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CLIMBING MANAGEMENT

A Guide to Climbing Issues and the Development
of a Climbing Management Plan





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The Access Fund is the only national advocacy organization whose mission keeps climbing areas open and conserves the climbing environment. A 501(c)3 non-profit supporting and representing over 1.6 million climbers nationwide in all forms of climbing—rock climbing, ice climbing, mountaineering, and bouldering—the Access Fund is the largest US climbing organization with over 15,000 members and affiliates.

The Access Fund promotes the responsible use and sound management of climbing resources by working in cooperation with climbers, other recreational users, public land managers and private land owners. We encourage an ethic of personal responsibility, self-regulation, strong conservation values, and minimum impact practices among climbers.

Working toward a future in which climbing and access to climbing resources are viewed as legitimate, valued, and positive uses of the land, the Access Fund advocates to federal, state, and local legislators concerning public lands legislation; works closely with federal and state land managers and other interest groups in planning and implementing public lands management and policy; provides funding for conservation and resource management projects; develops, produces, and distributes climber education materials and programs; and assists in the acquisition and management of climbing resources.

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A Guide to Climbing Issues and the Production of a Climbing Management Plan. Compiled by Aram Attarian, Ph.D. and Jason Keith, Access Fund Policy Director.

ACKNOWLEDGMENTS:

For assistance with this publication, special thanks go to: Access Fund staff; Mark Eller and Jeff Achey, Editor; The American Alpine Club; Steve Dieckhoff, Illustrator; Timothy Duck, Wildlife Biologist, Bureau of Land Management, UT; Leave No Trace, Inc., CO; The National Outdoor Leadership School (NOLS); Claudia Nissley, Cultural Resource Specialist, CO; Outdoor Industry Association; Jane Rodgers, Vegetation Specialist, Joshua Tree National Park, CA; and Wildlife Conservation Society, NY.

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Climbing, once an obscure activity with few participants, has become a mainstream form of outdoor recreation. Climbing occurs in unique environmental settings such as cliff sides, canyons, and alpine areas, which can also harbor valuable natural and cultural resources. These unique settings also present land managers with distinctive challenges. Climbing activities take place primarily off-trail, away from developed facilities, and historically have had little oversight by land managers or owners. Given the ever-growing popularity of climbing and other outdoor recreation activities, potential impacts on resource values must be considered and appropriate management actions taken. This need to develop climbing management strategies has led the Access Fund to offer the climbing management guidelines presented herein. This document outlines successful climbing management practices that provide for climbing access while protecting resource values. The following chapters address both fundamental aspects and narrowly-focused issues pertaining to climbing management.

Chapter 1 provides a schematic assessment of a typical climbing area that may prove helpful in examining the effects of climbing activity on resource values. This illustration is applied to the section on impacts to vegetation.

Chapter 2 presents information on various climbing management issues related to natural resources. Each topic is discussed by identifying primary issues, citing relevant literature and research, and providing examples of Management Practices that Work. These practices are well-defined methods and management techniques developed and successfully implemented by various resource management agencies and climber organizations across the nation to help address climbing management concerns.

Chapter 3 includes a presentation on Cultural Resources and Climbing Activity with an emphasis on issues relating to Native American sacred sites, archeological and historic sites, pictographs and petroglyphs, and issues pertinent to the National Historic Preservation Act. A schematic assessment of a climbing area is presented in this section in relation to cultural resources. **Chapter 4**, Social Impacts and Climbing, addresses visual impacts and other considerations such as pets, noise, and litter. **Chapter 5** analyzes Activities and Areas of Special Concern to provide information and awareness on a growing number of climbing activities such as bouldering, ice climbing, dry tooling, and alpine climbing. This chapter also discusses unique and sometimes controversial climbing environments like wilderness and caves, and presents a short summary on climbing and economic considerations.

Chapter 6 outlines Climbing Management Methods and discusses specific Philosophies and Tools used by land managers to respond to specific climbing issues such as visitor capacity, recent increases in climber visitation, and the development of new climbing routes. Chapter 7 provides a template for the Production of a Climbing Management Plan. Emphasis in this chapter is placed on developing clearly stated goals and objectives, defining the scope and longevity of the CMP, and conducting a thorough review of climbing activity by including members of the relevant user group. An outline for a successful CMP is also suggested.

CLIMBING MANAGEMENT:

A Guide to Climbing Management and the Production of a Climbing Management Plan

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PURPOSE AND NEED FOR THIS DOCUMENT

The Access Fund was established in 1990 to resolve issues of climbing access and education. The organization provides information, human resources, and grants for access improvements or impact mitigation, and works closely with climbing advocates and land managers on access issues, resource protection, and climbing management initiatives. With climbing activity on the increase (Outdoor Industry Foundation 2006), policies and management plans are being developed throughout the United States that will have significant effects on climbing access and experiences in the future. We intend this document to assist to those involved or interested in climbing management, and encourage greater consistency in climbing management policy.

This document is intended for use by land managers, recreation planners, and climbing representatives (and any other interested members of the public) who are working on climbing management issues. It is designed to reach a range of audiences, with widely varying management experience and needs. This manual introduces typical climbing-related issues and suggests management responses that have proven successful in the past. The level of management will depend on the mandate of the managing agency, the relative importance of climbing compared to other recreation uses in that area, and staffing and budgetary resources.

This document can assist with:

- Providing an enjoyable public land climbing experience.
- Review of issues related to climbing management
- Production of a climbing management plan
 - Identification of management alternatives to address climbing and resource-protection issues
- Identifying the different recreational values associated with climbing.
 - Coordinating with climbing organizations and local climbing representatives for the purposes of gathering information and participating in development and implementation of climbing management policy.

If you have additional information or comments on this document please contact the Access Fund: info@accessfund.org. (303) 545-6772.

INTRODUCTION

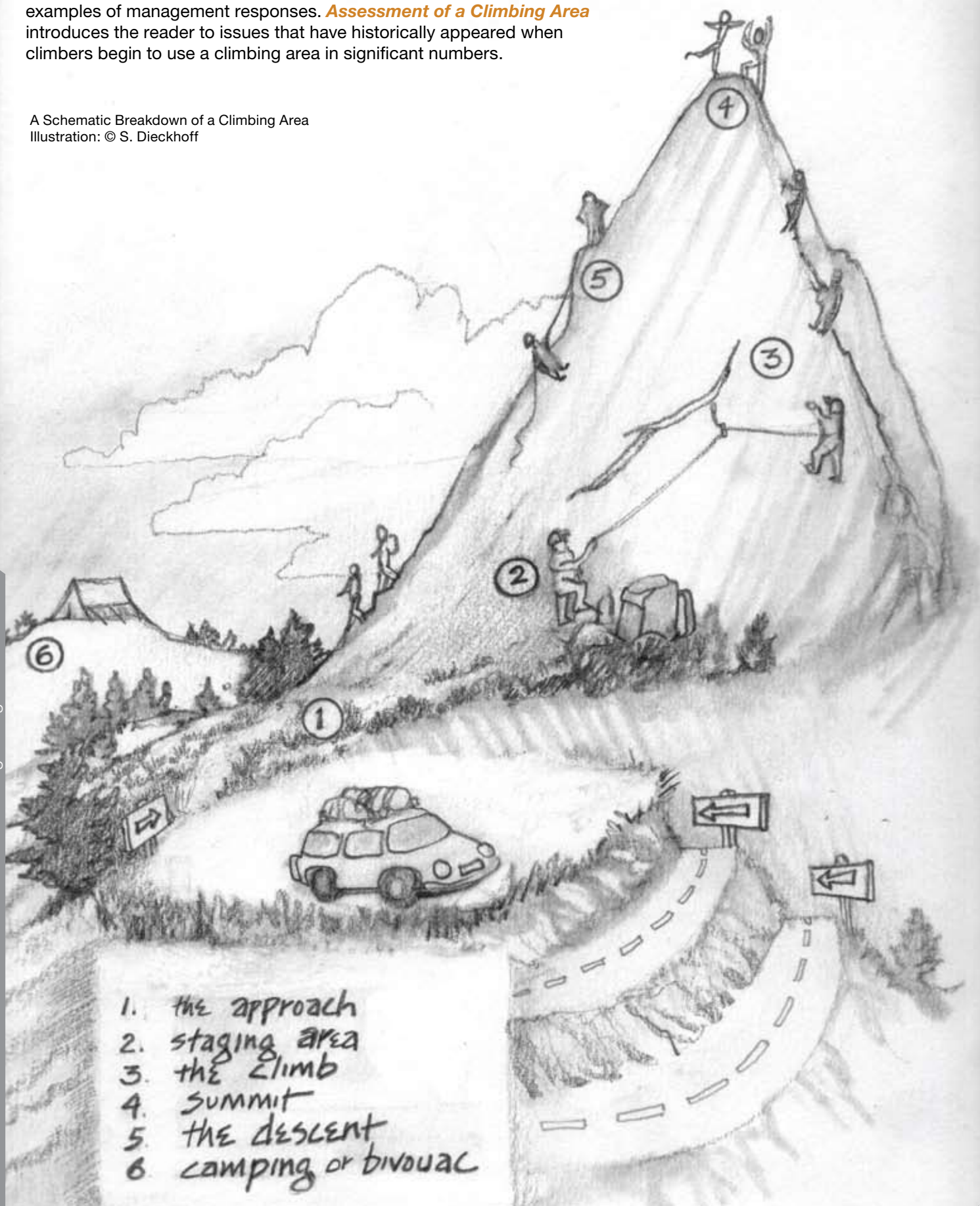
Over the past two decades, outdoor recreation activities that contain the elements of risk and adventure have grown in popularity (Cordell 1999). The adventure sport of rock climbing, a highly visible and diverse activity, is no exception to this growth. More people than ever are participating in climbing in its many forms—bouldering, sport climbing, ice climbing, big-wall climbing, and mountaineering (Appendix A). The primary resources for climbing include cliffs, talus, glaciers, frozen waterfalls, and boulderfields, which are found in a variety of environments. Currently, more than 2,000 climbing areas have been documented in the United States, with almost half (47%) of these found on federal lands (Toula 2003; Stuart-Smith 2003). Participation rates have been on the rise for the past 25 years. Beginning in the 1980s, participation in climbing increased 8% from 1980 to 1984 and 12% between 1985 and 1989 (Moser 1990). The 1994-95 National Survey on Recreation and the Environment reported 300,00 to 400,000 active rock climbers in the United States, with this number expected to increase 50 percent by year 2050 (Cordell 1999).

More than any other issue, the increase in climber visitation has driven recent discussions about climbing management and the development of climbing management plans. Climbing is as much about intimacy with nature and exploration of wild places as it is about personal challenge. As the number of climbers increases, greater demands will be placed on the vertical and surrounding environments to support the various types of climbing activities. As a result, the climbing experience may be diminished when the environment is degraded. However, the impacts associated with climbing activities depend less on the total number of climbers than on the spatial and temporal concentrations of climbers in particular areas. Historically, climbers have had a high standard of environmental awareness and stewardship—for example, climbers such as David Brower were instrumental in passing the 1964 Wilderness Act. Most managers will acknowledge that climbers as a group support programs that protect natural resources, as well as those that protect resources with cultural and historic values.

CHAPTER 1: A GUIDE TO CLIMBING MANAGEMENT

This chapter addresses the various climbing management issues and examples of management responses. **Assessment of a Climbing Area** introduces the reader to issues that have historically appeared when climbers begin to use a climbing area in significant numbers.

A Schematic Breakdown of a Climbing Area
Illustration: © S. Dieckhoff



1. the approach
2. staging area
3. the climb
4. summit
5. the descent
6. camping or bivouac

ASSESSMENT OF A CLIMBING AREA

This section provides an overview of the unique management issues related to climbing.

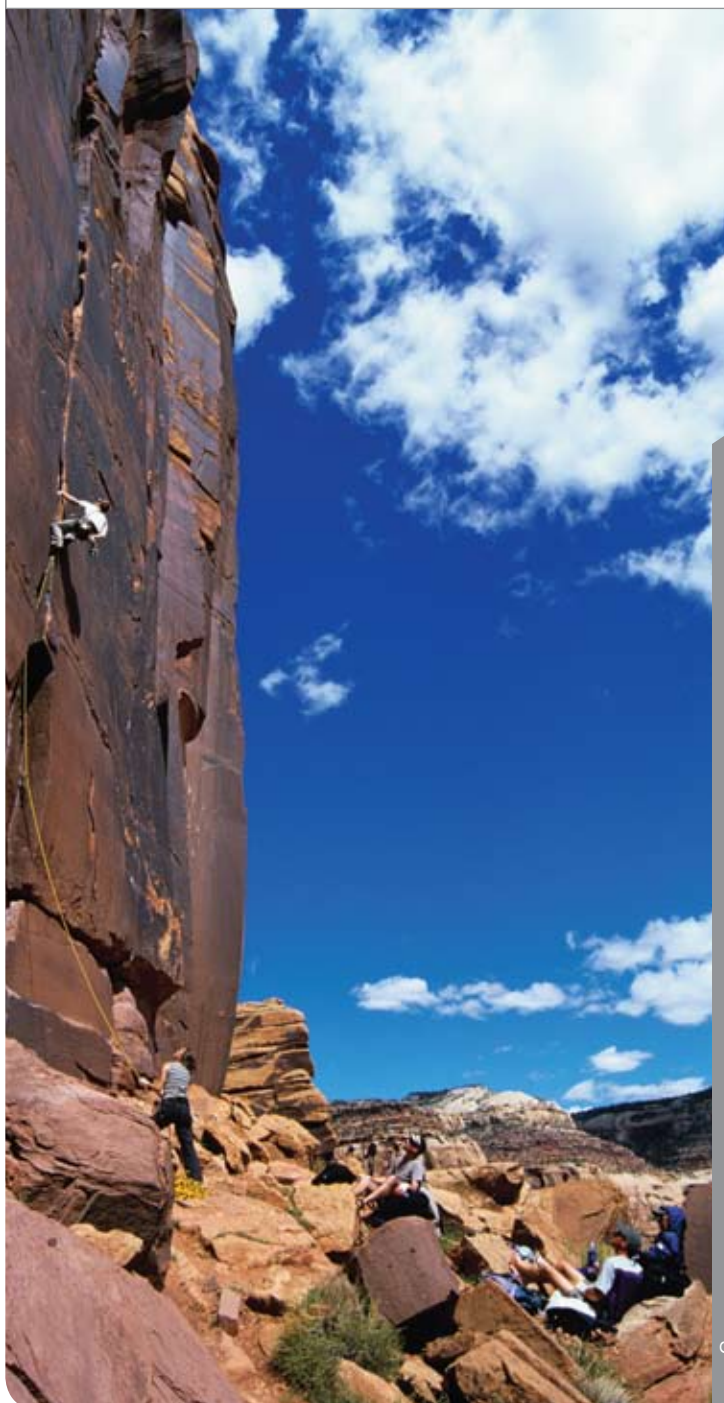
The areas affected by a climbing visit can be split into six zones. Inspecting these individual zones can help clarify how, where, and during what stage of a visit climbing activity may affect rare plants, animals, or archaeological deposits. This scheme can also assist in distinguishing the effects of climbers from the effects of other less conspicuous recreation visitors, such as hikers, who may also frequent the various zones. The zone scheme of assessment and other information-gathering tools can help ensure that management responses accurately target the correct sites of impact and the use practices responsible for impact.

A typical climbing visit may be considered to pass through six zones:

- 1. The approach to the climb** (see glossary for technical definitions of climbing terminology). The “approach” is the route used to travel from the parking area to the base of the rock or mountain. It may or may not include discernible climber trails.
- 2. The staging area.** The approach ends at the “staging area,” typically the base of the cliff where climbers prepare to climb and sometimes leave backpacks which will be retrieved after the descent. In some cases, the staging area will be at the top of the cliff. Of all the zones used by climbing visitors, the staging area is typically the most heavily impacted.
- 3. The climb.** The “climb,” often called the “route,” is the line of travel up the cliff or mountain. This zone is typically 6 to 8 feet in width, follows a line that may be straight or very irregular, depending upon the climbing terrain, and will extend from the base to the summit, or sometimes to a fixed anchor below the summit.
- 4. The summit.** The “summit” is either the top of a mountain or the rim of a cliff, where one or more climbs terminate.
- 5. The descent.** The “descent” is the route by which climbers return to either the staging area or to the parking area where their visit originated. In some cases, the descent will involve a climber trail, while in other cases it may entail a rappel down the rock face.
- 6. The camping or bivouac area.** This zone is the area used by climbers for overnight stays during the climbing visit.

In this document, the schematic assessment will be used in the sections on Impacts to Vegetation and Cultural Resources. In addition to these sample uses, the scheme can also be applied in the assessment of other resources or effects mentioned in this document. Site visits and surveys may be carried out periodically to record effects in each zone. Ideally, some baseline data will be available from prior inventory and monitoring. This information may then be evaluated in its contextual environment to determine whether management intervention is required.

Climbers at the base of Super Crack Buttress, Indian Creek, UT.
Photo: © Celin Serbo



CHAPTER 2: CLIMBING AND NATURAL RESOURCES

This chapter introduces and discusses a variety of environmental concerns including trails, camping, human waste, vegetation, water resources, and wildlife.

Both resource managers and researchers have reported a variety of impacts related to rock climbing (Attarian and Pyke 2000). Soil erosion, the development of social trails, damage to vegetation both on and off the rock, improper disposal of human waste, and disturbance to wildlife have been reported as a result of climbing activity. Visual impacts to the rock and its environs, the use of fixed anchors, potential damage to historical and cultural sites, and negative recreation experiences by non-climbers have also been identified as climbing-related concerns. Impacts have the potential to compromise the objectives of conserving the natural environment, can make recreation areas less attractive or functional to the visitor, and can detract from the recreation experience through crowding, conflicts between users, and depreciative behavior (Cole 1986; McAvoy and Dustin 1983). The potential impacts associated with outdoor recreation activities like rock climbing can be divided into three primary areas: ecological, cultural, and social impacts.

