensure that the significant natural and cultural resources of the Squamish area parks are protected for future generations while allowing for high quality, safe outdoor recreation today.

See section 1 "Introduction" for more information about the *Stawamus Chief Master Plan* and the *Rock Climbing Strategy* (1999).

**Note to readers:** Formerly, the advisory group was referred to as the Squamish Climbers (of Rock) Advisory Group, "Squamish CRAG" or simply, "CRAG" and since renamed Climbers Advisory Group, or CAG. The public committee records leading to the completion of this *Best Practices Guide* are under the former name of CRAG and are kept by BC Parks.

### 1.1.1 Phase 1: Production

The CAG was formed and met regularly for about two years to produce a first draft of the *Best Practices Guide*. This involved extensive discussion, debate, authoring, re-authoring, and eventually consensus to adopt a first draft for public consultation.

### 1.1.2 Phase 2: Public Consultation

The CAG submitted the draft of the *Best Practices Guide* to BC Parks to initiate public consultation. BC Parks published, promoted, and distributed the draft *Best Practices Guide* and requested stakeholders, interested parties and persons to provide input through this internet survey. The SAS also approached prominent members of the climbing community directly for feedback. Furthermore, a public meeting was held on November 5, 2011 to elicit input and suggestions from the climbing public. This phase of public consultation also involved review by BC Parks staff and representatives.

### 1.1.3 Phase 3: Publication

The CAG re-assembled to consider input received from the general public and BC Parks, and revise the *Best Practices Guide*. The *Best Practices Guide* was finalized and submitted to BC Parks for publication and distribution.

#### 1.1.4 Phase 4: Education

BC Parks and the SAS launched a campaign to educate climbers of the *Best Practices Guide* and of the reasons for adhering to it. This education component is ongoing and is accomplished through various internet and web communications (including information posted on websites, webmail and email), signage, brochures and other publications, and word-of-mouth among other forms.

### 1.2 Role of the Squamish Access Society (SAS)

The SAS is a grassroots, local climbers' organization dedicated to preserving access to the climbing areas in and around Squamish. The SAS works together with the CASBC and other access groups in "on the ground" initiatives and in engaging with local and provincial government and the private sector on behalf of climbers. At the request of BC Parks, the SAS appointed members to the CAG, who authored this *Best Practices Guide* collaboratively with BC Parks.



### **1.3 Role of BC Parks**

BC Parks is responsible for the designation, management, and conservation of a system of ecological reserves, provincial parks and recreation areas located throughout the province. British Columbia's parks and protected areas contain nationally and internationally significant natural and cultural features and outdoor experiences.

BC Parks, protected areas, and conservation lands are a public trust. As such, BC Parks' mission is to protect representative and special natural places within the Province's Protected Areas System for world-class conservation, outdoor recreation, education, and scientific study.

BC Parks has jurisdiction over all matters concerning parks and protected areas. Once a park is established its natural values are then afforded legal protection. The legal framework for protecting these important areas includes the:

- *Protected Areas of British Columbia Act*;
- *Park Act*;
- *Ecological Reserve Act*; and
- *Environment and Land Use Act*.

(Source derived from: <http://www.env.gov.bc.ca/bcparks/conservation.html>.)

These acts and regulations specify what BC Parks must do in order to protect the natural resources of a protected area. If unacceptable damage is occurring within a BC Provincial Park, BC Parks must take action to stop that activity.

### **1.4 Role of the Climbers Advisory Group (CAG)**

The role of the CAG is to advise BC Parks on the management of the three Squamish area Provincial Parks—Stawamus Chief, Shannon Falls, and Murrin—about climbing related issues. The CAG is a group of dedicated individuals appointed by the SAS to represent the interests of the climbing community. The CAG members volunteer their time for this purpose.

See section 1.1 “Process” for further details concerning the CAG's evolution in the development of this *Best Practices Guide*.

## 1.5 Core Principles

**Warning! Rock climbing and route development are hazardous activities with inherent risks of personal injury and death.**

Rock climbing and route development safety requires your personal judgment and ability. The safety of a rock climbing venue is never guaranteed. The SAS, BC Parks, and members of the CAG tried to ensure the information in this document is accurate. However, this information must not be relied upon in any way, as any form of guarantee for your personal safety.

The core principles behind this document aim to:

- safeguard the security of persons;
- preserve the natural ecosystem;
- ensure climber and hiker access;
- promote route development; and
- protect cultural assets.

Route developers having read and abided by this document are not relieved, protected, or indemnified from their personal responsibility and liability for any harm or loss caused as a result of their route development.

## 1.6 Scope of Best Practices

The jurisdiction of these best practices is limited to the Squamish area Provincial Parks—Stawamus Chief, Shannon Falls, and Murrin. The scope of the guidelines is primarily concerned with issues of security of the persons within, and the ecological preservation of, the Parks. Other considerations, such as how to spot a route worth developing, are beyond the scope of this document. This document is not a “how to” guide to route development. It is not intended to replace climbing courses, hands on experience, and other applicable skills and knowledge.

## 1.7 Applicability and Enforcement of Best Practices

BC Parks as a Ministry is entrusted with the preservation and care of its provincial park resources. As their legal mandate, BC Parks will not allow the continuance of activities that are contrary to relevant acts, regulations or approved management plans. If route development is occurring in an unacceptable manner as defined and interpreted through BC Park’s legal, regulatory, and management framework, BC Parks has no choice but to stop/correct the activity—it is mandated to do so.

Enforcement is one response in an array of tools that the Ministry will use to achieve its objectives or compliance; this array includes education, advisories, warnings tickets, and formal charges.

If route development is carried out in a manner that lies within the parameters of the BC Parks' legal, regulatory and management constraints then the route developer would not draw any enforcement attention to him or herself. This type of sustainable route development is a specific objective that BC Parks and its stakeholders want to achieve.

BC Parks aspires to achieve "shared stewardship". Shared stewardship is the belief that environmental sustainability depends on the collective knowledge, commitment, and actions of individuals, stakeholders, and government.

**Total disregard for the *Park Act* and other applicable acts, regulations, and management directives, or acts of gross negligence could result in enforcement actions.**

Continued negligence within the Parks will force BC Parks to manage their liability and reduce risks of harm or loss by imposing heavy regulations, such as instituting a permitting process or even placing a moratorium on route development activities.

The authors and BC Parks hope, through voluntary compliance, to avoid enforcement actions.

## 2 Considerations for New Route Development

### 2.1 General

Routes should be planned out before any physical effort is put into the construction of the proposed route. Consider the following before beginning route development:

- Consider whether the route development compromises BC Parks' mandate to maintain the ecological and cultural values of the park. Become aware of BC Parks' guidelines regarding vegetation removal and protection of falcons. See section 3 "Ecological and Cultural Considerations". Keep in mind that if a new or re-cleaned route doesn't become a resource to the climbing community, the killing of vegetation was for nothing. If uncertain contact BC Parks for more information.
- Consider how the new route will contribute to the future growth of climbing in the area. Many developed routes end up growing over. Will your route stay clean naturally? Or, will it be popular enough to remain clean due to traffic? Is it likely to help alleviate pressure on other popular routes? Is the route in an area that is already a destination? If not, even quality routes can lack much traffic if they are lone routes away from any destination. A basic amount of route density seems to bring traffic.
- Consider whether the route development process will irrevocably harm or impact the character of an already established and valued route. See section 3.3 "Existing Routes".
- Consider the impact on other recreational users within the park, such as hikers on established trails. See section 3.4 "3.4 Impact on Recreational Opportunities within the Park".
- If the route will involve fixed protection, consider the best practices on bolts, anchors, and other forms of fixed protection in section 5 "Fixed Protection: Materials".
- Consider that route cleaning poses risks for both the route developer and for any hikers and climbers below. Anyone performing route development is completely responsible for his/her actions, regardless of the risk mitigation they may have used. See section 6. "Liability and Due Diligence". Can the hazards posed by cleaning a proposed new route be safely mitigated? See section 8 "Mitigation Options".

The above questions and considerations are described in more detail in the sections following.