The term “impact” was defined by Lucas (1979), as a neutral term synonymous with change. In contrast, “damage” and “deterioration” suggest negative changes in natural resource conditions. However, at least one study, Hammitt and Cole (1998), defines “impact” as an undesirable change in environmental or social condition of a recreation site or experience. Impacts are dependent on three major factors: (1) the amount and distribution of use, (2) the type and behavior of visitors, and (3) the ecosystem and its condition (Hendee, Stankey and Lucas 2005).

ECOLOGICAL IMPACTS

Ecological impacts are those impacts that have a potential effect on the biological and physical characteristics of a site or resource, thus making the area less natural (Hendee, Stankey and Lucas 1990). While some climbing impacts are similar to those found in other recreation environments (for example camping and hiking), managing rock climbing activity poses special challenges due to the unique character of the climbing environment, which is spatially diverse and encompasses both a horizontal and vertical perspective. The ecological issues presented in the following section focus on climber trails, bivouacking and backcountry camping, human waste disposal, vegetation, water resources, and wildlife.

CLIMBER TRAILS

Many of the trails found in park and natural areas were originally designed to serve non-recreational uses. Some of these uses include fire and logging roads, livestock and game trails, and trade and travel routes.

Climbers use trails to access and egress climbing areas. Unlike hiking trails that are designed, constructed, and maintained by professionals, some trails to climbing sites are created by climbers when new climbing areas are developed. Climber trails usually “follow the path of least resistance,” avoiding obstacles and minimizing the effort to reach a climbing destination (DeBenedetti 1990). In some cases trails may be ill-defined causing climbers to unknowingly take several trails to the same destination.

Sometimes called “social trails,” these trails develop as climbers make repeated visits to climbing-specific destinations that are not serviced by existing trail systems, or move around in predictable ways within a climbing area. Typically, climber trails develop in three general locations: 1) along the quickest route from a parking area to the climbing site; 2) on the simplest descent from the top of a mountain or cliff; and 3) on routes between cliffs and boulders within the climbing site (DeBenedetti 1990).

The most critical problems associated with trails are soil compaction, trail widening, trail incision, and soil loss. Trail degradation is usually a function of site durability, type of use, and use behavior rather than simply the amount of use (Leung and Marion 1996). The majority of environmental changes to trails occur during initial trail development. Once a trail becomes established, factors such as soil characteristics, topography, ecosystem characteristics, climate, and local vegetation’s resistance and resilience will dictate its prominence in the landscape (Hammitt and Cole 1998). Climber trails tend to be primitive with minimal improvements, are often sited on steep slopes, with loose soils and “scree” common elements.

Climbers, like other outdoor enthusiasts, have the potential to disturb soil, particularly in heavily used areas or where environmental and other factors cause these areas to be more susceptible to damage. Damage to soil can limit aeration, affect soil temperature, moisture content, nutrition, and soil micro-organisms. Erosion, the most damaging impact to soil, occurs primarily through the development and use of trails. Problems may be more serious at higher elevations where the soil is poor and the growing season shorter (Hammitt and Cole 1998). Climber trails that are located on soils with high gravel or mineral content have been found to be less prone to soil erosion. These materials are not as easily eroded by water or wind and act as filters, binding and holding on to finer soil particles (Leung and Marion 1996).

Staging areas and cliff tops are subject to impacts by other recreationists such as hikers, backpackers, and sightseers (Wood, Lawson and Marion 2006; Williams 1990; Long et al. 2003). For example, in California’s Yosemite National Park, El Capitan Meadow, located just south of the base of El Capitan, is a popular visitor destination, especially for tourists observing rock climbers on “El Cap.” Conditions in the meadow are becoming increasingly degraded, due in part to a lack of designated trails and extensive use of social trails. Soil compaction in this area has been identified as a potential problem (Ortiz 2006).

The type of climbing that occurs in an area may also have an affect on the amount of impact an area receives. Recent research conducted in Kentucky’s Red River Gorge found impacts to staging areas are different for sport and traditional (“trad”) climbing. Trail quality, the number of similarly rated climbs in the area, and the presence of overhanging rock were found to contribute to staging area impacts for sport climbs. Factors contributing to impacts associated with traditional climbs, on the other hand, include the rating of the climb, climb quality, approach trail length, and the presence of overhanging rock (Carr 2006).

Soils in arid environments like those found in Joshua Tree National Park, CA, and in Arches and Canyonlands National Parks, UT, may contain cryptobiotic crusts, which consist of mosses, lichens and blue-green algae known as cyanobacteria. These crusts are important to the environment, since they increase the water-holding capacity of soil, increase nutrient cycling, limit the invasion of weedy, non-native annual grasses, and reduce soil erosion. Any type of disturbance—for example hiking and climbing—can compromise the sediment associated with these crusts (Overlin et al. 1999).

MANAGEMENT PRACTICES THAT WORK



CLIMBER TRAILS

If many climbers use an area, some degree of formalization and stabilization of climber trails will eventually become desirable. Some climber trails may be redundant or adversely affect resource or aesthetic values. Such trails can be minimized or in some cases eliminated. Local climbing representatives can provide input on the minimum trail requirements to access climbing locations. Management response may initially include conducting a climber trail inventory. Local climbing guidebooks will often describe climber access routes, descent routes, and locations of other climbing-related trails. Consultation with a local climbing representative or arranging a joint site visit may also help with climber-trail inventory.

Once trails are documented (typically GPS techniques are used), a map is created. If necessary, a trails plan can be developed to eliminate redundant or unnecessary trails. Some trails may be targeted for stabilization or upgrading to withstand heavier traffic, while others may be closed to protect sensitive resources, and replaced with new, re-routed trails. This approach was taken by managers in North Cascades National Park, WA, to restore the Eldorado Creek drainage, a popular route used by climbers to access the Eldorado Glacier. The route had become deeply rutted and eroded. Following an environmental assessment, a 1,300 foot section of the trail was rerouted to divert climbers to more resilient terrain which could withstand impacts that the damaged area could not. This project was the first attempt by the park to rehabilitate recreational climbing impacts in a cross-country or non-trailed area. (North Cascades National Park 1997).

Local climbing representatives may prove helpful in dispersing information concerning desired changes in climber-trail use. Other management options include signing of management-preferred trails, and brochure, kiosk, and poster information concerning site advisories or area closures. There have been many examples of successful climber trail management. At City of Rocks National Reserve, ID, climbers and hikers originally used (and then expanded) livestock trails through sagebrush vegetation. A park-wide trails plan was developed to identify a rational trails network and mitigate impacts (U.S. Department of the Interior 1988).

At Joshua Tree National Park, CA, climber-trail networks have been formalized using a special climber-specific symbol. This is produced in the form of a weather-resistant sticker that can be applied to standard trail-marking carsonite posts.

The symbol (an image of a carabiner—a piece of climbing equipment) is recognizable to climbers, but not the general public (Joshua Tree National Park et al. 2000).

At Joshua Tree National Park, CA. A special climbing symbol is used on standard path-marking carsonite posts to mark climbing access trails. These signs on the approach to the Hall of Horrors climbing area direct visitors and reduce the development of duplicate trails. Photo: © The Access Fund Collection





Volunteers on a trail-building project at North Table Mountain, Colorado. Funding for materials and trail design can also be obtained from climbing organizations. Photo: © Access Fund Collection

BIVOUAC AND BACKCOUNTRY CAMPING

Camping or bivouacking may be required as part of a climbing objective. This may take place either on the approach, on the climb itself, or on the descent. Unplanned bivouacs are not uncommon, and typically occur after a long backcountry route not completed by nightfall. Climbing in the interior of mountain ranges or on remote cliffs usually requires a planned camping experience to put the climbers in position to do a long route requiring an early start. Sometimes there will be a need to camp for several days in one area if a long and challenging route is intended (which might require several attempts), or if there are several route objectives in the area. Climbing on some of the large cliff faces of Yosemite, Zion, Rocky Mountain, and Black Canyon of the Gunnison National Parks may require bivouacs on the climb itself. Hanging tents called “portaledge” provide shelter and are designed to withstand minor storms during a multi-day climbing ascent.

MANAGEMENT PRACTICES THAT WORK



As climbing becomes more popular, climbers visiting well known climbing areas will require additional camping areas. Climbers in the New River Gorge National River, WV, and the Obed Wild and Scenic River, TN, have indicated a need for public campgrounds. The American Alpine Club is working with the Mohonk Preserve and the state of New York in developing a climbers’ campground. Under the proposal, the state would assist in the development of a 45-acre, 20-site campground scheduled to open in 2008 (American Alpine Club 2005).



“Cryptic” trails have also been used to limit non-climber access in areas with sensitive habitat. Such trails are designated on a park-wide trails plan but not signed to the general public. This technique has been used at Snow Canyon State Park, UT, to allow climbing access to Hidden Canyon, a narrow riparian canyon with high ecological value. Climber trails may see low traffic volume or access steep and difficult terrain, and thus may merit special design and maintenance specifications that would be inappropriate for high volume multi-visitor use trails. Collaboration between park management and the climbing community improved trails, created belay platforms, and erected directional signs at Smith Rock State Park, OR, to control trail erosion and enhance the climbing experience.

Permits are required for overnight bivouacs in Rocky Mountain National Park to access popular alpine climbing areas such as the Petit Grepon. At the backcountry ranger office, permit holders are provided with a mapped location of the site they should use and information on minimizing impacts at bivouac sites. Photo: © K. Pyke

Bivouacking must be considered a fundamental aspect of the climbing experience in many areas. If the area receives a high level of use, management response may include outreach to ensure low-impact practices, site monitoring, the designation of bivouac sites, permit requirements, or, occasionally, the provision of a primitive facility in order to reduce human impacts over a wider area. For a sample of a heavily used area, see the backcountry camping and bivouac policy for Rocky Mountain National Park, CO (Table 1).

Table 1.
Bivouac Permit Rocky Mountain National Park

A bivouac is a temporary, open-air encampment established between dusk and dawn and is issued only to technical climbers. The permit also provides technical climbers with an advanced position on long, one-day climbs and/or climbs that require an overnight stay on the rock face. All bivouacs require permits. Permits must be in your possession while in the backcountry.

You must be within a designated bivouac area. Your bivouac should be on a durable surface such as rock or snow as close to the base of the climb as possible or on the face. Reservations may be made for the restricted areas on or after March 1st, by mail, in person, and by phone (through May 15th).

A total of 7 nights may be used in the SUMMER. Stay no more than 3 nights at any spot, then move. An additional 14 nights are allowed in WINTER. In Winter, you may use a tent.

A vehicle/parking permit will be issued for all vehicles parked at the trailhead. Have the vehicle license number(s) available when you get your bivouac permit. The parking permit must be displayed on the vehicle dashboard.

Bivouac Parameters:

- A climbing party is limited to a maximum of 4 people; all must climb.
- A site must be 3-1/2 miles or more from the trailhead
- A climb must be 4 or more pitches, roped, technical climbing.
- A site must be off all vegetation. You must sleep on rock or snow.
- No tents are allowed. You may use a ground cloth.
- Pets, weapons, & vehicles are not allowed.

(Rocky Mountain National Park 1999)

In some areas with big-wall climbing opportunities, such as Zion National Park, UT, <http://www.nps.gov/zion/planyourvisit/permits.htm>, a permit is required to bivouac on multi-day climbs.

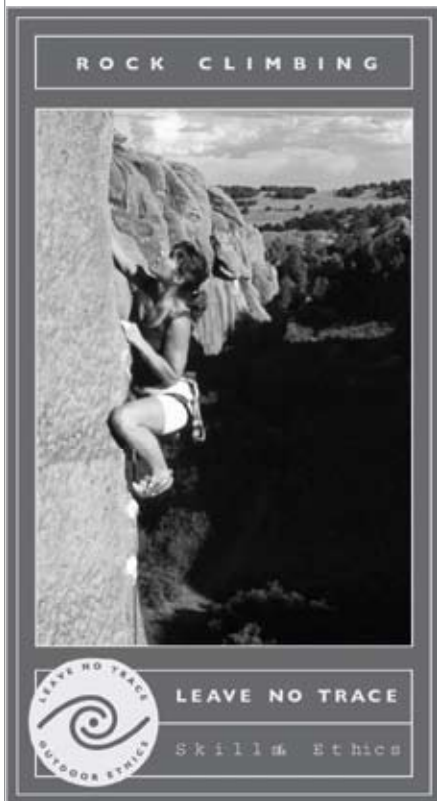
Where permit processes are in place, they should be well advertised to users to avoid unintentional non-compliance. The process for obtaining a permit should be straightforward. The Black Canyon of the Gunnison National Park, CO, uses a self-service permit system located at a kiosk near the climber descent route into the canyon. Reservation-only permit systems have proven to be problematical for both climbers and managers. Climbing is a weather-dependent activity, and bad weather conditions lead to late cancellations, while good weather may create a sudden demand for permits. Depending upon the specific climbing route, it may be daily or weekly forecasts that influence demand, creating significant administrative challenges for a fair and accessible permit-distribution system.

HUMAN WASTE DISPOSAL

The disposal of human waste is an important issue in the management of climbing as it can create human health problems through direct or indirect contact with drinking water, cause negative reactions of climbers and non-climbers who come in contact with improperly disposed of human waste (and the impact this may have on their recreation experience), and the transmission of disease-causing pathogens from human feces (Cilimburg, Monz and Kehoe 2000).

Human waste generated by climbers can be managed in the same ways as waste from backcountry hikers. Site assessment can identify whether impacts are due to poor disposal methods or long-term cumulative effects, and appropriate management strategies can then be designed. In general, trailhead toilets and other waste-disposal facilities will be used if available. Many climbers may be aware of minimum-impact waste disposal practices, and this knowledge can be reinforced by education outreach. The handbook *Skills and Ethics for Rock Climbing* (Leave No Trace 2001) describes ways climbers can minimize their impacts. Climbers from foreign countries may have different waste-disposal standards. Building awareness and compliance among foreign visitors should be incorporated in outreach programs, for example, by producing education materials in the primary languages of foreign climbers. Grant assistance can be obtained from climbing organizations for such projects. The best methods for human waste disposal will vary with different environments.

Educating climbers on the proper disposal of waste is an important management and public health consideration. In the past, finding a solution to the human-waste problem was difficult due to a lack of climber compliance, inadequate funding, disposal issues, and differences in environments (Nickel 1994). However this attitude towards human waste disposal is changing.



The Leave No Trace, Inc. publication on rock climbing provides guidance on how impacts from climbing can be reduced by following the seven Leave No Trace principles.

MANAGEMENT PRACTICES THAT WORK



HUMAN WASTE DISPOSAL

Managers in Grand Teton National Park, WY, recently implemented a new system of human waste removal and reduce the need for the vault toilet located on the Grand Teton's Lower Saddle (Anzelmo and Skaggs 2002). The new system provides mountain guides, their clients, and individual climbers with special triple-layer mylar bags, called "Restop2,"

<http://www.whennaturecalls.com> to encourage a new "pack-out" method, replacing the need for the stationary, high-elevation toilet. Restop2 is a blend of polymers and enzymes housed in a specially designed plastic bag.

The system works by containing human waste and then converting it into an environmentally friendly material that can be packed out in the onetime-use bags and deposited in the appropriate trash receptacles located at the Lupine Meadows trailhead. Similar practices are being tried by Utah Open Lands at Castle Valley and the BLM at Indian Creek, UT (Osius 2006), where a pack-in/pack-out policy has been instituted promoting the use of Wag Bags <http://www.thepett.com/>, a product similar to Restop2, to pack out human waste.

Poop Tubes: In popular big-wall climbing areas that require bivouacs such as Zion and Yosemite National Parks it is mandatory to remove human waste by carrying a "poop tube" (specially designed human waste storage container) or other type of container, which is hauled with equipment up the climb. The poop tube is constructed from PVC pipe. The climber defecates into a paper bag, adds a small amount of kitty litter to reduce odors, and places the bag into the tube. After descending, the climber empties the contents of the tube (less any plastics bags) into any vault toilet. If climbers are using Wag Bags or Restop2 with their poop tubes then the bags may be disposed of in any conventional garbage can, thus making waste disposal more convenient for climbers and less problematic for agencies to manage.

Climbing equipment manufacturers are beginning to promote the "pack it in, pack it out" principle by developing waste management systems. One product, the Waste Case, developed by Metolius <http://www.metoliusclimbing.com/wastecase.htm> is designed to carry waste bags on big walls.

Waste Case Disposal System: Clean Mountain Can (CMC). Denali National Park and Preserve, AK, has an ongoing research program on human waste in the glacier environment. Outhouses are provided on glaciers at some of the most popular Denali camping areas and climbs. During 2001, the NPS ran a series of successful trials with "clean mountain cans" (CMC)—plastic waste-disposal receptacles (a smaller, lighter version of a commercially designed river toilet box) issued voluntarily to climbers going above 14,200 feet on the West Buttress route. During the 2003 climbing season, the box toilet was removed from its 17,200-foot location and replaced by the CMC. The CMC is now the method for the removal of human waste from the mountain above 14,200 feet. <http://www.nps.gov/archive/dena/home/mountaineering/cmc.htm>. This project was supported by a \$5500 Access Fund grant and has been very successful.

Blue Bags: On Mount Rainier and other Cascade peaks, human waste is deposited in "Blue Bags" available from ranger stations and high camps. The Blue Bag system contains one clear bag, one blue bag, and twist ties. To use the "Blue Bag," the climber defecates on the snow and collects the waste by using the light blue bag like a glove. The blue bag is turned inside out, secured with a twist tie, placed in the clear bag and closed with a twist tie. Finally, the bag is deposited in one of many labeled collection barrels throughout the park. <http://www.nps.gov/mora/climb/climb.htm>.

Similar practices have been implemented in North Cascades National Park, WA, and at Mount Shasta, Shasta-Trinity National Forest, CA, where visitors are provided with plastic bags for packing out human waste.