**Route developers should consider altering or abandoning their project if, after careful consideration, they do not believe their route will satisfy these considerations.**

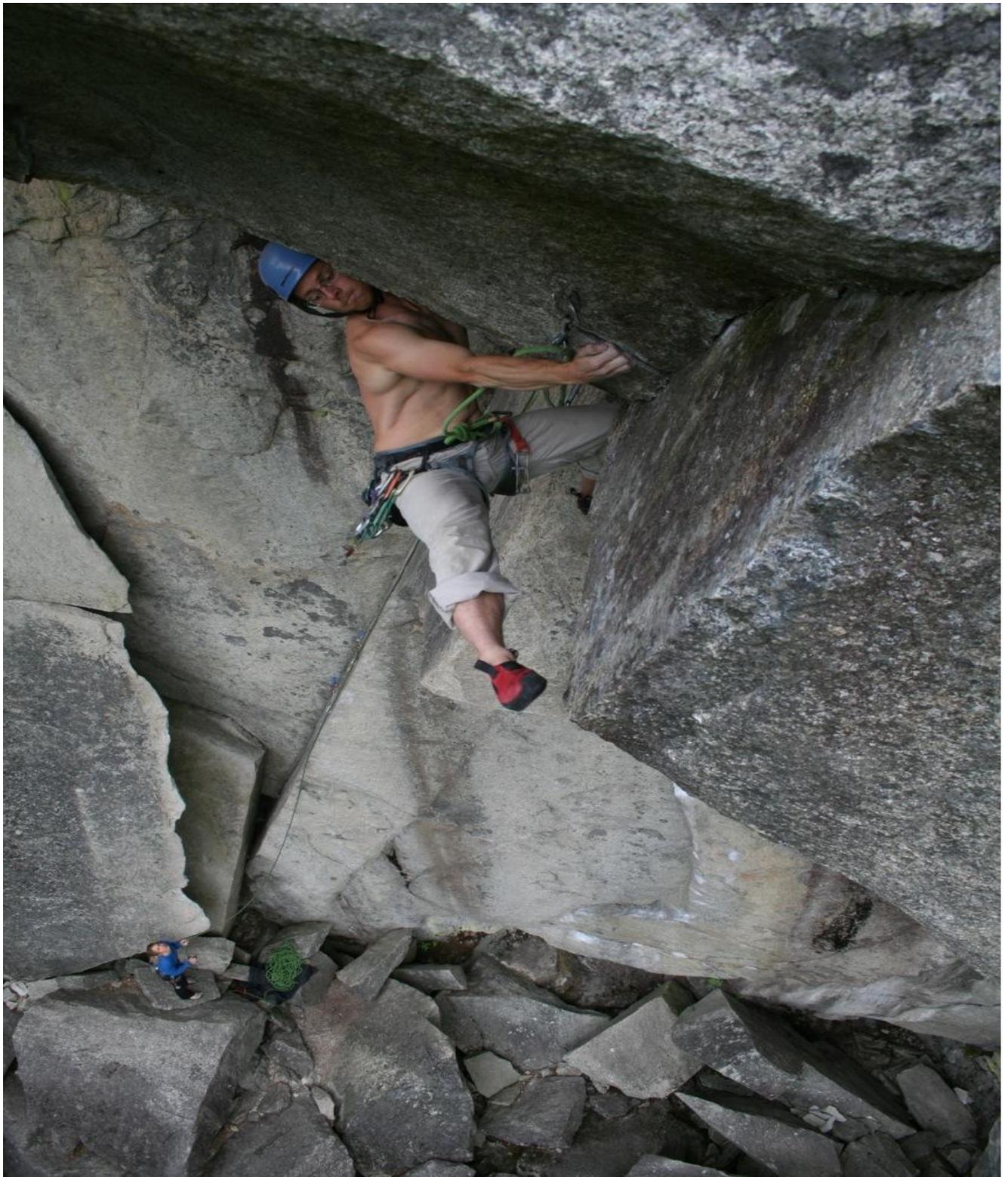
## 2.2 Future Growth of Climbing in Squamish

From the *Squamish Climbing Strategy Report* (2008):

The historic annual growth rate over the last 30 years is estimated at between 5% to 7%, although it is difficult to quantify with precision due to the lack of studies. But it holds true based on a wide range of factors, from equipment sales, car counts, observations of long-time climbers, the degree of increased crowding, and industry trends. That rate was particularly rapid when the popularity of urban climbing gyms in the mid-1990s introduced thousands of people to climbing techniques, and then again in the early 2000s when bouldering skyrocketed in popularity. That has resulted in an increase of a ten-fold order of magnitude over the 30-year period since 1978, with no abatement today in that pace of growth.