EDUCATIONAL VIDEO:

The use of video to educate visitors on various safety, environmental, or local procedures has become popular in recent years due to the advances in technology. Videos can be shown online in visitor centers, ranger stations, rented, or copied. They should be entertaining and professionally produced, and ought to be considered as a supplement to other informational media. Careful consideration should also be given to their length (ideally 5-10 minutes) (Douchette and Cole 1993). The Friends of Indian Creek (UT) recently produced a public service announcement video called: *The Wag Bag Movement* to promote responsible waste management at Indian Creek. The video see <http://accessfund.org/extras/tic.php> supports the use of Wag Bags and other portable human waste bags as a way to protect the desert environment. It also helps educate visitors on why waste should be packed out and will help guarantee the success of the BLM's new management plan for Indian Creek. In addition, kiosks have been installed with climber information and free Wag Bag dispensers (Friends of Indian Creek 2006).

IMPACTS TO VEGETATION

Of all the changes that occur as a result of recreational use, impacts to vegetation are the most visible (Hammitt and Cole 1998). The most common impacts to vegetation at climbing sites occur through trampling or by mechanically removing vegetation from the rock surface when establishing new climbing routes. Trees can also be compromised due to the effects of trampling and their use as rappel or belay anchors, or manually removed to make way for a climbing route. Most damage to vegetation occurs during the initial development of a new climbing site. Climbers may contribute to vegetation damage by removing (commonly referred to as "cleaning" or "gardening") lichen, ferns, mosses, small trees, and other vegetation from the cliff face (Rocky Mountain National Park 1990). Camping in sensitive areas such as cliff tops and staging areas may also compromise vegetation.

Recreational impacts to vegetation are caused by either direct or indirect ways and vary according to season of use, frequency and amount of use, and the type of activity (Hammitt and Cole 1998). A number of intervening factors can influence the susceptibility of vegetation to the impacts associated with climbing and the recreational use of parks and natural areas.

For example, the response of vegetation to outdoor recreation activities like hiking, camping, backpacking, and climbing can vary according to the genetic make-up of the plant, the characteristics of its life cycle, the ability to adapt to its environment, and the anatomical differences inherent to growth habit and morphology (Kuss, Graefe and Vaske 1990).

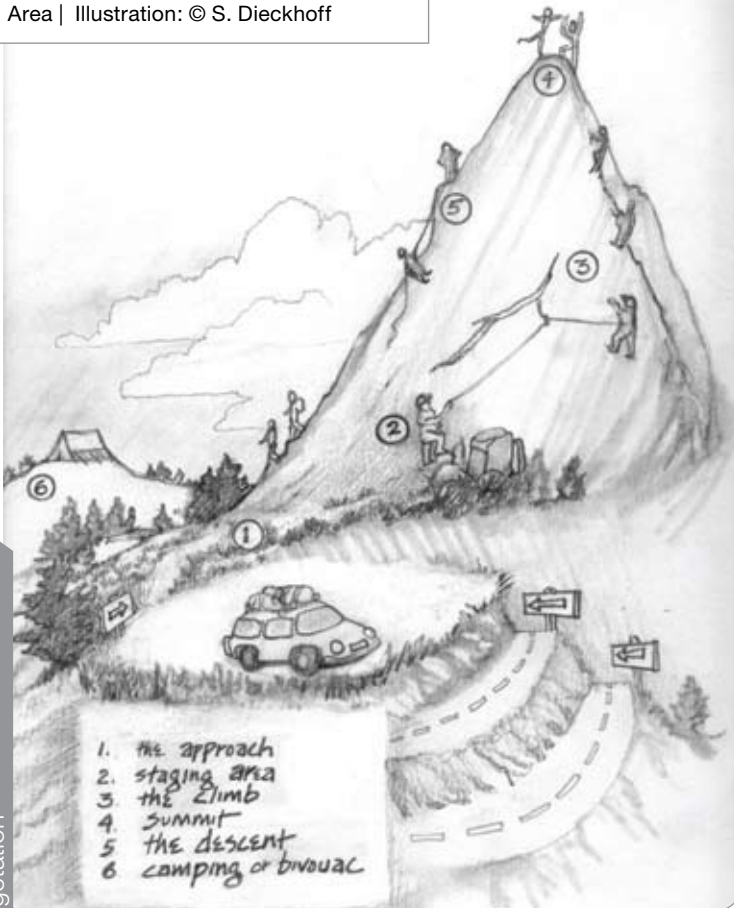
Environmental factors like soil moisture levels, canopy density, elevation, aspect, microclimate, soil drainage, texture, fertility, and productivity may make plants more susceptible to impacts (Kuss, Graefe and Vaske 1990; Spear and Schifman 1979; Monz et al. 1994). Cliff-edge vegetation and soil are strongly influenced by human factors (Parkikeist, Larson and Matthes-Sears 1995) and seasonal influences may also affect vegetation. Care should be taken in deserts and alpine areas since these areas are highly susceptible to vegetation damage due to the lack of vegetation, water, and organic soils. Alpine environments are the most fragile and impacts very noticeable due to a short growing season and the presence of low temperatures, which preserve impacts and extend the time needed for recovery (Hampton and Cole 2003).

Until recently, cliffs were completely overlooked by scientists as they represented geological rather than biological habitats, and were viewed as inaccessible, unsafe, unimportant, or impossible to sample (Larson 1989). However, recent exploration of these vertical environments has discovered diverse natural communities that contain rare flora and fauna. This interest in "cliff ecology" has led some researchers to explore the effects of rock climbing on cliff environments. Early research suggested that climbing activity has the potential to impact vegetation. Farris (1998) hypothesized that differences in vegetation between climbed and unclimbed cliffs were a result of climbers avoiding heavily vegetated cliffs due to the presence of the vegetation itself. More recent reports support the notion that some of the studies exploring the impact of climbing on cliff plant communities did not take into account habitat, physical (topography) differences between climbed and unclimbed cliffs, the style of climbing (e.g. sport, traditional, aid, bouldering) or the difficulty of the routes sampled (Kuntz and Larson 2006; Walker et. al. 2004). Scientists and academics continue to study the relationship between climbing and cliff ecologies, sometimes with inconsistent conclusions.

However, research examining climbing and vegetation impacts suggests that some types of vegetation are more resistant to the effects of trampling than others (Nuzzo 1995; 1996). Vegetation may be more or less affected by climbing activity based on their location on the cliff-face (Nuzzo 1996) and by the presence of cracks, ledges, crevices, and other topographic features (Kuntz and Larson 2006).

The types of vegetation and percent coverage on climbed cliff faces may differ from vegetation found on unclimbed cliffs (Smith 1998; Rusterholtz, Muller and Bauer 2004). Some species may be more susceptible to impacts during early stages of development (Malkin 2002). Researchers have also noted that lichens and mosses may be more vulnerable to the effects of climbing activity than vascular plants (Malkin 2002; Smith 1998) and exotic species may increase with more disturbance (Overlin et al. 1999).

A Schematic Breakdown of a Climbing Area | Illustration: © S. Dieckhoff



SCHEMATIC ASSESSMENT OF IMPACTS TO VEGETATION

Vegetation concerns at climbing areas will vary between the different zones used by the climber: the approach (both on and off trail), the staging area, climb, summit, descent, and camping or bivouac area.

1. The approach. The proximity of undesignated climber approach trails to federal- and state-listed species or special plant communities may be of concern, especially if trampling and disturbance affect the species in question. Management responses to these concerns often focus on trail diversion or area closures away from sensitive vegetation and soils. For example, at the Echo Cliffs climbing area in San Monica Mountains National

Recreation Area, CA, trails were diverted around areas containing coyote bush, a sensitive endemic plant.

2. The staging area. Typically, staging areas receive the most concentrated effects from climbing visitors. Management responses to mitigate impacts have included site hardening, barriers, exclusion zones, and visitor dispersion to more robust sites through selective publicity, signing, and trail management. Often, heavy traffic on specific climbs will lead to isolated occurrences of trampling and subsequent erosion at certain staging areas. Local climbers can provide useful information, such as locations of particularly popular climbs, or multiple climbs that share a common staging area.

Penitente Canyon, CO: to address climbing impacts to vegetation the BLM has produced educational materials that encourage minimum-impact practices and allow recognition of significant species. Such information may also be printed in area climbing guidebooks. Local climbing groups or representatives may be able to assist managers to develop an effective outreach strategy. For example, managers at White Mountain National Forest, NH, worked with the Rumney Climbers Association to highlight the sensitivity of the fern *Dryopteris fragrans* through pictures and special symbols in guidebooks, brochures, and on notice boards. Climbers may also be able to assist with vegetation surveys.

3. The climb. Climbers may traverse important plant habitat on the cliff face itself. Effects may include dislodging of organic matter from cracks, or direct contact with plants by climbing shoes, hands, or ropes. Damage to ferns, mosses, and lichens may be of particular concern (Nuzzo 1996; Farris 1998). Management responses to vegetation concerns on the cliff face include placement of fixed anchors to protect tree specimens. They can also be used to protect vegetation communities on belay ledges from trampling by diverting use away from their occurrence. Other measures include targeted outreach on species recognition and avoidance practices, and individual climbing route restrictions.

4. The summit. Vegetation at the summit or cliff rim is often especially susceptible to trampling due to its exposed position and thin soils (Figure 4). In some locations, intensive summit activity has led to severe erosion around cliff-top trees used for anchors, and their destabilization at the cliff edge. At Leominster State Park, MA, this type of erosion problem was successfully addressed with domestic landscaping techniques. The cliff edge was stabilized using wood and stone materials, and fixed anchors were placed at the cliff edge as an alternative to tree belays. If climbing activity

impacts sensitive vegetation on the cliff edge, consider promoting the use of fixed anchors below the summit.

Such anchors can allow climbers to descend by rappelling instead of needing to exit over cliff edges to access descent trails. Such rappel stations have been successfully used at New River Gorge National River, WV, and Chickamauga and Chattanooga National Military Park (Sunset Rock), TN to reduce impacts on summit vegetation.

5. The descent. Descent from cliffs or summits may involve any combination of walking, down-climbing, and rappelling. Although rappelling is generally more dangerous than walking off, it causes the least disturbance to vegetation. This practice is required at Shiprock, NC, where rare and sensitive vegetation are known to exist. Descent by walk-off may destabilize loose-soiled slopes and gullies and accelerate natural erosion processes. Where climbing activity has been determined to affect sensitive resource values, consider placing signs to divert use from sensitive or impacted areas, stabilization of existing descent trails, trail diversion, or construction of new trails. Refer to the study on the effects of human disturbance on summit vegetation on Devils Tower (Driese and Roth 1992), which describes how the summit vegetation was protected through discrete signing and trail definition.

6. Camping or Bivouac Areas. Bivouac areas may show trampling and soil-disturbance impacts similar to those in staging areas, and management response may be desirable. Education should focus on minimum-impact camping and Leave No Trace principles. In some areas, climbers are required to camp and cook on “durable surfaces” such as rock, gravel, or snow, instead of on vegetated areas. For more information, see the Leave No Trace, Inc. website: <http://www.lnt.org> and the backcountry camping and bivouac policy for Rocky Mountain National Park, CO, described in the public-education brochure Rocky Mountain National Park Technical Climbing and the Bivouac Permit.

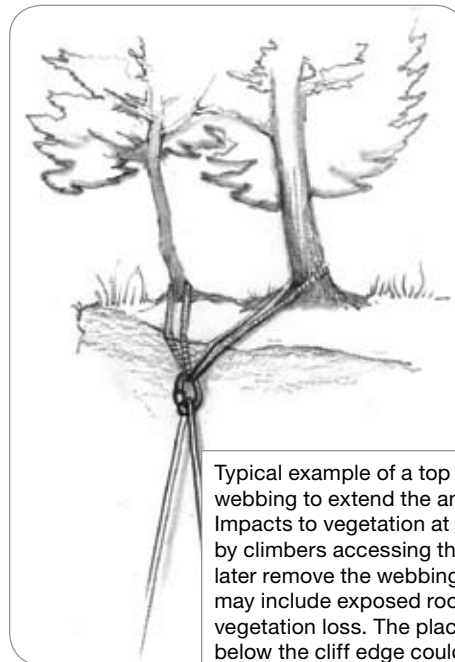
MANAGEMENT PRACTICES THAT WORK



IMPACTS TO VEGETATION

Effects on vegetation at a climbing area should be considered within the context of the overall resource. Analysis should address how much of the overall habitat or resource value is impacted by climbing. For example, an approach trail may disrupt or destroy small quantities of a valued vegetation type, but if this vegetation occurs in large quantities elsewhere in the area, the effect of the trail may be deemed insignificant. Conversely, if the affected area represents a significant portion of the resource or its habitat, then the same quantity of

disturbance would be considered a serious impact. The staging area for a climb might have isolated occurrences of a special-status plant, but the habitat may be marginal compared with other sites. Conversely, the cliff-side site might represent prime habitat and support a high-quality occurrence of the plant. Each scenario suggests a different management response.



Typical example of a top rope anchor using webbing to extend the anchor from tree belays. Impacts to vegetation at the cliff top are caused by climbers accessing the cliff top to install and later remove the webbing belay anchor. These may include exposed roots, soil compaction and vegetation loss. The placement of bolt anchors below the cliff edge could reduce these impacts. The top rope can be seen running through the carabiner just over the edge of the cliff—this is the approximate location where the fixed anchors could be positioned. Illustration: © S. Dieckhoff



Trees are often used on multi-pitch climbs for belay anchors or rappel descent. Despite the placement of slings, the tree will be subject to trampling effects and abrasion. Impacts to the tree can be reduced, or avoided by the placement of fixed anchors (shown here). Local conditions (e.g. where the climb ends, rock suitability, topography, land designation) will dictate whether placement of anchors is practical or appropriate. Illustration: © S. Dieckhoff

As the popularity of rock climbing continues to grow, monitoring vegetation in areas heavily impacted by rock climbing becomes an important tool for developing sound management practices. Monitoring is a way of identifying a change in population, density, size, or distribution using some form of periodic survey. Ecosystems are complex, so appropriate monitoring can require considerable commitment of time and resources. The first step should be to specifically define the objectives for monitoring, which will then allow an appropriate monitoring method to be selected. For example, a photo-monitoring system can be implemented establishing photo points, with a protocol and an implementation plan including who will do the photography, and how often. A more complex monitoring method could involve permanent plots to be sampled by a specialist at appropriate intervals. The Cliff Ecology Research Group (University of Guelph in Ontario, Canada) and Appalachian State University, Boone, NC, have developed consistent techniques to monitor and measure human disturbance on cliff environments.

Joshua Tree National Park and the California Native Plant Society established a system to monitor approach trails to climbing sites (Joshua Tree National Park et al. 2000). Other methodologies for monitoring cliff habitat in the eastern U.S. are described in the studies by Farris (1998) and Nuzzo (1996). Monitoring programs should include direction on management response based on the scientific data collected. Programs should be able to address questions such as:

- At what point are the data evaluated?
- If change is slow, and severe impacts will not be detectable for many years, what is the best interim management approach?
- Conversely, if change is fast, what should the response be?
- What education and outreach mechanisms are in place between managers and users to relay monitoring information and proposed responses?

WATER RESOURCES

The impact of recreation on water resources is the least mentioned and understood feature of visitor management (Kuss, Graefe and Vaske 1990). Like other outdoor recreationists, climbers may unknowingly impact the quality of surface water through a variety of mechanisms, including improper human waste disposal, trampling of soft soils and vegetation, and poor camping practices.

The presence of humans in the backcountry can lead to the contamination of surface water with Giardia and other protozoan and viruses. Water sources may be contaminated through surface run-off, especially when fecal matter is deposited improperly by humans (or

dogs) and where little soil or organic matter is present (Cilimburg, Monz and Kehoe 2000). Water contamination may also be linked to an increase in the population of rodents and other mammals made possible by the availability of human food sources.

Water resources are critical to the ecological value of an area. The extended presence of climbers or other visitors in an area may deter the use of water sources by wildlife. Approaches or descents from climbing areas may pass near water sources such as desert guzzlers, seeps, pools, creeks, and lakes. Undesignated climber trails may lead to encounters with water sources more frequently than trails planned with knowledge of sensitive water-source locations.

MANAGEMENT PRACTICES THAT WORK



WATER RESOURCES

If there are concerns about effects from climbing activity on a specific water resource, the pattern of climbing use for that area and interactions with the resource should be determined. It may help to consult local guidebooks and climbing representatives when gathering this information. Resource specialists can advise on the sensitivity of local wildlife to human intrusion. Management responses may include education, re-routing or closure of trails, seasonal climbing restrictions on climbing areas proximal to water sources, or limits on visitor numbers in an area.

WILDLIFE

Both climbers and wildlife share cliffs: climbers use them to pursue their sport and wildlife need them for feeding, breeding, and nesting (Knight and Gutzwiller 1995). For some wildlife species, the mere presence of recreationists can cause disturbance, regardless of the activity involved. Recreational activities that take place in wildlife habitats may also cause a change in behavior, alter reproductive behavior, and cause wildlife to avoid parts of their normal range (Gander and Ingold 1997). There are some studies that suggest that the tolerance for a given species depends on when and where human disturbance occurs. For example, White, Kendall and Picton (1999) examined the effects of climber disturbance on Grizzly Bears and found that when bears detected climbers they subsequently spent 53% less time foraging, 52% more time moving within the foraging area, and 23% more time behaving aggressively.

Rock outcrops and cliffs are important wildlife habitat, especially for birds and other species. Birds benefit directly by these features as they provide shelter and nesting sites, and indirectly by providing diverse vegetation structure. Cliffs and rock formations are also important to birds because of their stability, promoting the continuous use of these areas as breeding habitat. Birds that use these habitats for nesting tend to be highly specialized and therefore more likely to experience loss and degradation of nesting habitat. Recreational activities like climbing have the potential to disrupt normal activity by altering species distribution, disrupting nest attentiveness patterns, causing abandonment of breeding territories, reducing productivity, and affecting foraging behavior even when climbers do not have direct contact with eggs, young, or adults.

Although undocumented, climbers have the potential to cause negative effects on birds (especially raptors) by: (1) flushing a bird from its nest, leading to nest failure during incubation, (2) opening the nest to predation, (3) exposing eggs or young to inclement weather, (4) knocking eggs or young birds from the nest by a startled bird, (5) dehydration or changes in humidity occurring if eggs are left unprotected, (6) feeding disruption when adults are kept from the nest for extended periods, and (7) physical damage to young birds that become lost or abandoned if they fledge prematurely (Lanier and Joseph 1989; Knight and Skagen 1988; Rocky Mountain National Park 1990). In some instances, climbers have reported being harassed by raptors when climbing near a nest, compromising the safety of the climber (Rocky Mountain National Park 1990).

As the popularity of rock climbing increases, the nesting success of some birds may be reduced and changes in cliff bird communities questioned, although this has yet to be scientifically determined. To investigate these potential issues some studies have been conducted. An early study in Pinnacles National Monument, CA, was undertaken to collect baseline information to develop management decisions concerning conflicts between climbers and raptors (Cymerys and Walton 1988). Although no conflicts were reported between raptors and climbers, it was noted that potential for conflict did exist. Researchers in Joshua Tree National Park, CA, recorded observations for both climbed and unclimbed cliffs (Camp and Knight 1998) and discovered that bird species and bird behavior differed between sites with different levels of rock climbing. Researchers at the Mohonk Preserve, NY, (the "Gunks") documented the first black vulture nest in New York State near Bonticou Crag in 1997. This finding is significant, as the Shawangunk Ridge is currently the northern range of the black vulture.

Why Wildlife Closures?



Several areas of City of Boulder Mountain Parks and Open Space are seasonally closed to public visitation to protect nesting golden eagles, prairie and peregrine falcons, which breed on our rocky crags.

- These birds are *extremely sensitive* to human disturbance while nesting.
- When people get too close, parent birds may be flushed from the nest. This leaves eggs or chicks exposed to heat, cold and predators.
- Disturbed birds may permanently abandon the nest site or chicks.
- Wildlife closures keep people at a distance, increasing the birds' chances for a successful nesting season.

Seasonal closures protect our birds of prey during their most vulnerable time. The loyal support of Boulder's hiking and climbing community demonstrates that recreation and wildlife protection can coexist.

Please respect all wildlife closures so we may continue to enjoy these magnificent birds.



City of Boulder, Colorado manages over a dozen seasonal wildlife restrictions each year to protect three species of cliff-nesting raptor. Shown here is an example of interpretative material posted on trails for hikers and climbers.

In a popular rock climbing area like the Gunks, it is important for this species' successful establishment to determine its sensitivity to human presence. Since the black vulture can tolerate humans at close range the Preserve may need to close climbs or sections of cliffs to avoid disturbing nesting activities (Mohonk Preserve 2006).

Managers with input from climbers at the Gunks are also addressing issues surrounding the Common Raven, a non-threatened species. During spring 2004, about 20 climbs were closed as part of an "ecological restriction" to accommodate nesting ravens in the Scrotum Pole area. These birds may be impacted by technical rock climbers as they nest directly on the cliffs. If a nest is discovered, the nesting area will be closed to climbers until fledglings have left the nest (Mohonk Preserve 2006).

MANAGEMENT PRACTICES THAT WORK



WILDLIFE

Climbing activity can affect wildlife in ways including attraction, habituation, and avoidance. Human presence can affect the reproductive success of wildlife by causing disturbance during breeding, feeding, or resting, or by disruption of habitat. Local climbing representatives can provide information on climbing activity and use patterns to assist resource specialists in understanding where and how climbing may affect wildlife values. Evaluation of climbing effects on wildlife should also consider effects by non-climbing visitors. Education strategies may focus on promoting awareness and recognition of sensitive species, utilization of wildlife-proof food-storage techniques, and general minimum-impact practices to protect habitat.



Seasonal climbing restrictions protect cliff-nesting raptors during their most vulnerable time. There are over 100 restrictions in place at U.S. climbing locations each year (see www.accessfund.org). Photo: © Royal Society for the Protection of Birds

Management techniques may include diversion of approach or descent trails to minimize habitat fragmentation or wildlife disturbance, and use limits and seasonal restrictions for species with special-protection status.

The majority of existing wildlife-related climbing restrictions have been implemented to protect cliff-nesting raptors (e.g., Peregrine Falcon, Prairie Falcon, and Golden Eagle). Seasonal climbing restrictions protect nest sites during the breeding season by partial or complete closure of cliffs where raptors nest. Restrictions usually extend from February through to mid-August, but vary with elevation and latitude. Ideally, sites are regularly monitored and restrictions may be lifted or altered if birds fail to nest, change nest sites, or if birds fledge before the end of the restriction date. If seasonal restrictions are deemed necessary, their spatial extent will depend on many factors. Considerations will include the species-specific factors such as distribution, history of breeding success, ecological requirements, and how climbing or other recreation activities affect behavior or nesting requirements.

Example of outreach for a seasonal climbing restriction at Eldorado Canyon State Park, Colorado, to protect nesting prairie falcons. The image indicates by picture and name of climbing routes the restricted area. This information is posted on approach paths at the climbing area and on the park's web site.

STATE OF COLORADO

Eldorado Canyon State Park
April 1, 1998

Attention Climbers:

Falcons have recently been observed nesting on a section of rock wall that, to date, had not been closed this year. To protect these birds. To protect these birds, **Redguarden Wall from the Naked Edge (pitch 3-top) through Sidetrack is closed until July 31.** this includes the following routes:

- * The Naked Edge (last three pitches only)
- * The diving Board
- * Centaur
- * Redguard (last three pitches above upper ramp only)
- * Red Ant
- * Semi-Wild
- * Anthill direct (last three pitches only)
- * The Sidetrack

Climbers are not the only creatures drawn to Eldorado's rock faces. The walls are also crucial breeding areas for birds of prey; they are sensitive to human disturbance during their nesting and roosting cycle. People who stray too close to a nest can scare off parent birds. Even if the nest is not abandoned, disturbance can cause nest failure. Eggs need to be constantly incubated so they do not become too hot or cold. Newly hatched raptors can not regulate their own body temperature and frightened juvenile birds may attempt to fly before they are ready. It is critical that everyone abide by posted seasonal closures in order to protect the birds.

For more information: call (303) 494-3943, e-mail- eldorado@cn.net, Web Site- www.dnr.state.co.us/parks, or call the raptor closure information line at (303) 441-4060 ext. 420.

Restriction boundaries typically take into account cliff features such as protruding buttresses that may serve as visual and sound barriers, vertical height of nests, pattern of climbing use such as proximity of established climbing routes, and tolerance of individual pairs of birds.



Volunteers can provide technical assistance for surveying and monitoring projects, and may be interested in being trained to participate in field projects that require climbing skills. Local climbing groups can be contacted to seek interested volunteers. Conversely climbers should contact their local agency or management unit to inquire about volunteer opportunities. Photo: New Hampshire Audubon Society

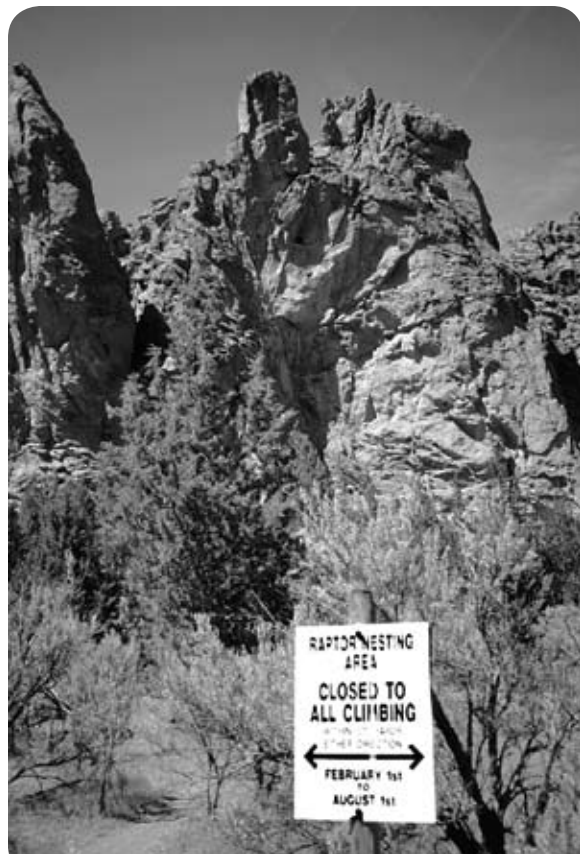
Several seasonal restrictions on climbing and hiking use managed by City of Boulder Open Space and Mountain Parks, CO, range from 160 to 1,300 feet from the nest site. Restrictions to protect nesting prairie falcons at Devils Tower National Monument, WY are initially based on a standard distance of 50 meters from the nest site, but can be greater or smaller from year to year depending on the location of the nest sites and the configuration of the cliff sector and adjacent rock climbing routes. There are many examples of managers working closely with local climbing groups on raptor issues.

In the Southeastern United States, the North Carolina Wildlife Resources Commission (NCWRC) has carried out some observational work on falcon behavior in response to climbing activity (Cecil and McGrath 2000). This study, conducted on Whitesides Mountain, NC, used controlled climbing activity to determine if climbers using specific routes caused any visible disturbance to the nesting Peregrine Falcons.

Documentation of the falcons' behavior (data was gathered by watching nest sites and recording disturbance activities) allowed the NCWRC to make recommendations to the U.S. Forest Service that certain routes be opened for climbing.

This study, as well as the NCWRC's monitoring work at nearby Linville Gorge Wilderness, illustrates how it may be possible to mitigate the effects of raptor closures on recreation access, while still meeting resource protection objectives. The NCWRC also coordinates a statewide intra-agency program to provide the public with regular updates on the status of seasonal restrictions during the nesting season.

In another example, climbers and NPS managers are working together in New River Gorge (WVA) to successfully monitor peregrine activity. The Park Service is asking climbers to voluntarily limit their use of the Endless Wall area and consider alternative sites because of the Peregrine's sensitivity to human activities when seeking suitable nesting sites. To date climbers have been responsive to the NPS request and have not only directed their activities to other areas within the Gorge, but have also helped the NPS release chicks in the area. See www.nps.gov/neri/naturescience/peregrine.htm.



Sign used to notify the public of a seasonal climbing restriction to protect a Golden Eagle nest site at Smith Rock State Park, Oregon. Photo: © K. Pyke

Climbers may travel long distances to climb specific routes or cliffs, so management concerns have often included ways to make closure information easily available to the climbing public. Eldorado Canyon State Park, CO, and Pinnacles National Monument, CA, provide excellent outreach to users with information posted on their own or linked websites. See: <http://parks.state.co.us/Parks/EldoradoCanyon/> and <http://www.nps.gov/archive/pinn/home.htm>.

In addition, managers at these areas have posted signs at trailheads and approach trails. The City of Boulder, CO, provides a dedicated 24-hour telephone information line to update visitors on seasonal raptor restrictions. Another example of public outreach on cliff-nesting raptor issues is the education brochure Raptor Protection Closures (Rocky Mountain National Park 1998). There are currently (2007) over 100 climbing locations in the United States with seasonal climbing restrictions to protect nesting raptors. A complete listing of these sites is provided on the Access Fund website: <http://www.accessfund.org>.

Other species that have received protection during the breeding season through seasonal restrictions include Desert Bighorn Sheep, various bat species, and several desert reptiles. The City of Boulder protects maternity colonies of Fringed Myotis Bat through annual restrictions from April 1 to September 1. In the Pusch Ridge Wilderness, Coronado National Forest, AZ, desert bighorn sheep populations are protected during the lambing season from January 1 to April 1. In Snow Canyon State Park, UT, riparian corridors supporting Gila Monster, Desert Tortoise, and Chuckwalla populations are restricted to access from March 1 to November 15. For further information on the management of raptor issues, refer to the handbook “Raptors and Climbers – Guidance for managing technical climbing to protect raptor nest sites” (Pyke, 1997); and to “Climbing and Resource Management –An Annotated Bibliography” (Access Fund and North Carolina State University, 2000). The Access Fund website also serves as a clearinghouse for information on climbing management practices around the country, including wildlife management policies implemented by various public land agencies. See <http://accessfund.org/resources/ncms.php>.



The New River Gorge Peregrine Falcon Program, Fayetteville, WV.
Photo: © Gary Hartley www.garyhartley.com

CHAPTER 3: CULTURAL RESOURCES AND CLIMBING ACTIVITY

This chapter discusses issues relevant to Native American sacred sites, archeological and historic sites, pictographs and petroglyphs, and the National Historic Preservation Act.

Compiled with assistance from Claudia Nissley, Cultural Resource Specialist.

Cultural resources include, but are not limited to, Native American sacred sites, archaeological sites, petroglyphs and pictographs, ancient and historic trails, historic mining areas, cabins, springs, and landscapes that may include a mountain or a river. Foot traffic, climber trails, ground compaction, chalk residue, and other effects associated with climbing activities may affect cultural resources just as they do natural resources. Climbing activity often interfaces with cultural resources and may result in the development of climbing management plans on federal lands.

Climbers are often attracted to the same geologic formations that Native Americans identify as traditional cultural and religious places. One example of this type of geologic feature is Devils Tower National Monument near Hulett, WY. Devils Tower is an international climbing destination and is also known as Bear's Lodge by the Lakota people. It is sacred to over 40 American Native tribes. Another example is the unique geological formations in the City of Rocks National Reserve, ID, which is managed by the National Park Service as a significant historic park. The rocks and surrounding area served as an important meeting place for emigrants heading West on foot and by wagons in the 1860s. Hueco Tanks State Historical Park, TX, is a unique environment and ecosystem that includes exceptional rock art, unusual climbing, and rare fauna and flora. Hueco Tanks State Historical Park is managed for its unique environmental diversity and diverse user groups.

On federal land, cultural resources must be considered and managed under the National Historic Preservation Act (NHPA) the National Environmental Policy Act (NEPA), and other laws that pertain to the cultural heritage of Native Americans, archaeological sites and districts, and historic buildings and landscapes. Cultural resource professionals, Native American traditionalists, and other qualified people determine if cultural resources may be "historic properties" and therefore given special consideration under federal laws. An important principle when determining a cultural site's significance and eligibility for listing on the National Register of Historic Places is its contextual environment. Age, function, and areas with evidence of activity will factor into the significance of the cultural resource. For example, a few scattered pieces of pottery and stone lying on the ground may not contain enough information to be significant if there are no other sites within the area. If the same pottery and stone was found in a valley with many activity areas, artifacts, and other features, they would be part of a prehistoric landscape. Within the context of a landscape, the pottery and stone may provide information about practices of the indigenous people. The importance of a site is related to its overall environment and cultural context.

When a cultural resource is determined eligible for the National Register of Historic Places, it is defined in law and federal regulations as a historic property and merits specific treatments and management practices. A cultural resource that is determined ineligible requires no further consideration by the federal agency. In state, county, and city parks, there may be state laws or local ordinances that regulate use of the park and consideration of cultural resources. When a federal agency plans an undertaking such as construction of a foot bridge or trail, developing a campsite, or writing a management plan, Section 106 of the NHPA requires that they consult with interested parties on the undertaking's effects on historic properties. Decisions regarding treatment of cultural sites important to tribes should be made in consultation with tribes that ascribe significance to the area.

On federal land, there are legal requirements that tribes, interested groups, and the public must be consulted prior to a final decision. In the case of climbing areas, consultation may include such groups as climbers' coalitions or clubs, other user groups, and Native Americans. The purpose of this consultation process is to develop management alternatives that take into account the activities and preferences of the diverse parties that attach importance to the area. Climbers have responded well to advisories and restrictions aimed at protecting cultural resources and historic properties. For example, the Devils Tower climbing management plan was based on consultation with climbers and representatives from over 25 Native American tribes. The outcome of the consultation is a voluntary restriction on climbing at Devils Tower during the month of June. It was implemented to accommodate Native Americans a specific period of time without interference for traditional religious and cultural practices (U.S. Department of the Interior, 1995).

MANAGEMENT PRACTICES THAT WORK



CLIMBING AND CULTURAL RESOURCES

Management response to protect cultural resources will range from education and outreach to selective site closures and barrier construction. Respect for the resource and the affiliated culture can be encouraged with brochures, signs, interpretive displays, campfire presentations, guided tours, and write-ups in local climbing guidebooks. The management response should be appropriate to the type of cultural resource. For example, a historic cabin might warrant an interpretive sign, while a place of traditional cultural or religious practice may be best managed by not drawing attention to it. Native Americans may consult with the federal agency to ensure that interpretation of the area and educational materials are acceptable from their perspective for places of religious and cultural value. Climbers may consult with both the federal agency and the Native Americans to identify routes that may warrant closure or limitations due to excessive use and subsequent environmental damage to the cultural resources. These discussions often result in a proposed draft management plan that addresses restrictions, temporary closures, and alternative routes. When all interested parties have reviewed and commented on the plan, it will be made into final plan and implemented by the federal agency.

Within the Indian Creek corridor near Monticello, UT, individual climbing routes with either rock art or ruins at the base have been closed. Some of the routes now have closure signs posted because the climbing route traverses rock art panels. At Red Rocks Canyon National Conservation Area, NV, 50-foot buffer zones around rock-art sites have been delineated with split-rail fences. Educational signs are erected at the rock art panels and explanatory brochures are distributed at the visitor center, the fee booth, and during the rangers' visitor-contact patrols. In some locations, buffer zones of less than 50 feet have been implemented. Hueco Tanks State Historical Park near El Paso, TX, requires a permit for climbers that specifies the area and dates of where the climbing will take place and the number of people that will be climbing. The permit system is part of an overall park management plan that facilitates protection of cultural resources by closing some areas of the park to climbing and controls the amount of activity and use by climbers in other areas. Military Wall, KY, was temporarily closed while the federal agency assessed damage to an archaeological site located at the base of the sandstone outcrop.