Projecting ahead, if the historic growth figures of 5% to 7% annual climber-days are used, the number of climbers would double in the next 8–12 years, and indicators point to demand-pressure for hiking on the Chief and in the Smoke Bluffs of at least that order. That is a prospect of considerable change, bringing with it a need to plan wisely and strategically how to best manage and absorb the growth, and ensure positive gains for the economic, social, health, and environmental pillars of planning.

...[The estimated] number of climber-days in 2008 [was] 131,531. While not an authoritative study, the order of 120,000 to 150,000 is a probable range. It is more challenging to estimate how many climbers climb at Squamish annually, but 5,000–8,000 or more is a fair estimate. One third or more would have travelled from outside of British Columbia.



## 3 Ecological and Cultural Considerations

Route developers should carefully consider the potential for ecological and cultural damage in the process of route development. Furthermore, route developers should minimize their impact on other user groups, such as hikers.

### 3.1 Falcons

#### 3.1.1 Best Practices

Route developers can expect closures in the Dihedrals/Trichome Ledge areas in the Stawamus Chief Park around the end of March to early-mid July. No route development will be allowed once the closures take effect. Nor will the route, once complete, be climbable during closures. This may be a point for developers to consider before they start. Falcons and their nest sites are protected under the *BC Wildlife Act*. Disturbance of these nesting sites can lead to charges being laid.

#### 3.1.2 Background on Falcons

The reason for climbing closures is to provide the best opportunity for nesting falcons to be successful breeding and help them to increase their population numbers to a sustainable level. The Committee on the Status of Endangered Wildlife in Canada designates falcons as Special Concern. The Peregrine Falcon at one time was designated as endangered due to low population numbers caused by environmental contamination and human activity. During nesting activity falcons are especially susceptible to human activity. Disturbance at this time can cause the failure of the falcon's breeding season, thus slowing the recovery of the species.

There are three key times in the nesting season when the falcons are most susceptible:

1. When a pair of falcons has courted/mated and is looking for a nesting site. If there is human activity at their chosen nesting site this will cause them to leave and perhaps not nest.
2. When the falcons have laid eggs and then there is human activity. This may cause them to abandon the nest causing mortality to the unhatched eggs.
3. When the falcon eggs have hatched and the young are almost ready to fly (fledge). Fledging is typically one of the most sensitive periods for any nesting bird.

Initially, falcon chicks are most likely to hide when they are disturbed at the nest because they have very little ability to escape. As they get older and approach the time when they take their first flight, escape becomes a more feasible option for them should they be disturbed at the nest. However, young that are close to fledging will often attempt to fly away from the nest before they are capable of flight. Such 'forced early fledging' often leads to death or serious

injury of the young due to crashes at the end of the attempted flight, or due to predation or exposure on the ground, or possibly due to starvation if the parents are unable to locate the fledgling or unable to reach it.

Through the cooperative falcon-monitoring program, BC Parks staff collects relevant data to help determine the occurrence of these various stages of nesting and set appropriate closure windows.

For more information on the falcon monitoring program visit BC Parks website:

<http://www.env.gov.bc.ca/bcparks/explore/parkpgs/stawamus/>.

You may report sightings to BC Parks at: (604) 898-3678, or by email to:

[Katy.Chambers@gov.bc.ca](mailto:Katy.Chambers@gov.bc.ca).



## 3.2 Vegetation Removal

### 3.2.1 General

Vegetation within a provincial park is protected under the *Park Act*. Further direction on how vegetation may be used within a park is found within the Parks' individual management plans and guidelines. See section 10 "References" for a list of management plans available through the BC Parks website.