A SCHEMATIC ASSESSMENT OF IMPACTS TO CULTURAL RESOURCES

Evaluation of effects from climbing on cultural resources may be aided by considering that the climbing experience typically involves six "phases" which correspond to zones on the ground.

1. The approach: Clearly marked approach trails will divert foot traffic away from sensitive sites will help prevent damage to cultural resources. If a large site cannot be avoided, trail improvements such as wood chips, soil, gravel, or paving may help minimize damage. Excavation where the trail crosses the site can recover artifacts or information and function as a legal mitigative action if the site is eligible for the National Register.

2. The staging area: Climbers gathering in a small area may compact soils and disturb surface artifacts. Loss of vegetation can increase natural erosion processes and loss of site soil or midden. If staging areas occur where significant cultural resources exist, management response may involve aggressive mitigation, including construction or placement of artificial surfaces, excavation and data recovery at the site, or temporary or permanent closure. Data recovery or archaeological excavations have proven to be an effective management response when archaeological sites of uncertain quality and significance have coincided with climbing staging areas. A sample area, rather than the entire site, is excavated. The sample may target that portion of the site that is or will be heavily impacted, and sampling may be done at various sections of the site to determine human use patterns that may have occurred at the site. Data recovery may be conducted by volunteers such as a local chapter of an archaeological organization, a university or college, or contracted to resource analysis professionals. Once data recovery is completed, artifacts analyzed, and the report written, visitor use may resume in the area. Federal agencies typically use this procedure. For example, the National Park Service uses data recovery if they are going to build a visitor center or interpretative trails in an area where cultural resources exist. An example where data recovery has been undertaken at a climbing site is at Daniel Boone National Forest, KY, where a Phase II archaeological survey was carried out at the climbing site known as Military Wall. This project received grant funding support from the Access Fund. See Access Fund Climbing Grants Program and guidelines at the website: <http://www.accessfund.org>.

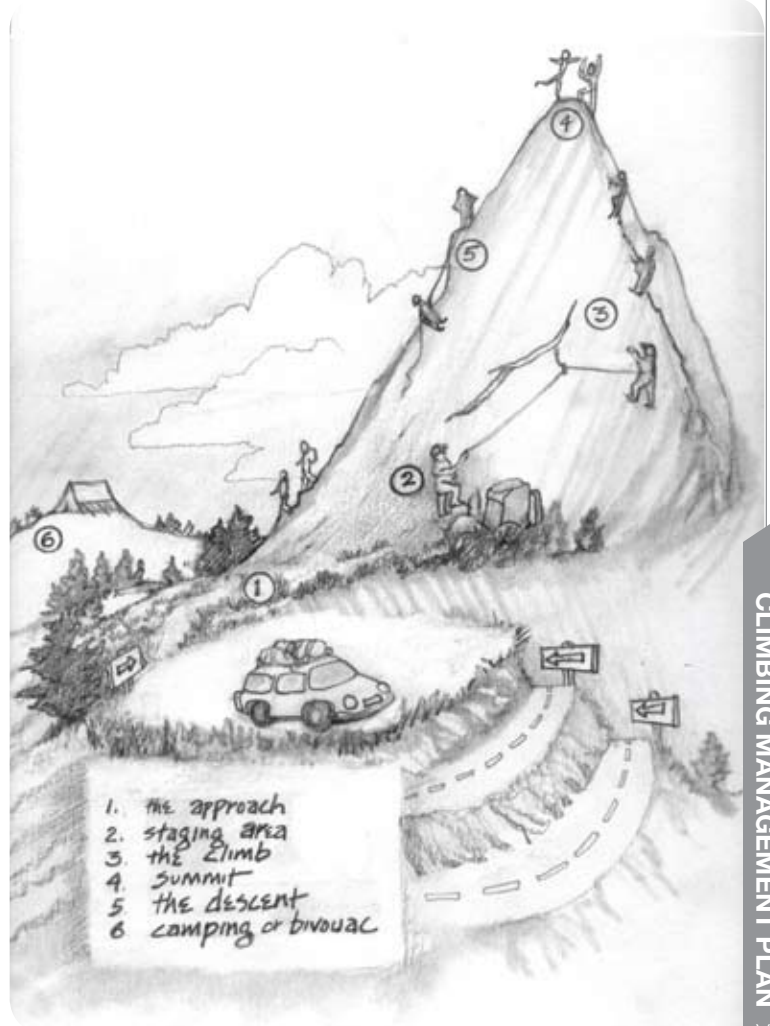
3. The climb: The cliff face may have important cultural resources, including petroglyphs (etched art), pictographs (drawn or painted art), cliff dwellings, ancient or historic carved steps or ladders, and the rock itself, which may be considered significant by Native Americans and other groups. Management response can include instituting buffer zones, or temporary voluntary climbing moratoriums such as that at Devils Tower National Monument. In areas with cliff-side cultural resources that may be difficult to reach, a federal agency may consider using climbing volunteers to help with inventories or surveys for the presence of cultural resources.

4. The summit: Cultural resources may be present on the tops of cliffs, spires, mesas, buttes, and other geologic formations. They might include rock cairns and vision quest sites. Identification of cultural resources at the summit of climbs can be conducted by a professional that may utilize information obtained from climbers who have summited the route. Technical information may also be obtained from the climbers as to access to the cultural resource and how to avoid damaging it. Such resources can be protected through education, signage, fencing, or limited closure.

5. The descent: Cultural resources near climbing descent routes can generally be protected by the same trail routing and soil stabilization measures mentioned in the discussion of climbing approaches. Impacts associated with descents made by rappel can be treated in the same way as those related to ascent.

6. Camping, bivouac areas or other areas where climbers stay overnight: Management response to effects at camping or bivouac areas will be similar to those discussed for staging areas. Even more aggressive mitigation action may be appropriate. Camping areas are typically large areas with higher levels of impact, and in general should not be located in areas with cultural resources. Low-traffic backcountry bivouac sites will see much lower levels of impact. Management options in camping or bivouac areas should include designating specific bivouac sites, defining trails within camping areas to avoid cultural resources, and relocating campgrounds away from cultural sites. Educational materials that describe cultural resources and how to respect them should be made available. In some cases, the most desirable management option may be complete closure of an area to the public. For certain sites, particularly those areas that may have traditional cultural and religious values for Native Americans, there may be no acceptable alternatives.

A decision to close a climbing site completely due to cultural resource concerns should be made and implemented in consultation with all affected user groups. All alternative options should be discussed among all parties and carefully considered. Voluntary and seasonal closures may be sufficient mitigation and are a preferred alternative to complete closure for climbers. Rotating areas of closure on a seasonal basis or impact basis may also be an option in lieu of permanent closure.



CHAPTER 4: SOCIAL IMPACTS AND CLIMBING

This chapter presents concerns which have the potential to compromise a climbing or recreation experience, and focuses on visual impacts, fixed safety anchors, pets, noise, litter, guiding, parking, user fees, safety and risk management, and economic considerations.



Climbing at Indian Creek, UT. Photo: © Celin Serbo

SOCIAL IMPACTS AND CLIMBING

Social impacts have a potential effect on an individual's recreation experience through the interaction or behavior of others (climber-to-climber or climber-to-non-climber). Examples include: crowding, litter, brightly colored equipment that contrasts with the rock, shiny hardware (bolts, carabiners), the use of chalk, other visitors in the area, and the presence of climbers. The impacts of trail and rock erosion and vegetation damage may also detract from the aesthetic quality of a recreation area. In this section a variety of social issues are presented: visual or aesthetic impacts, fixed anchors, pets, noise, litter, guide services and organized groups, parking and transportation, user fees, visitor capacity, climber visitation, safety and risk management, and new climbing routes.

VISUAL OR AESTHETIC IMPACTS

In some areas, climbing can be a conspicuous activity. Some non-climbing visitors enjoy the presence of climbers in the natural landscape, while for others it will detract from their experience. At climbing areas such as Yosemite National Park, CA, and Zion National Park, UT, watching climbers has become a popular activity in itself. Resource managers should expect questions about climbing from the general public. Devils Tower National Monument provides an outdoor interpretative display about climbing to help the general public understand this prominent recreation activity.

Aesthetic impacts are an important issue in parks and natural areas because they can diminish the visitor's enjoyment and appreciation of a resource, or spoil the character or quality of such a place. The visual impacts in climbing are usually associated with a direct impact on a specific resource. For example trail damage or modification to the rock surface, rock climbing equipment left in situ (bolts, slings, fixed ropes, chain anchors, etc.), chalk residue on the rock, or bare soil associated with some staging areas (Carr 2006; Skrzypczynski 1994).

Brightly colored sling material at belay and rappel stations may be visible from considerable distances. Visual intrusion is difficult to assess, since other users of the area will display a range of positive and negative responses.

Visitors may also notice the white marks left on the rock by the gymnast's chalk (magnesium carbonate) that climbers use on their hands. To most observers, chalk causes the most common climbing related visual impact. Magnesium carbonate, or "chalk," is a frictional aid and hand-drying agent widely used by gymnasts and rock climbers.

It is possible to climb without chalk, but when used in moderation, it improves friction between skin and rock. An early study by Stannard (1978) suggested that the accumulation of chalk on coarse-grained rock could reduce friction below that which is obtained by using only small amounts of chalk.

More recently, Margetts and Fowler (2001) found that magnesium carbonate dries the skin reducing the coefficient of friction, creating a slippery granular layer. The authors suggest that to improve the coefficient of friction in rock climbing other methods for drying the fingers be explored. When white colored chalk makes contact with a rock's dark surface it creates a contrasting visual effect. Anecdotal evidence suggests that the remaining residue may be a distraction to some climbers, giving away the next handhold and marking the route for others to follow.



On many types of rock with smooth surfaces such as granite or limestone, and in hot or humid environments, climbers consider chalk to be an essential tool for its friction enhancing and hand-drying properties. Photo: Courtesy of Troll, UK.

Sweaty hands are slippery, so despite chalk's visual effects, climbers will be highly resistant to "no-chalk" policies. Chalk can be expected to accumulate wherever popular routes are found, though its white color is more visible on dark rocks such as basalt than on other lighter colored rocks such as limestone and granite. Although chalk is soluble and removed by rainfall, chalk marks will persist on rock faces that are steep, not directly exposed to weathering, or in areas that receive very little rainfall. Resource managers have tended to treat the impacts of chalk exclusively as a visual effect. However, there have been additional concerns generated over the use of chalk. For example, MacGowan (1987) reported that chalk and sweat dissolved in water may raise the solubility of carbonate minerals in rock. This suggests that the natural weathering of rock containing carbonates such as dolomite and limestone would be accelerated. However, this finding has been questioned (Swineford 1994).

MANAGEMENT PRACTICES THAT WORK



VISUAL OR AESTHETIC IMPACTS

If visual impacts from climbing become a problem, much can be done via education and outreach. Climbers can camouflage fixed anchors, clean chalk from prominent or heavily used climbs, wear clothing of muted colors, and refrain from climbing in areas considered to have especially significant scenic values. In Yosemite National Park, CA, for example, climbers are requested not to climb in the Lower Yosemite Falls amphitheater.

Climbers have complied with this voluntary request, without need of formal regulations. Arches and Canyonlands National Parks, UT, requires that software left in place must match the rock surface in color. At Chickamauga and Chattanooga National Military Park, TN, concerns over the historic viewshed led to the placement of fixed anchors below the top of the cliff, greatly reducing the number of climbers at the summit of Sunset Rock (U.S. Department of the Interior 1998).

The visual impacts of permanently fixed equipment like bolts and webbing can be managed by camouflaging equipment, educating climbers on the use of chalk, education on reducing the use of chalk, and encouraging chalk clean-up projects. Bolts and fixed anchors can be camouflaged by applying a durable coating that blends in with the rock and withstands weathering and repeated clippings. It is recommended that flat or matte colors be used rather than glossy finishes, which tend to reflect light and are easy to spot (Martin 2003). Webbing left behind as rappel anchors and bail-out slings should match the color of the rock. Gray, brown, green, black, and tan are the best color choices for webbing.

“Earth-tone” chalks were developed in the 1980s in response to calls from some resource managers to match chalk color to the native rock colors. It was found, however, that adding dyes to chalk left longer-lasting stains on the rock and introduced new chemicals (dye components) into the cliff environment. Today, colored chalk is not widely used. In the absence of further research and product development resource managers have not encouraged colored chalk. Future management responses to chalk use will depend on the extent of impacts. Education and outreach can focus on practices to minimize use (e.g., “chalk balls” help avoid spillage).

Some alternatives to chalk blocks or powder are available, for example, the Eco Ball <http://www.metoliusclimbing.com> contains a powder enclosed in a ball and leaves a limited residue on the rock. Rock Chalk (www.rockchalk.net) is a colored chalk made by mixing magnesium carbonate with a pigment to match rock color.

And Mega-Grip <http://www.megagrip.co.uk> is an alcohol-based liquid chalk that does not leave a white residue. Use of these products can reduce the extent of white marking on the rock surface. To date, however, there has been no documentation that compares the level of use of these products and their effectiveness in minimizing residue accumulation on rock compared to the more widely used white chalk powder products.

In some areas, for example Eldorado Canyon State Park, and Boulder Mountain Parks, CO, resource managers recommend that climbers remove chalk residue when rappelling or being lowered from top-roped routes. In addition, climbers hold annual chalk clean-ups. Similar practices are encouraged by the NPS in the Obed River Gorge, TN, where park personnel with the help of climbers instigate chalk clean-ups, especially in high visibility climbing and bouldering areas (National Park Service 2002). Although chalk can be removed using water and a brush, caution should be exercised to minimize abrasive effects on the rock surface and water run off on the immediate cliff environment. In some environments, is appropriate to prohibit chalk use within 50 feet of critical resources such as rock art, as has been done at Red Rocks National Conservation Area, a major climbing and bouldering area near Las Vegas, NV.



Weathered anchors and slings such as at this rappel arrangement in Monument Basin, Canyonlands National Park, Utah can be replaced with two camouflaged anchor points. If webbing is still required to extend the anchor this can be supplied in earth-tone colors to reduce overall visual impact. Photo: © K. Pyke

FIXED SAFETY ANCHORS

Of all the impacts identified, the use of permanent or fixed anchors has received the most attention by resource managers. The controversy derives from the fact that fixed anchors remain in place, often for long periods of time. One of the most common forms of fixed protection, bolts, require the drilling of a small hole in the rock, typically 3/8-inch, or 1/2-inch in diameter. These drilled holes and the attached metal hangers focus much of the discussion on fixed anchors which may cover issues such as location, density of placement, impact to the rock, visibility from the ground, and how their placement will influence climbing activity and visitor-use patterns in a given area.

Technical climbing is defined as the use of specialized equipment to provide a margin of safety while ascending and descending steep terrain. Most of this equipment is carried by each climbing party, to be placed and removed during the ascent. In places, however, the nature of the rock requires a drilled or hammered protection device for safe passage.

The need for such “fixed anchors” is determined by the first climbers to encounter the passage, and the anchors are then left in place for use by subsequent climbers. Bolted routes are typically safer and more convenient to climb. Other fixed anchors are left in place when climbers descend from difficult summits by rappelling.

From a management perspective, it is difficult and sometimes impossible to allow climbing in an area but also prohibit the use of fixed anchors. The frequency and type of fixed-anchor use varies according to geology and topography, and the type of climbing. Limestone, for example, typically has few natural cracks, and safe climbing will likely require more fixed anchors than on a comparable granite cliff. Sport climbing will rely almost entirely on bolts, while traditional climbing typically requires only widely dispersed use of fixed anchors, and bouldering requires no fixed anchors at all. Some have noted that this change in use patterns significantly increased the number of climbers and resulted in the proliferation of fixed anchors and increased fixed anchor restrictions. (Jones and Hollenhorst 2002). Managers have reported that this growth in numbers results indirectly in the creation of multiple trails, soil and vegetation damage, waste accumulation and crowding (Scholl and Wichman 1990). Members of the climbing community, especially traditional climbers, have different views when it comes to the use of bolts (Schuster, Thompson and Hammitt 2001).



Example of a modern fixed safety anchor. The arrow marks the load-bearing direction for correct placement. Photo: © S. Levin

Fixed anchors may have effects on natural resources, scenic and aesthetic values, and visitor-use patterns (Baker 1999). Despite the lack of empirical evidence to justify the claims of resource managers, an increasing number of climbing management plans have stated that fixed anchors are a visual impact (National Park Service 2002). Sites where studies have provided an analysis of effects on scenic and natural resources include City of Rocks National Reserve, ID (U.S. Department of the Interior 1988) and the Wichita Mountains Wildlife Refuge, OK (U.S. Department of the Interior 1995).

PLACEMENT OF BOLTS AS A RESOURCE-PROTECTION TOOL

Strategic bolt placement has been increasingly used to protect sensitive resources such as cliff-edge vegetation, soils, and specimen cliff trees that might otherwise be directly used as rope anchors. For example, at Eldorado Canyon State Park, CO, managers and local climbing organization have been able to protect cliff trees that were previously used as rappel stations by placing adjacent bolt anchors. The use of fixed anchors and a “no top out policy” at the NPS-managed Obed Wild and Scenic River, TN, has been successful in limiting the impact of climbing on cliff-edge habitat where researchers reported that “disturbed areas were relatively infrequent” (Walker, et al., 2003). Research at Shenandoah National Park, VA, supports this management strategy by recommending that installing fixed anchors on the cliff-edge could minimize damage to cliff top trees and cliff-edge vegetation caused by rope abrasion (Wood, Lawson & Marion, 2006).

Management agencies have also used bolts to protect scenic and historic viewsheds. At Sunset Rock, Chickamauga and Chattanooga National Military Park, TN, climbers were highly visible on the summit, but not on the cliffs screened by trees below. Bolt anchors were placed below the summit, enabling climbers to lower to the ground rather than exiting via the summit at the end of a climb.

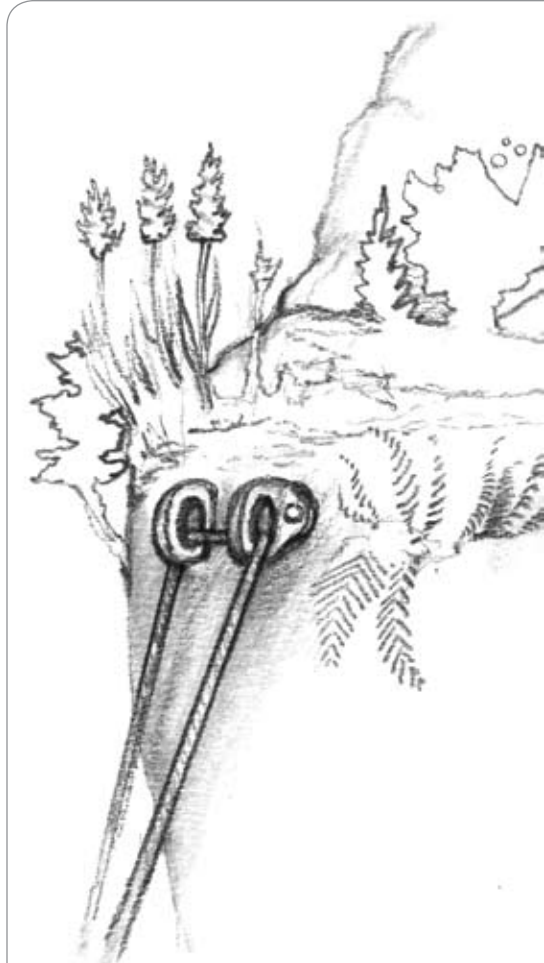
LIABILITY AND FIXED ANCHORS

Fixed anchors are standard components of a climber’s safety system that remain in place on the cliff face or mountain. These tools have historically been placed, inspected, and replaced if necessary by the climbers who use them, and not by land-managing agencies. This has served an important role in limiting potential liability for landowners, land managers, and agencies. Under federal and most state law, the government has no “duty of care” provided there is no “fee for service,” no interference with climbers’ ability to use standard safety equipment, and no administrative “improvements” to the climbing environment. However, if managers attempt to mitigate risks in climbing by intervening in fixed-anchor placement, this action could increase exposure to liability.

As a general rule, the placement and maintenance of fixed anchors should be undertaken by knowledgeable climbers and climber groups dedicated to fixed anchor maintenance and replacement such as the American Safe Climbing Association <http://www.safeclimbing.org/>, and not by the land management agency. This approach removes land managers from potential legal liability issues, and is therefore an important risk management consideration. The fundamental issue is that more regulations create more legal obligations and duties. Therefore, the less an agency regulates fixed anchors, the less potential liability they will experience.

There are a number of cases where agencies have chosen to be involved, at least to a limited degree, in the management of fixed anchors. Usually the respective agencies have worked in close collaboration with the local community to ensure that anchor placement and maintenance remains the sole responsibility of climbers, thereby limiting both the agencies’ responsibility and potential liability.

Existing statutes also indicate that land managers can further limit their liability by not becoming involved in decisions concerning when and where fixed anchors should be placed. See <http://www.accessfund.org/pdf/riskmgmt05.pdf>. Climbers and climber organizations have the expertise to install and maintain these anchors, and thus it is appropriate that climbers should provide this valuable community service.



Fixed anchors can serve as a resource protection tool. Their strategic placement lets climbers descend to the ground without needing to exit over the cliff edge, allowing cliff-top vegetation to remain undisturbed. Rappel anchors are available in earth-tone colors for low visual impact. Illustration: © S. Dieckhoff



Photo of a weathered fixed safety anchor over 30 years old. Old anchors can be removed cleanly and the same hole used to place a new anchor of a higher standard of safety. If use of the anchor is redundant the hole can be filled with a resin and natural rock dust mixture so as to be indiscernible. Photo: © Access Fund Collection

MANAGEMENT PRACTICES THAT WORK



LIABILITY AND FIXED ANCHORS

Management response to the use of fixed safety anchors may include no action, fixed-anchor inventories, prohibition of power drills, or other more restrictive interventions. Often, changes in patterns of climbing activity or rapid fixed-anchor proliferation are of greater management concern than fixed-anchor use itself. Because fixed-anchor use is integral to many but not all types of climbing opportunities, management response should be undertaken carefully. Focusing on bolts or pitons, rather than patterns of the climbing activity as a whole, may not achieve management objectives. For example, the time and effort required to place a bolt is greatly reduced by use of a battery-powered drill, and the NPS has used this fact indirectly to regulate the frequency of bolt placement. Rather than placing restrictions on bolts, managers in areas such as Rocky Mountain National Park, CO, have controlled the potential increase in fixed anchors by restricting the use of power drills in certain locations. In areas where fixed-anchor use has approached maximum desirable levels, other management responses have been used. Joshua Tree National Park, CA, allows new fixed anchors in non-wilderness through a required reporting process that helps the park monitor fixed anchor proliferation.

The City of Boulder Open Space and Mountain Parks, CO, uses a permit process for replacement of fixed anchors. Other approaches or considerations for controlling the use of fixed anchors may include camouflaging anchors, placing the initial fixed anchor on a climbing route out of sight from hikers, properly using a hand drill, placing fixed anchors only when traditional types of protection is unreasonable, placing fixed anchors at least 30 feet away from existing routes to deter excessive bolting, placing fixed anchors on quality routes with little vegetation, placing fixed anchors at intervals necessary to maintain a sense of adventure, and discourage the placement of fixed anchors unless their use is absolutely necessary to ascend quality climbs. Prior to any management response, an analysis should be made to determine the need for and role of fixed anchors (Jones and Hollenhorst 2002).

Local climbing organizations and the Access Fund may be able to assist with gathering information on climbing history and opportunities, both locally and regionally. If management intervention is required, decisions can then be made about whether restrictions are warranted and how significant these should be. In general, education and outreach should encourage climbers to minimize their use of fixed anchors. Exceptions are the instances where fixed-anchor use helps protect resources.

(See Appendix III – Outreach and the development of education materials). However, many climbing areas, such as Shelf Road, CO, are supportive of sport climbing practices; indeed, liberal bolting practices are considered acceptable at hundreds of areas across the country. See <http://www.accessfund.org/resources/ncms.php> for examples of various fixed anchor management practices from across the United States.

Management alternatives for agencies with concerns about safety standards include working with local or national climbing organizations, which may be able to replace and upgrade aging fixed safety anchors. For example, the American Safe Climbing Association <http://www.safeclimbing.org> has replaced fixed anchors in climbing areas throughout Arizona, California, Idaho, Nevada, Oregon, Utah, and Wyoming. In North Carolina, the Carolina Climbers Coalition upgraded anchors at Stone Mountain, Pilot Mountain, Laurel Knob, and Crowder’s Mountain State Parks.

In New Hampshire, the Rumney Climbers Association in a partnership (defined through a Memorandum of Understanding) with White Mountain National Forest has sole responsibility for overseeing fixed-anchor use. Some field units—such as City of Rocks National Reserve, ID, and the Mohonk Preserve, NY—form an exception to the general rule and have assumed responsibility for fixed-anchor standards, their placement, and safety-monitoring procedures.



Carolina Climbers Coalition assisted North Carolina State Parks with the removal of old fixed anchors and rappel slings from Pilot Mountain, near Winston Salem, North Carolina. Photo: © A. Attarian

PETS

The presence of pets on public lands, even where legal, can raise issues about impacts to natural resource values or social conflicts. Impacts from dogs may be especially concentrated in climbing areas, since animals may spend considerable time (sometimes all day) in the staging area, waiting for their owners to complete a climb or several climbs. Impacts may include cumulative effects from dog feces and urine accumulation. This may pose a significant problem, as dog feces may take up to two months to break down (Taylor et al. 2005). It also has the potential to cause vegetation change, depending on spatial distribution, timing, and intensity of deposition. Nitrogen (the main ingredient in dog urine) may have detrimental ecological effects on an area. Dogs also have an innate tendency to chase wildlife, especially ground-nesting birds (Taylor et al. 2005). Additional impacts may include ground or vegetation disturbance through digging and chewing vegetation. Social impacts may consist of noise (barking), and unacceptable behavior of leashed or unleashed animals (fighting, obstruction, distraction) affecting other visitors' enjoyment of the area. In bouldering areas, unleashed animals may present obstruction or safety issues.

MANAGEMENT PRACTICES THAT WORK



PETS

Dog management by various land management agencies varies from agency to agency. The NPS requires that dogs must be on a leash or "under physical restraint at all times." Dogs are permitted in front-country areas, but are prohibited from backcountry trails, with some exceptions. The USFS requires that pets be restrained or on a leash at all times while in developed recreation areas. Generally the BLM has the least restrictive policy concerning dogs, requiring a leash where habitat or wildlife restorations exist. State park and local government policies will vary. Smith Rocks State Park, OR, has a very strict policy regarding dogs. It requires that "no pets shall be tied to any trees, belay stations, fences, rocks or any other object." Failure to do so will result in future restrictions on visitors bringing pets into the park, and result in the issuance of a citation to the owner or guardian of unleashed or unattended pets. This policy has a significant impact on those climbers doing multi-pitch climbs. Climbers with an unattended leashed dog at the base of a route will be cited. It is recommended that a "dog sitter" be available for climbers to play it safe. See: <http://www.smithrock.com/flash/news/dog.html>.

Jefferson County Open Space, Boulder, CO has a similar policy. Pets may be tied to trees or other fixed objects but should not be left unattended.

Regulation 5.84.20 states:

"It shall be unlawful for any person to permit any pet under his custody, control, or ownership to be off leash and not under physical control on any Open Space lands." In addition climbers and other visitors are required to pick up after their pet: "It shall be unlawful for any person to fail to pick up and dispose of pet excrement deposited by any pet under their custody, control, or ownership in a waste receptacle" (Jefferson County Open Space 2006).

In addition climbers and other visitors are required to pick up after their pets:

"It shall be unlawful for any person to fail to pickup and dispose of pet excrement deposited by any pet under their custody, control, or ownership in a waste receptacle." In contrast, North Carolina State Parks requires that "pets must be on a leash no longer than six feet."

See: <http://web.eenorthcarolina.org/net/content/go.aspx?s=44787.0.108.37430>.

Where impacts from pets at climbing areas are identified as unacceptable and no regulations exist for the area, special guidelines on pet management may need to be developed. These may include leash or voice and sight control requirements, or tethering pets away from the base of climbs. Owners may also be asked to remove their animal's waste from the staging area of a climb and either bury it away from the area or pack it out. Education strategies should be developed to support the requested management practice. Dog management policies vary in effectiveness but personnel (i.e. ranger) contacts and regulations appear to work best. Brochures and signage are the least effective, unless these methods are part of a more comprehensive strategy. Consider working with local climbing representatives to assist with developing the education message and distributing information through climbing outlets.

Table 2. lists some guidelines that land managers may encourage climbers to consider when bringing dogs to climbing sites.

Table 2.
Managing Dogs at Climbing Sites

1. Use common sense. When visiting a popular area with lots of climbers, or are planning to climb long multi-pitch routes, or if the day is hot and the approach is long you may want to leave your pet at home. This will create less hassles for you and others.
2. Respect the rights of others. If and when you have to leave your dog make sure s/he is tethered, especially in high-use sites, like bouldering areas or staging areas for climbs. Tethering your pet will keep them out of the way of spotters, belayers, other visitors, and prevent packs from being pilfered for food. If at all possible consider, bringing along a “dog-sitter” to look after your pet while you climb.
3. Respect the rights of your dog. If you insist on bringing your dog to the crag, then take care of it. Make sure you spot your pet on those exposed slabs, or provide support as they negotiate demanding terrain. Make sure they have plenty of food and water, let others know your dogs’ name so they can get your dog’s attention if need be.
4. Keep your dog under control. Before venturing out with your canine be sure it responds to verbal commands. This will help keep your animal under control, especially around others. Train your dog to stay with your gear and not someone else’s.
5. Clean up after your dog. Canine feces is unsightly, smells, and can become a problem underfoot. Dogs are also known to be vectors (carriers) of Giardia. In a recent study of 7500 dogs, 1 in 8 were found to be infected with Giardia. In some instances cysts of Giardia can reach streams directly or via surface runoff. Dogs most susceptible to Giardia include those dogs that spend a lot of time outdoors especially hunting and farm dogs. Dog waste should be buried in a “cathole” or carried out.

NOISE

Noise is seldom reported as a climbing-related management issue. Nevertheless, noise associated with climbing activity may cause others to have difficulty in concentrating on their climbing, affect the experience of their visit, or disturb wildlife. To some, noise is an inexcusable intrusion on the experience of others (Waterman 1993). Climbing requires occasional voice communication between members of the climbing party.

Factors such as the distance between climbers, topographic features, and strong winds may force climbers to yell in order to be understood.

Although voice communication is part of the climber’s safety system, climbers are expected to keep noise to a minimum. Education of other visitors about climbers’ safety signals may help address complaints. In some locations, climbers generate noise by placing and removing safety equipment such as pitons, which require a hammer. Such activity is not part of the everyday climbing experience and is only carried out by a very small percentage of the climbing population in special circumstances, such as undertaking a first ascent or aid-climbing.

Bolts, a form of fixed anchor, require hammering and drilling in their placement, and such activity also generates noise. Bolt holes can be drilled with a simple hand drill, but will often be bored with a portable, battery-powered drill. In the case of general concerns over noise, where power-tool prohibition is not an issue, it is worth noting that although power drilling is louder than hand drilling, the noise will be shorter lived. With a power drill, a bolt placement will take only 30 to 60 seconds, while hand drilling the same hole might take 15 to 30 minutes. In instances where noise has been a problem, management responses to noise associated with placement of fixed equipment have included restrictions ranging from voluntary closures and zoning, to restrictions on battery-powered devices. In rare instances the use of audio devices by climbers can pose a problem to other climbers and visitors and these may be restricted as well.

LITTER

Litter is often caused by careless or accidental handling of trash and waste instead of disposing it properly. Litter is an unacceptable impact that tends to negatively impact the recreation experience (Noe, Hammit and Bixler 1997). Litter can also have an indirect impact on wildlife and water resources. Research has identified four reasons why people litter:

1. Human behavior says it’s okay to litter (for example, smokers throwing their cigarette butts out of car windows is an acceptable practice);
2. People are unwilling to take personal “ownership” in, or responsibility for, areas in their community that are shared by all community members;
3. People litter when they believe someone else will pick up after them; and

4. People are more likely to litter when other litter has accumulated in a given place.

(Keep America Beautiful 2006)

There is no excuse for litter left by climbers, who should be expected to practice a “pack in, pack out” policy and to clean up after less considerate visitors. Nevertheless, small items such as fragments of athletic tape (used to protect fingers) or marker tape (used to mark climbing equipment), cigarette butts, and food wrappers may accumulate at high use areas. On big-wall or long backcountry routes, equipment or refuse may be dropped during the course of a climb and may be irretrievable.

MANAGEMENT PRACTICES THAT WORK



LITTER

Research suggests that littering is behavioral in origin and can be changed with awareness and education directed towards individuals or groups of individuals engaged various outdoor recreation activities. Education has worked well in many areas to bolster climber commitment to keeping climbing areas litter free, particularly where outreach has focused on persistent small items such as tape fragments. Role modeling and verbal appeal by guides has also been found to be an effective way to control litter (Wagstaff and Wilson 1988). Organized clean-ups are also widespread at popular climbing areas. There are many examples of climbing groups organizing clean-ups at areas impacted by activities such as illegal dumping. Each year, the Access Fund coordinates the national event “Adopt-a-Crag Day” which entails local climbing groups working with agency units to initiate a stewardship project at a local climbing area, which may include litter removal or trail projects. Information packages about this event can be obtained from the Access Fund website: <http://www.accessfund.org>.



Each year, the Access Fund coordinates the national event “Adopt-a-Crag Day.” Climbing groups work with agencies on a stewardship project at a local climbing area. Information packages about this event can be obtained from the Access Fund web site: www.accessfund.org. Photo: Access Fund Collection

GUIDE SERVICES

Climbing guide services and climbing programs operate on many types of public land, usually under the conditions of a commercial use permit or incidental business permit. Professional guide services can be an important part of any climbing and conservation education program within a park. Guide services can be held to a high standard of risk management, client care, and Leave No Trace (LNT) environmental ethics. The fact that they hold a permit that can be revoked ensures accountability. The administrators of many popular and well established climbing locations have considerable experience working with climbing guide services. Examples include Yosemite, Grand Teton, and Mount Rainier National Parks; Red Rock Canyon National Conservation Area; White Mountain National Forest; and New River Gorge National River.

Guide services provide an important recreational opportunity and instruction to those learning to climb safely while also instilling environmental responsibility and LNT practices. A preliminary assessment of the need for this type of climbing experience can be gained by consulting with climbing representatives, nearby climbing stores and indoor climbing gyms, and by gauging the number of unsolicited requests from guides and outdoor educators for permission to operate in a management area.

It may be difficult to determine which guide companies offer better quality of service. Services permitted to operate on federal lands undergo a great deal of scrutiny from the managing agency, while elsewhere there may be greater variation in quality. Standards are being raised through recognized certification programs such as those run by the American Mountain Guides Association (AMGA). The AMGA maintains a current list of accredited institutions on their website: <http://www.amga.org>.

Issuance and renewal of guiding permits provides managers with an opportunity to provide guidance on resource-protection or other issues. These may include practices to reduce visitor effects on natural resources; camping, parking, and transportation concerns; group-size limits; limits on days and seasons of operation; liability insurance; and safety procedures. In some areas, climbing guides knowingly operate without a permit. Generally such operations are small (one-person) and infrequent. In such cases, enforcement of permit or other requirements is difficult. Consult with legitimate guide services and the AMGA about possible responses.