Route development usually involves removing organic material, including, but not limited to, moss, lichen, soil, bushes, and trees. Vegetation removal tends to be most needed on moderate, lower angle routes. These new routes serve an important purpose—to alleviate pressure on existing, popular moderate climbs. However, there are other factors to consider with larger scale vegetation removal—exposing loose rock; creating an aesthetic liability; stirring up controversy within the climbing community—many of these factors can lead to disapproval from the general public.

Removal / dispersal of debris from the base of a recently cleaned route needs to be considered on a case-by-case basis, as many factors impact what can and cannot be done with the debris. Park staff should be consulted on what can be done with potential debris, such as scattering and / or removal.

### 3.2.2 Best Practices

Route developers are encouraged to think carefully about the level of vegetation removal. On the one hand, some tree removal will be required to make the climb safe and enjoyable. On the other hand, avoid a repeat of the Crap Crags/Europa vegetation removal project example, wherein many trees were pulled out, roots and all, exposing loose rock. When in doubt, consult with more experienced route developers on finding the balance between *enough* and *too much* before undertaking large-scale vegetation removal projects.

If endangered species are discovered in the Parks, BC Parks will implement restrictions on route development. BC Parks has a duty to ensure that no rare or endangered plant species are present or getting destroyed through route development/cleaning.

**As a guiding principle, the least amount of material should be removed while still ensuring that a climb is safe, aesthetic, and offers an appropriate climbing experience.**

### **3.3 Existing Routes**

The character of existing routes should be maintained after a new route is introduced.

#### **3.3.1 Dirt and Debris**

As the number of climbs in Squamish increases, the proximity of route development projects to existing routes will generally increase. In developing a route, removed debris can fall onto existing routes, leaving them dirty. Route developers should (a) avoid affecting existing routes at times of the year when climbers are likely to want to climb them, and (b) re-clean these affected routes after they are finished cleaning their route him or herself.

#### **3.3.2 Damage to Holds and Fixed Protection**

Avoid damaging existing holds on nearby routes from rockfall during cleaning. Once cleaning is finished, all permanent anchors on affected existing routes should be carefully inspected for possible damage. If damage has occurred, the route developer should contact the first ascentionist (if possible) and offer to pay for and repair the damage. If the first ascentionist is not available, the new route developer should restore damaged permanent anchors.

### **3.4 Impact on Recreational Opportunities within the Park**

Route developers must minimize impact on other park users' recreational experience and safety. Because other recreational users may not understand route cleaning practices, avoid cleaning in high visibility areas during times when many users may be present.

For this reason, trail closures should take place at times when there are few park users. At the end of cleaning, ensure that all debris which has landed on hiking/access trails is cleared away and visual aesthetics are maintained. For other impacts of route development, such as hazards, see section 8 "Mitigation Options".

## 4 Bouldering

Bouldering in the three Squamish area Provincial Parks can be a varied experience. From well travelled classics right off the main trails of the Chief, to unclimbed moss covered boulders scattered away from the main areas. The main concerns regarding bouldering in the parks is the “spider webbing of the trail system” and excessive vegetation removal. See section 3.2 “Vegetation Removal” for details about vegetation removal.

### 4.1 Two Approaches to Development

Developing bouldering problems and sectors in the Parks can be divided into two schools of thought.

The first is a more permanent approach where the problems are completely cleaned of all moss and loose features, and permanent well-delineated trails are developed to these new problems/sectors. The advantage to this approach is it generally encourages more climbing traffic. The disadvantage is at a higher environmental impact. Most of the main bouldering sectors in Squamish have been developed in this manner.

The other less permanent approach involves cleaning the minimum amount to allow the passage of a climber and leaving the area with as minimal impact as possible. Many problems developed in Squamish have grown over due to this approach. As a result, these problems are often claimed as first ascents, even though they have, indeed, been climbed before.

### 4.2 Planning

When developing a new problem or sector, here are some things to consider:

- What amount of use will this problem/sector receive? As a general rule, high quality problems in remote or minimally developed areas generally see much less traffic than medium (or even low) quality problems in highly developed, popular areas. This can be a guide to how much cleaning/trail building is required.
- What is a sensible trail layout? The goal is to have a clear, well-delineated trail system with the minimum amount of side trails. As a general rule, climbers take shortcuts. Trails that lead more directly to the problems or areas are more likely to be adhered to, rather than circuitous trails which might seem more aesthetic or environmentally friendly.