MANAGEMENT PRACTICES THAT WORK

GUIDE SERVICES AND ORGANIZED CLIMBING GROUPS

To address these issues and others, both climbers and resource managers are implementing “light-handed” approaches to help manage climbing groups. For instance, in North Carolina’s Pisgah National Forest, The Pisgah Commercial Climbers Association, (Brevard, NC) in cooperation with Pisgah National Forest managers have developed a set of Minimum Standards of Commercial Use. The new standards were created to make organizations more responsible in their hiring practices and for the USFS to hold organizations accountable for operating within industry standards. The revised standards focus on leader and staff qualifications, group size, staff/participant ratios, anchor and site development, group management, and equipment requirements. The (Pisgah Commercial Climbers’ Association 2002). The PCCA has also initiated a web-based calendar system as a means to communicate climbing days and avoid overcrowding at local crags. The calendar is not intended as a way to “reserve” a climbing site. Instead it gives climbing groups and other visitors a “heads up” on what climbing areas are being used by other groups and provides an outlet for contacting the organization and discussing options. For more information on the PCCA calendar visit their website: <http://www.pisgahclimbers.org/>.

In West Virginia’s New River Gorge, guides and commercial climbing outfitters are cooperating with National Park Service managers to ease congestion and minimize the impact of climbing on the ecology of the gorge’s cliff areas and historic sites. A variety of ideas have been proposed to help mitigate these problems, including the creation of new parking areas and access points, developing educational and interpretive programs on climbing to benefit all park visitors, the creation of a climbing route reservation system (via e-mail or web site postings), or erecting sign-in stations at trailheads to popular climbs (Steelhammer 2000). Through the use of information and education, climbing group leaders should be encouraged to follow the guidelines listed below to mitigate potential problems associated with climbing groups, while providing a quality climbing experience for their clientele.

Park administrators may wish to encourage operators’ involvement in resource-protection programs such as trail monitoring and maintenance, education brochures and signing, or assistance with field observations at sites with cliff-nesting raptors and seasonal wildlife restrictions. Guide services can assist resource managers by helping with awareness-raising efforts with clients and by providing feedback on climbing use patterns or proposed management actions. Any general outreach efforts concerning climbing should ensure that local guide services are informed. Not-for-profit educational services such as the National Outdoor Leadership School (NOLS) and Outward Bound conduct climbing courses throughout the country and are also managed through the commercial permit process. These organizations have distinguished histories of working cooperatively with resource managers to develop backcountry etiquette and minimum impact practices (e.g., the Leave No Trace education program). NOLS is increasingly involved in research projects on recreation and resource protection. For further information see the NOLS website:

<http://www.nols.edu/>.

ORGANIZED CLIMBING GROUPS

In addition to commercial guide and outfitter operations, popular climbing areas nationwide receive a significant amount of use from organized climbing groups. These groups include but are not limited to climbing gyms, summer camps, college and university programs, church and scout groups, and other human service organizations. The increases in the number of groups engaged in climbing activities have the potential to contribute to an already difficult and sometimes impossible task for resource managers to accommodate the growth of climbing with administering lands for recreation.

Managers at the Seneca Rocks-Spruce Knob National Recreation Area, WV, reported individual climbers felt that large climbing groups posed a safety hazard and affected their climbing experience (U.S. Department of Agriculture 1996). Climbers also reported that large groups tended to monopolize climbing routes for several hours, could be loud and obnoxious, and interfere with rappel routes. Climbers in New River Gorge, WV, and Crowders Mountain State Park, NC, suggested that group size should be limited, and groups should climb only in designated group areas. Climbers also reported that large climbing groups detracted from their climbing experience and posed a safety hazard and group leaders should be qualified to teach rock climbing (Attarian 1999).

Planning and Group Management

Thorough planning, effective group management, and knowledge of “clean climbing” practices has the potential to reduce resource impacts and social problems. Some of the criteria for choosing an appropriate climbing site should be based on group size, experience, staff, sensitivity of the site, and carrying capacity. Take into consideration the following when planning a group climbing trip:

Choosing a climbing area.

- What level of impact can the area withstand?
- Are there any unique historical, cultural, environmental, or sensitive areas to consider?
- Any access issues?

Group size and staffing ratios. Limiting group size is an acceptable management technique, especially in federally designated wilderness areas. To address the issue of group size, resource managers may provide information on alternative climbing sites; impose restrictions on parking such as time and space limits, and increase the distance or difficulty of access. Resource managers implement group size restrictions to mitigate environmental impacts, maintain consistency with neighboring areas, reduce conflict between groups, address facility or site constraints, manage overall high use of the area, and to address public complaints and pressure (Monz et al. 2000).

Group leaders should consider a variety of factors before traveling to climbing sites:

- Is the group a manageable size?
- Is there adequate staff to manage safety effectively?
- Can overcrowding be reduced through closer communication and scheduling with other climbing groups?
- Timing visits—Avoid popular climbing areas during periods of high demand, for example weekends and holidays.
- Skills training—Consider preliminary teaching before leaving for the climbing site (equipment, knots, belaying). Artificial climbing walls are ideal for this type of training.
- Transportation and Parking – What are the parking considerations at the climbing site? Is there adequate parking available?
- Climber education—What opportunities are there for educating participants on the merits of “clean climbing” or LNT?
- What are the local rules, regulations, and ethics, for the area you plan to visit?

PARKING AND TRANSPORTATION

Climbing sites may develop their own informal parking areas, including road shoulders and pullouts, or may lead to increased use of existing parking areas. Management issues may include demand for parking exceeding capacity, particularly during peak visitor periods; increasing use of undesignated areas for overflow parking; and vehicular congestion at popular visitor areas. Other concerns include vehicle camping in sensitive areas and visitor effects on natural resources (vegetation trampling, wildlife disturbance, improper human waste disposal).

MANAGEMENT PRACTICES THAT WORK



PARKING AND TRANSPORTATION

Management responses to address parking issues may include definition and containment of sites to prevent vehicle encroachment, use of barriers and regulations to prevent parking at undesignated sites, the identification and promotion of alternative parking sites, and policies that encourage car-pooling. Climbers can be encouraged to visit during off-season and off-peak hours if local climate considerations allow climbing at these times. In particularly congested areas, designating parking spaces with varying time limits may be a useful measure to reserve short-term parking for non-climbing visitors. This approach was used at Chickamauga-Chattanooga National Military Park, TN (U.S. Department of the Interior 1998), where climbing visitors required all-day parking while history enthusiasts typically visited for one hour or less. The Access Fund provided grant funding to address parking issues in areas including Jefferson County Open Space, CO; McConnells Mill State Park, PA; on BLM land near Durango, CO; and at Joshua Tree National Park, CA.

Some park and recreation areas have addressed traffic and parking problems at popular sites by developing park and shuttle systems. These systems may be problematic for climbing visitors. Existing access may be essential for climbing opportunities that require early starts or late finishes (e.g. long rock climbs or alpine climbing opportunities), or those that require the transferring of heavy equipment (e.g., big-wall climbing opportunities). Information can be obtained from local climbing representatives about climbing use patterns and locations, to determine the practical implications of changes in access from parking and transportation proposals. In some areas where there have been proposals to change existing parking and introduce new public transportation arrangements, climbing visitors have been given special consideration.

At Zion National Park, UT ranger staff worked closely with local climbers over the introduction of the new shuttle transportation scheme, resulting in a system that accommodated big-wall climbing opportunities and provided for access for pre-dawn starts to long climbs.

USER FEES

Many parks and recreation areas charge fees for general entry. As authorized by Congress under the 1997 federal budget bill, the Recreation Fee Demonstration (Fee Demo) program authorized the federal land management agencies (National Park Service United States Fish and Wildlife Service, Bureau of Land Management, and United States Forest Service) to implement and test new fees throughout the recreation sites each of these agencies manage. These include specific use fees, facility-use fees (e.g., campgrounds), and parking fees. Each agency is allowed to retain all monies generated from the Fee Demo revenues from the program. Eighty percent of the revenue must be spent at the sites where the fees were collected to help pay for improvements at recreation sites managed by the Departments. As of September 30, 2004, there were over 666 fee sites involved in the program, some of which include climbing areas (United States Department of the Interior 2005).

During 2005, The Federal Lands Recreation Enhancement Act, replaced the Fee Demo program. In the Act, each agency was given the authority to charge and expand recreation fees and special use permit fees for recreation on public lands through 2014 (United States Department of the Interior 2005).

While collection of new and higher fees has given a boost to some administrative programs, there have been problems with fee collection, public support, and compliance. For example, the user fee system at Mt. Lemmon, AZ was appealed by the US Attorney's office when a US magistrate ruled that the USFS exceeded its congressional authorization when it began charging a \$5.00 daily fee for recreational use of the area. The appeal is important because (1) user fees have been an important source of operating revenue for the Forest Service and (2) the courts need to clarify whether those fees are legitimate (Davis 2006). If the USFS is unsuccessful in its appeal, this case could set precedence for other federal areas which charge a fee for recreation.

With tight budgets for recreation management and resource protection, land managers may seek funds to assist with management costs of specific activities such as climbing. There are presently fees for climbing at Denali National Park, AK, Mt. Rainier National Park, WA, and Mt. Shasta in Shasta-Trinity National Forest, CA.

User fees can raise strong opinions from the affected user group particularly if there is a perception that other recreation use groups are not being charged.

This has been a particular issue in Denali National Park, where climbers make up less than 10 percent of park visitors accessing the park through the Talkeetna Ranger Station and are the only user group required to pay additional fees (Loomis, 2006).

Before introducing or raising fees for climbing activities, managers may wish to contact the Access Fund, the American Alpine Club, or local climbing groups. These organizations can often provide some funding for management at climbing areas through grant programs and targeted fundraising for special projects. Climbing organizations can also help obtain more funding through appropriations by working directly with Congress and state legislatures to identify needs. Before introducing or raising fees for climbing activities, managers may wish to contact the Access Fund, the American Alpine Club, or local climbing groups, to discuss the need for fees and whether other management alternatives exist.

SAFETY AND RISK MANAGEMENT

Although climbing has a very reasonable safety record (Williamson 2006), it is perceived as a high-risk activity. Some types of climbing, such as mountaineering, are statistically much more dangerous than others, such as bouldering or sport climbing. The opportunity to experience climbing through the full spectrum of risk is appealing to climbers. One of the most common management concerns about climbing is over the landowner's and land managers' liability in the case of accidents. Common law principles regarding assumption of risk suggest that climbers assume all responsibility for their safety and well being while climbing. At the federal level, the Federal Tort Claims Act protects resource managers from liability.

LANDOWNER LIABILITY AND GOVERNMENTAL IMMUNITY

As a general rule, under Governmental Immunity Acts and Governmental Tort Claims Acts, political subdivisions of the government, including federal and state agencies, and their employees are generally protected from liability for acts conducted within the scope of their duties and employment. This is also referred to as governmental or "sovereign" immunity (you cannot sue the government without its permission). Willful and wanton acts of public employees are generally not protected under these acts. See: <http://www.accessfund.org/pdf/riskmgmt05.pdf> for more information.

State laws generally provide liability protection to both public and private landowners through recreational use statutes and/or landowner liability statutes. These laws, which exist in some form in all 50 states, provide public and private landowners with protection from liability when they allow their lands or facilities to be used for a recreational purpose, with the provision that no fee is charged for that use. For example, an agency that charges a climbing entrance or permit fee would likely be held to higher duty of care than one that does not. Recreational User Statutes do not grant immunity (i.e., provided that the landowner cannot be held liable), rather they limit the duty of care owed by a landowner to recreational users subject to a few key conditions such as malicious failure to warn of hidden dangers. The protections afforded under RUS's vary from state-to-state. Consult with legal counsel to determine the applicability of these statutes to specific public lands. Recreational Use Statutes for all 50 states can be found by logging on to: <http://tarlton.law.utexas.edu/dawson/recreate/recreate.htm>

ASSUMPTION OF RISK DOCTRINE.

The perceived risk associated with climbing is good news for land managers concerned about liability. In cases that have gone to trial, the courts have applied the "assumption of risk" doctrine, ruling that climbers are engaged in a recreational activity with known safety hazards, and are responsible for their own safety. The Assumption of Risk Doctrine states that a person assumes the risk of injury or damage if he or she voluntarily or unreasonably exposes oneself to injury or damage with knowledge or appreciation of the danger and risk involved. This doctrine is fundamental to all forms of outdoor recreation including climbing. Assumption of risk requires knowledge of the danger, and consent to it. As a practical matter assumption of risk has broad applicability to recreational rock climbing and is frequently used as an affirmative defense in recreational sports cases. In other words, someone engaged in an obviously risky activity like rock climbing assumes the risk of injury as a result. The defense is generally effective regardless of whether the theory of recovery is based on negligence, reckless conduct, or strict liability.

Climbers cannot win damages against landowners or land managers for simply allowing climbing to occur. Relevant to such rulings is the fact that the hazards arise from the direct interaction of the visitor with the natural environment, rather than with human-made facilities, and that land managers and private property owners have made their lands available for recreation, without any fee for service and without acting negligently. On the other hand, where a land owner or manager has developed an infrastructure to facilitate a recreational use, for example,

ski areas on national forest lands, the owner or permittee may be liable for damages for accidents suffered as a result of use of that infrastructure, where negligence has been shown.

ATTRACTIVE NUISANCE DOCTRINE

The Attractive Nuisance Doctrine imposes liability for landowner negligence resulting in a physical injury to a child (for example, in Colorado this doctrine only applies to children under 14 years of age). It was developed to permit recovery when a landowner 1. keeps an artificial (non-natural) condition on his or her premises which is an attraction or allurement to a child; 2. involves an unreasonable risk of injury, and 3. is located in a place where it might be expected that children are likely to congregate. Generally the object that caused the attraction must be unusual and extraordinarily attractive, not an ordinary matter. Generally, negligence exists where a person (in this case a land manager) owes a recognized duty of care to take reasonable precautions to prevent or alleviate unreasonable risks of harm to other persons and fails to do so. However, an important exception to a landowner's duty to reasonably guard or warn others of harm is the common law idea that no duty to guard or warn exists where the risk is an "open and obvious natural condition." The primary reason for this exception is that a land user is as capable as the owner (land manager) of recognizing and appreciating the risk of injury presented by an "open and obvious" danger, and because it is "natural," the owner does not bear responsibility for its creation. The "open and obvious natural condition" of cliffs means that, in nearly every situation, landowners and land managers will not appreciably increase their liability merely by allowing climbing.

SEARCH AND RESCUE

Like hikers, fishermen, and boaters, climbers sometimes find themselves the subjects of search-and-rescue operations. The courts have ruled that public lands managers have no "duty to rescue" climbers or other visitors who are lost, injured, or killed through engagement in their activity (for example, see Johnson v. United States, Department of Interior, 949 F.2d 332, 335 (10th Circuit 1991); and Kiehn v. United States, 984 F.2d 1100, 1108 (10th Cir. 1993)). Even though the government may regularly carry out search-and-rescue (SAR) operations for lost or injured visitors on public lands, it has been found not liable for ineffective or unsuccessful rescues. Examples of such operations include those carried out by the National Park Service in national parks, and volunteer SAR organizations in conjunction with local law enforcement agencies and/or land management agencies in other areas.

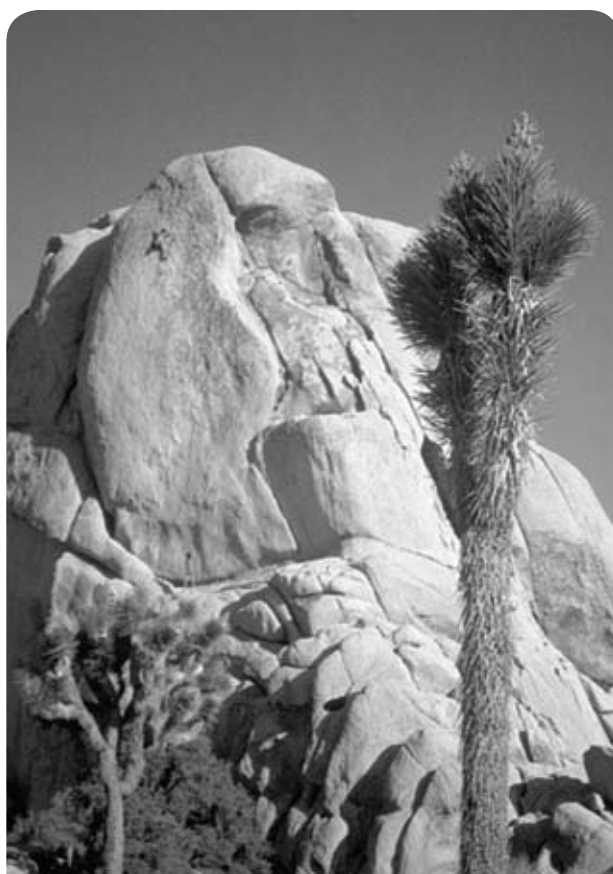
Some public SAR organizations have started to charge fees for rescue if the person(s) being rescued have contributed to their demise. For example, New Hampshire Fish and Game, the agency responsible for SAR in New Hampshire is subject to state law which declares that a “person shall be liable for response expenses if, in the judgment of the court, such person recklessly or intentionally creates a situation requiring an emergency response” (New Hampshire Fish and Game 2001). A person’s liability under this subdivision for response expenses shall not exceed \$10,000 for any single public agency response incident. Any money collected will support training and purchases of equipment for volunteers of search and rescue organizations who help with rescue missions (New Hampshire Fish and Game 2001).

Access Fund survey outlining how liability risk is managed at the nation’s key private climbing areas can be found at: <http://www.accessfund.org/pdf/riskstrat.pdf>

ECONOMIC CONSIDERATIONS

Local economies can benefit significantly from climbing activity in nearby locations. Climbers often travel long distances to visit popular locations, paying for fuel, food, lodging, and other services from local businesses. Several studies have examined economic contribution from climbing activity to municipalities and regions near important climbing areas and have found these contributions to be significant. See *Travel Cost Models of the Demand for Rock Climbing* (Shaw and Jakus 1996), *Meta-Analysis of Outdoor Recreational Use Value Estimates* (Rosenberger, Loomis and Shrestha 1999) and *Gateways to Adventure Tourism* (Ewert 1996). Some businesses or towns actively promote climbing and attract climbers through special discounts or special events. Examples include a winter ice-climbing festival in Ouray, CO, and a summer rock-climbing festival in Lander, WY. Restrictions on climbing access may have repercussions for local businesses. Local chambers of commerce and climbing businesses such as outdoor retail stores, climbing gyms and guide services can provide feedback on how new fees or use restrictions may affect climbing activity and use of associated services from the local community.