### 4.3 Cleaning

Artificial manufacturing (e.g., chipping of holds) and artificially reinforcing (e.g., gluing) of holds is strongly discouraged. The use of bleach or any other chemicals is not permitted by BC Parks as these materials are damaging to the Parks natural resources and ecology. Furthermore, the use of chemicals, as an aid to cleaning routes, is not accepted within the Squamish climbing community.



## 5 Fixed Protection: Materials

### 5.1 General

Fixed protection is defined as hardware that is deliberately left in place. Removing fixed protection can damage or otherwise permanently alter the rock. It should not be treated lightly. This applies to equipping new routes or altering existing ones. Careful consideration and thoughtful contemplation of your actions is warranted whenever considering placing fixed protection. When in doubt, seek opinions of other climbers including seasoned route developers before you take action. Keep in mind, opinion on these matters vary widely and individuals who disagree with what you have done may take action and remove your work.

BC Parks in Squamish do not monitor or regulate the materials or placement of fixed anchors at this time. This is not the case in many federal parks in the USA where regulation on the placement of permanent anchors varies from requiring official approval to an outright ban.

The climbing community in Squamish does recognize and uphold certain general standards and best practises concerning the type of fixed protection used, which are discussed below.

### 5.2 Materials

These guidelines address issues related to the type and quality of hardware used.

#### 5.2.1 Slings/Webbing

Slings and webbing degrade quickly in an outdoor climate; this may compromise the strength of the material itself. Moreover, old worn slings are unsightly and considered by many as litter. Where slings accumulate, a permanent rappel anchor should be considered as a more appropriate solution.

#### 5.2.2 Pitons

Although popular as anchors in other areas, the marine climate of Squamish degrades pitons rapidly. Pitons are not ideal as fixed anchors in Squamish.

#### 5.2.3 Bolts and Hangers

Due to Squamish's marine climate all fixed protection should be made of stainless steel. The recommended best practice is that bolts be a minimum of  $\frac{3}{8}$  inches (10 mm) diameter and 2  $\frac{1}{2}$  inches (63 mm) long, made of stainless steel, and designed or certified by the manufacturer with a minimum breaking strength of 22 kN (~5000 lbs). Hangers should also be stainless steel and designed and certified by the manufacturer for climbing with a minimum breaking strength of 22 kN (~5000 lbs).

Stainless steel and non-stainless steel components should never be used together. Contamination of the stainless steel with non-stainless steel can lead to rusting of the stainless steel components, defeating the purpose of using stainless steel in the first place.

**Never mix stainless with non-stainless hardware.**

Glue-in bolts, more commonly used in areas with softer, porous rock are not recommended for granite. The adhesive used to secure this type of bolt to the rock works because it penetrates into the rock. Granite is much less porous than softer rock such as sandstone. Proper installation of glue-in bolts require strict adherence to the manufacturer's specifications. Once installed, it is very difficult for others to determine if the correct adhesive was used and the proper installation procedures were followed. Generally speaking, the granite found in the Squamish area Provincial Parks provides an ideal medium for commercially available mechanical wedge bolts.

#### 5.2.4 Belay/Rappel Anchors

The generally accepted minimum standard for a fixed belay anchor is a 2-bolt configuration. Rock competency is a key factor in determining distance between bolts. The recommended minimum spacing between bolts in the competent granite found in these BC Parks is 9 inches or 23 cm.

One recommended configuration for rappel stations is two independent anchors linked to a load sharing focal point through which ropes can be easily threaded and retrieved. All of the components in this system must be certified to a minimum breaking strength of 22 kN (~5000 lbs). Other commercially available anchor sets, designed and certified for this purpose provide suitable alternatives. Ideally, all of the rappel anchor components should be replaceable and made of stainless steel. If using galvanized steel, consider that, over time these materials can lead to staining of the rock.

The commercially available (e.g., Fixe brand) stainless steel ring bolt rappel anchors meet all of these recommended best practises for permanent rappel anchors.

## 6 Liability and Due Diligence

If route development activity directly harms a person below, criminal or civil charges may be laid. The *Best Practices Guide* is not meant to relieve or exempt involved parties of liability.

As individuals, everyone has the responsibility to conduct a reasonable level of due diligence or standard of care to ensure the risk or risks associated with their activities are at a level acceptable to society and the rule of law.

### 6.1 Route Developer

This document is meant to suggest the standard of care for route developers. With time, the standard is likely to change. Anyone performing route development is completely responsible for his or her actions, regardless of the risk mitigation they may have used. The goal of any route developer must first and foremost be to do, or cause, no harm or loss to any persons below. The route developer is always obligated to ensure that no person is below when debris is trundled. A number of mitigation options are available to the route developer, and are described in section 8 “Mitigation Options”.

### 6.2 Hiker

Even though these parks are near an urban center it is still considered a wilderness area. Wilderness activities are undertaken at one’s own risk as there are environmental and human safety risks associated with these activities – especially at the base of cliff faces where rock fall occurs. Individuals need to ensure they are safe in their conduct and that their conduct will not harm themselves or others.

## 7 Rockfall

### 7.1 General

Route cleaning involves liability considerations for anchor placements and harm or loss caused to persons as a direct result of trundled debris from route cleaning – particularly in the debris run out zone. Debris run out zones are the areas wherein debris may move through or stop after being set in motion.

The length of the route will have an impact on the scale of hazard mitigation required during the cleaning of the line. When the run out zone is entirely within view to the route cleaner (i.e., most likely when within one pitch of the ground), hazard mitigation is less complex than when some part of the run out zone is obscured. When the route cleaner can see clear to the ground through the entire run out zone, less exhaustive risk management strategies are required.

When the entire run out zone is not clearly visible, more exhaustive risk management strategies are required.

## 7.2 Run Out Zone

The process of identifying the maximum extents of debris run out zones is beyond the scope of this document. Route developers should determine the run out zone, and err on the side of caution. A review of the base of the slope may help determine if any natural barriers may stop debris, or conversely, if any natural ground features may extend the run out zone.



## 8 Mitigation Options

**Anyone purposefully causing rocks or debris to be dropped from height during route development, retro fitting or cleaning, that results in bodily harm to individuals is completely responsible for their actions – regardless of precautions they may undertake to prevent it.**

This section outlines several options for mitigating the risk of harming persons below route development activities. Because every route development situation is unique, the guidelines offered here are general and should be used together to effectively mitigate risk.

### 8.1 Types of Route Development Activities

The sort of material that a route developer drops is an important factor. Dusting, scrubbing moss and lichen, and brushing off debris no larger than sand may safely be performed under dry conditions. Fewer precautions are needed to ensure public safety when the mass of individual particles of debris are tiny. Ensuring public safety becomes immediately more complex when debris is even pebble-sized. Beyond pebble-sized debris, dropping larger debris greatly increases the complexity of ensuring public safety compared to smaller debris.

### 8.2 Lookouts and Sentries

Having lookouts and sentries is an effective measure if there is doubt about the effectiveness of signage. Lookouts and sentries are persons assisting a route developer by occupying a trail or other popular area outside the run out zone and maintain communication (often by radios or cell phones) with the route developer. The job of a lookout/sentry is to intercept and inform persons walking by of the dangers, and to tell the route developer to stop work if the need arises.

### 8.3 Location and Height of Cleaning Activities

The location and height of route development has implications for levels of risk to persons below. Cleaning boulders on the floor of the forest tends to have different safety implications, compared to cleaning a route high on the Grand Wall on the Chief. When cleaning near (e.g., within one pitch of) the ground, and when a clear line of site is available from the cleaning activity to the extent of the run out zone, the task of ensuring public safety is easier for the route developer. The higher the route development activity, the more complex ensuring safety becomes.

## 8.4 Signage and Flagging

Research is needed to determine the public safety risks associated with the route development process. This sort of research should include becoming thoroughly informed about all the trails (for all hiking, roped climbing, and bouldering) in the area. The route developer may consult the SAS for more information about trails.

After placing flagging and signs (before cleaning on a particular day), perform a ground sweep. This involves walking around the entire run out zone to ensure that no persons are present.

During cleaning activities, have signage and flagging appropriately in place. Signs and flagging should be in place for the duration of cleaning activities, and should be taken down immediately after the day's cleaning. String brightly-coloured tape, clearly marked using strong language, "CAUTION" or "DANGER", across every trail that accesses the run out zone (i.e., the area that may be affected by falling rock). Signage should include:

- a written warning and explanation of what is transpiring;
- a non-verbal symbol of danger ahead; and
- the date of activity.

Signs should be able to withstand the elements of weather (e.g., water), and should be placed outside of the run out zone, typically at the beginning of each trail that accesses the run out zone. Be aware that multiple access points may exist for a given run out zone.

## 8.5 Timing

The timing of any route cleaning should coincide with a period where the area affected by the cleaning is expected to have few to no users. Following this general rule will make ensuring public safety easier and make it less likely that you will block public access to recreational opportunities.

The following factors tend to affect the number of persons below route cleaning activities. Route developers should interpret these timing factors together, combined with the location, to determine the likelihood of interacting/not interacting with other park users.

### 8.5.1 Month of the year

The Parks have far more users during the summer months than they do in the spring and fall; these seasons have far more users than in the winter.

### 8.5.2 Day of the week

The Parks have fewer users on weekdays than they do on weekends.

### 8.5.3 Time of day

The Parks have fewer users at night than they do during the day.

### 8.5.4 Weather

The Parks have fewer users when it's raining or snowing, and the rock is wet or icy.

## 8.6 Auditory Warnings

In some circumstances, yelling “rock” or sounding an air horn can help alert persons on the ground of falling debris. This strategy is not sufficient on its own to ensure public safety, but should be used in conjunction with other safety measures.

## 8.7 Internet Presence

Posting notices of cleaning on internet forums (e.g., Squamish Climbing Forum) is encouraged.

## 8.8 Hypothetical Examples of Successful Mitigation

What follows are theoretical cleaning projects for the purpose of illustrating core concepts. These examples are simply meant to illustrate what successful mitigation might entail; they are not meant to be suggestions for route development. This is not an exhaustive list of options. It is left to the route developer to design mitigation options for their particular activity.

- **Low risk example.** Lichen scrubbing on a slab route on the Apron. For a lichen scrubbing project on the Apron, where the route developer is *certain* that *only* tiny bits of lichen are being removed, cleaning can take place on a weekday in the spring or summer. Flagging tape, signs, and sentries are not necessary.
- **Medium risk example.** Rock, dirt, and vegetation removal at a crag (e.g., Pet Wall at Murrin). Anticipating that debris will be dropped that could cause bodily harm to someone on the ground, risk mitigation is needed. The entire run out zone is visible and the route development is within one pitch of the ground, but the cleaning is taking place at a popular crag. Trundling should take place when few or no people are around, either in the shoulder seasons, or on marginal days in summer. Flagging tape and signage are recommended but sentries are not necessary.
- **High risk example.** Rock, dirt, and vegetation removal on a 10-pitch route in the Dihedrals on the west face of the Chief. For cleaning more than one pitch above the ground, cleaning should take place on marginal or wet days in the off-season, with flagging tape and signs blocking all the trails leaving the parking areas (Campground

trails, Freeway trail, Grand Wall trails, etc.). A ground sweep is necessary. Sentries, if available, are recommended.

- **High risk example.** Enchimeggs, the 5.10+ crack directly overhanging the Chief backside trail, about half way to the first summit. Debris from this crack would land directly on the popular backside trail of the Chief. Route cleaners should remain sensitive to the rights of other users in the Park, including pedestrian traffic. In spite of its short length (20 m) and clear view of the drop zone, the popularity of the trail makes this a high risk project. Cleaning should take place either in poor weather or at night, with sentries blocking either side of the trail entering the run out zone. Flagging tape and signage are also required. Hikers should be stopped to temporarily allow route cleaning.

## 9 Contributors

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### 9.2 Photo Credits

Jeremy Frimer, Katy Chambers and BC Parks Image Bank.



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