New regulations of climbing at the national level will require analysis of possible economic effects to satisfy legal mandates provided by the Regulatory Flexibility Act 1980, the Small Business Regulatory Enforcement Fairness Act 1996, and Executive Order 12866 (Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (1993)). The NEPA planning process also requires an assessment of effects of proposed management actions on the human environment, including an evaluation of how “gateway communities” and climbers themselves are likely to be affected in an economic sense by changes in policy.



The Access Fund and local climbing groups worked with Joshua Tree National Park on the development of a park-wide policy for climbing in the 1998 Backcountry and Wilderness Management Plan which includes a special section on climbing management.
Photo: R. Vogel

CHAPTER 5: ACTIVITIES AND AREAS OF SPECIAL CONCERN

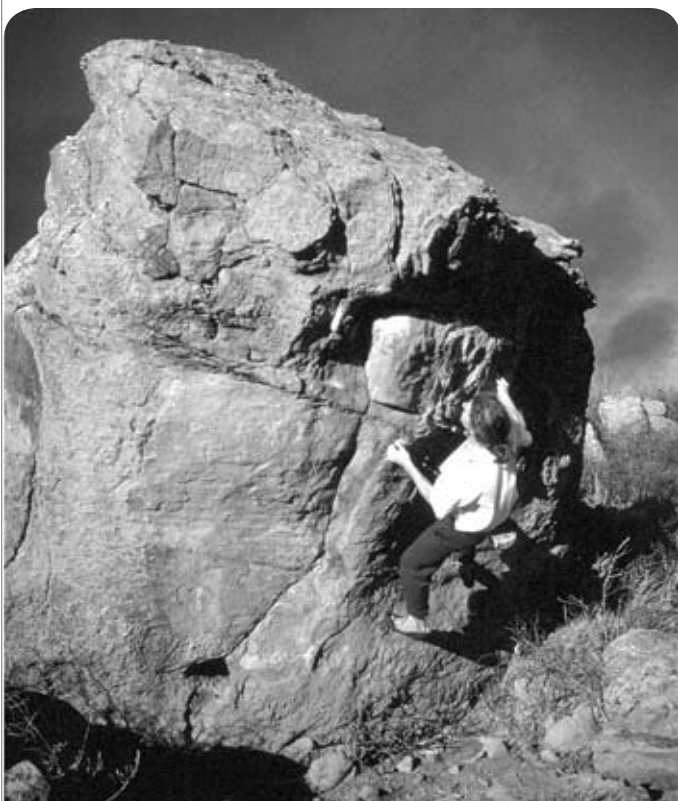
The following chapter addresses activities and areas of special concern such as bouldering, ice climbing, alpine areas, wilderness areas, and caves.



Ice Climbing at Hyalite Canyon, MT. Photo: © Jay Beyer

BOULDERING

Bouldering is the practice of climbing on small rock formations or boulders that are short enough in height that ropes and gear are not necessary. A route up a boulder is typically referred to as a “boulder problem” or “problem,” and rarely exceeds 15 to 20 feet in height. Surmounting a boulder via a specific side or problem is the general objective of the activity. Some boulder problems are “traverses,” climbing from one end of the boulder to the other. Since bouldering does not utilize ropes, relying on fellow boulderers to act as “spotters” is the common practice. In general, bouldering falls are frequent, but short. Spotters redirect falling climbers away from hazards and towards the safest landing zone. For this reason, most boulderers climb in a group (usually 2-6 people), relying on one another not only for technical climbing advice and positive encouragement, but for safety benefits as well.



Bouldering at Carter Lake, Colorado. Photo: © K. Pyke

Historically, bouldering developed as a means of training for bigger climbing and mountaineering objectives. In the past 30 years, bouldering evolved into a sport unto itself. The emergence of bouldering as an acknowledged, distinguished, and respected form of climbing is the result of several cultural, social, and economical factors. Bouldering’s initial appeal to climbers was the ability to practice extremely difficult and gymnastic climbing movements close to the ground and repeatedly.

As a result, bouldering became the avenue for achieving climbing’s most technically difficult accomplishments. This has made bouldering the climbing form of choice for many top climbers and legitimized bouldering as a respectable and distinguished form of climbing. As bouldering evolved, so have the tools necessary for boulderers to maximize their potential. Specialized shoes, with sticky rubber soles, and gymnastic chalk, for improved hand grip, are used by boulderers to improve performance. Bouldering pioneers invented (and eventually made commercial available) “bouldering pads,” portable cushioned mats used to pad the immediate area around a boulder to provide a soft landing surface if climbers jump or fall off the boulder. These three elements are the essential tools for bouldering.

Bouldering at Horsepen’s 40 in Alabama. Photo: © Andrew Kornylak



Bouldering’s growing popularity can be attributed to the low cost of entry, accessibility, progressive athletic potential, community, and mainstream publicity. Because entry into the sport only requires shoes, chalk, and a pad, bouldering has strong appeal to a health-conscious public as an ‘entrance-activity’ form of human-powered recreation. Youth climbing teams and an increase in competitive indoor bouldering events have increased its popularity among children and adolescents, as well. Bouldering’s social aspects of community and camaraderie are fostered in the spotter/climber relationship that has unified the bouldering community and created an expanding sub-culture among many enthusiasts. Finally, a growing market of magazines, companies, products, and events contribute to bouldering’s growing popularity.

The bouldering culture that is growing from these influences is primarily younger and energetic, the majority of whom are in their teens and twenties. Bouldering is not an activity only for the young, but for the “young at heart” as well. The difference being that many older climbers learned to climb on a rope, so today they, unlike the new generation of climbers, do not practice bouldering exclusively. A visit to any nearby bouldering area, however, will reveal the sports appeal all age levels and abilities of the climbing society.

Like all forms of outdoor recreation, bouldering causes impacts to natural resources. The recent increase in bouldering's popularity contributes to the potential for the establishment of new terrain and the rise in user numbers also increases impacts on the climbing environment. The Access Fund strives to educate all those who rock climb about the nature of climbers' impacts as well as techniques to minimize or prevent impacts. Impacts from bouldering activity tend to be concentrated around the rocks themselves. The climbing community has proven receptive to management where there has been thorough outreach during the development of management plans. Conversely, where actions which limit or eliminate bouldering opportunities are undertaken without consulting climbers, with little documentation of impacts, or that only affect climbing, the climbing community may be less cooperative.

Typically, the most concentrated effects of bouldering activity occur on the ground below and directly adjacent to heavily used boulders. Here, in the "landing zone" and "staging area," soils and vegetation can quickly become compressed as climbers walk around below the problems, sit down to put on shoes, socialize, place protective bouldering pads, and fall or jump to the ground. Management responses to mitigate impacts have included site hardening, barriers, exclusion zones, and visitor dispersion to more robust sites through selective publicity, signing, and trail management.



Portable crash pads are placed below boulders to reduce injury from falling. Photo: © Andrew Burr

Heavy traffic on and to specific boulders often leads to occurrences of trampling and subsequent erosion. In addition, in order to make the landing safer, climbers at times will move ankle-turning rocks from under the boulder problem. Since the soils directly below and adjacent to boulders often collect run-off and retain moisture better than other areas, they may prove to be critical habitat for certain plants and wildlife. Local climbers can provide useful information, such as locations of particularly popular bouldering areas. Outreach and education have been used successfully in many climbing areas to minimize such impacts before they become critical.

Bouldering pads are an important tool for bouldering. Pads positioned on the ground below boulders may reduce erosion by distributing and absorbing the force of bouldering falls. Pads can, however, cause damage to vegetation if they are draped over or leaned against grass, shrubs, bushes or flowers. Management responses to reducing impact include outreach, at trailhead kiosk postings and educational brochures, to place pads only on durable surfaces. For more information on bouldering, related concerns and management responses, see the Access Fund's Bouldering: Understanding and Managing Climbing on Small Rock Formations found at <http://accessfund.org/pdf/BoulderingPaper.pdf>

MANAGEMENT PRACTICES THAT WORK



BOULDERING

The hallmarks of successful management of bouldering are open communication between resource managers and climbers, and proactive management responses that rely principally on education and outreach to achieve objectives. Management planning for areas with bouldering opportunities should include consideration of the views and priorities of climbers. When boulderers feel that they have been included in the decision making process, they are more likely to comply with restrictions, and to help enforce those restrictions among their peers. In virtually all areas where bouldering is practiced, the activity has been found to be compatible with other land uses and values. Many bouldering areas have enjoyed largely unrestricted access for decades, yet have experienced minimal environmental impacts and few management problems.

Determining just what measures can accomplish management goals without needlessly reducing, or affecting the quality of, recreational opportunities requires a solid knowledge of the way bouldering is practiced in a specific management area.

Both this knowledge, and good relations with the bouldering user group, are informed greatly by the assignment of a specific liaison to handle bouldering-related issues. What is important is that boulderers perceive the liaison as willing to listen and learn about their activity, and more importantly, that he/she consider bouldering to be a valid and worthwhile activity. Boulderers, especially young boulderers, have an extensive network of Internet sites devoted to their activity, and this fact can be put to great use by resource managers the BLM has already done this to support education and outreach in the popular bouldering locations around Bishop, CA <http://www.ca.blm.gov/bishop>. Bouldering websites are receptive to postings from resource managers, and these sites can be a very efficient and cost-effective method for reaching this user group.

Management responses at bouldering areas may include planning for efficient and effective of trail networks, stabilization or ground hardening at points of concentrated use, and selective restrictions on boulders to protect sites with significant natural or cultural resource values. Education and outreach should promote low-impact use of crash pads (e.g., avoiding placing pads on top of delicate vegetation) and distinguish areas with special resource sensitivities where use of pads may cause adverse impacts. Management responses for protection of rock art may include voluntary buffer zones, signing, and fencing off of sensitive areas.

At Red Rocks Canyon National Conservation Area, NV, rock climbing is restricted within 50 feet of rock art. At other locations the restriction zone may be greater or smaller depending on site-specific conditions. Occasionally climbers may discover previously unknown cultural resources. If it is not clear that the land managing agency is aware of the cultural resources or impacts that might be occurring, climbers should inform and work with managers to establish practices that will prevent cumulative damage. Other responses addressing cultural resource protection may include construction or placement of artificial surfaces, site excavation (data recovery), or exclusion zones

More general concerns related to climbing activity at bouldering sites may include human waste disposal, vehicle parking, pets, and camping. These issues are covered in greater detail elsewhere in this document. Several areas (including the Buttermilks area in Inyo National Forest and the BLM Proposed Wilderness Study Area Volcanic Tablelands), near Bishop, CA have seen a large increase in bouldering activity since 1998 <http://www.blm.gov/ca/bishop/bouldering/index.html>.



Bouldering is a series of short sequential moves usually no more than 15 feet off the ground. The person on the ground is “spotting” the climber to help prevent an awkward landing if the person falls. Photo: © S. Green

Management responses developed with local climbing representatives have included trail definition, cultural resource inventories, raptor and vegetation monitoring, definition of parking areas, education materials promoting special use considerations and minimum-impact practices, selective publicity policy for areas with significant cultural resource values, designation of camping areas, provision of trailhead toilets, and monitoring visitor numbers through trail counters and vehicle parking surveys.

Flagstaff Mountain, City of Boulder Open Space and Mountain Parks, Colorado, receives both high climber and general visitor levels due to its proximity to an urban area. Here, management efforts have focused on erosion control, and have included trail definition with wooden barriers, ground hardening by importing material under heavily used boulders, and vegetation restoration using raised beds, mulch, and native planting. Similar practices have been initiated by climbers at Atlanta’s Boat Rock where native vegetation, mulch and pine straw is put in twice annually at eroded staging areas (Jacques 2006). Local and national climbing groups may be able to provide assistance with information on visitor use patterns, developing education strategies and outreach on sensitive resource issues, and raising funds towards mitigation efforts. For example the Access Fund developed the The boulderProject <http://www.accessfund.org/boulderproject> to promote and responsible bouldering.

**Table 3. Leave No Trace Bouldering:
THE ACCESS FUND'S BOULDERPROJECT**

Local Low Down – Check websites, guidebooks, and talk to locals. Not only do locals know the best lines, they know the beta (information) to keep areas open.

Boulder Green – keep nature pristine helps to keep it... well... natural. Some tips to keep it clean:

- Speak up when the actions of others threaten access. Remember it's your climbing future at stake.
- Pick up & pack out tape, spilled chalk, and wrappers.
- Brush off with a nylon brush or shirt slap tick marks & holds after you send the problem.
- Never chip, alter, sculpt, glue-on holds, or landscape. Your project is someone else's warm-up.
- Limit group size & sprawl.

Pad Lightly – Crash Pads can save your ankles; however they have the potential kill, abrade, or crush small trees, cactus and other vegetation. Some tips to coexist:

- Clever pad placements and attentive spotters turn dangerous landings into safe, enviro-friendly landing zones.
- Place your crash pads on rocks or areas free of vegetation.

The Road More Traveled – Stay on existing trails.

- Off-trail travel between boulders can create a network of trails and is a major problem at many areas.

Hard Choices – If no trail exists keep you and your gear on hard, durable surfaces.

Way Old-School – One of the quickest ways to shut down an area is to climb on or around rock art and cultural sites.

- If someone way older and wiser than you was there first, find a new problem on a different boulder.

A Climber's Best Friend – It's up to all of us to make sure our pets comply with local regulations or it's to the dog house for both them and us.

Whas's up? – Someone owns the land that you're bouldering on and chances are it's not you.

- Know who owns or manages the land and abide by their regulations, including closures.

The New Frontier – New areas warrant special care.

boulderProject (Access Fund 2006)

ICE CLIMBING

Ice climbing like rock climbing has a long and varied history. The origin of ice climbing can be traced back to 19th Century European mountaineering. During this period, ice climbing was not considered a discrete sport, but instead viewed as one of the many disciplines of mountaineering. Due to the development of crampons and the modern ice axe, and other technological innovations, ice climbing has evolved into the singular pursuit as we know it today.



Ice climbing at Provo Canyon, Utah. Photo: © K. Pyke

As ice climbing continues to evolve, a few ecological and social impacts are beginning to emerge. Both ice and snow are relatively resistant to impacts, however, with limited ice and snow cover, impacts to trails and soils can emerge. One of the more severe impacts of ice climbing can occur when crampon-clad climbers down-climb steep social trails causing significant disruption to the soil furthering erosion. Litter and human waste buried or discarded in snow can also emerge following the spring thaw creating an unsightly and potentially hazardous health concern, especially in heavily used areas.

Climber specific litter has the USFS concerned over the quantity of "V-thread" slings littering drainages near Cody, WY, home to some of the best ice climbs in the continental United States. The V-thread anchor is a common practice for rappelling ice climbs.

A V-thread is constructed by drilling two intersecting holes into solid ice (using a long ice screw) creating a V-shaped hole in the ice. A sling is threaded through the holes and tied off for an anchor. Many climbs contain multiple V-threads within a few feet of each other. Once the ice melts slings and rap rings are found hundreds of yards downhill from Cody's ice formations.

The Central Rockies Section of the American Alpine Club has donated materials for locals to install permanent rappel anchors on the most popular climbs where V-threads have been used (American Alpine Club 2005).

In recent years the development of ice farming has become popular, especially in the Rocky Mountain West creating both environmental and legal concerns. Ice activists have farmed ice both legally and illegally by diverting watercourses at cliff tops to enhance the quality of ice climbs.

MANAGEMENT PRACTICES THAT WORK



ICE CLIMBING

With a few exceptions, very little is known about the impacts of ice climbing on the environment. Continued monitoring of this activity by the climbing community and managers is warranted. Ice farming and the increased interest in ice climbing have led to the creation of ice climbing festivals. These events have the ability to educate climbers on the potential impacts of ice climbing and ways to minimize their impact.

Climbers, climbing organizations, and land managers should continue to utilize education and outreach to inform the climbing community of the potential impacts associated with ice climbing. In the mean time, ice climbers can minimize their impact by following a few common practices:

- Optimum conditions for ice climbing should be under frozen and snow covered conditions.
- The cliff should have a "winter" appearance with snow, hoarfrost, rime-ice or "verglass" covering rock, not just snow covering ledges.
- Vegetation as a climbing medium is best when it is frozen or covered in snow or "neve." In this condition it is least likely to be dislodged.
- Rock climbing routes that are of good quality and considered classic climbs should only be attempted in winter when fully coated with snow and ice in order to prevent damage to the underlying rock. (Mountaineering Council of Scotland 2006).

DRY TOOLING

"Dry tooling" or mixed climbing was developed by ice climbers searching for new ice routes as obvious possibilities ran out. This practice led to climbers look for ice stalactites, which were accessed by using aid climbing techniques. After reaching the ice, free climbing techniques were used to gain the top. Today, with a new and stronger generation of climbers, points of aid are being removed. To accomplish this dry tooling was born. Dry tooling is the climbing of very steep or overhanging rock using axes and crampons to free them. Often loose or dirty rock needs to be climbed in order to reach free hanging stalactites of ice. It would be almost impossible to climb purely by hand, however hands are used for a move or two on the rock or ice before switching back to tools, making routes truly mixed.

Dry tooling is a rising sport in its own right and has been associated with damaging of established rock climbs and out of condition winter routes. Dry tooling is controversial among many climbers. Some favor it as a new and exciting kind of climbing, while others dislike it for its nontraditional methods and the long-lasting damage it inherently causes to rock faces.

ALPINE AREAS

Climbers travel and camp in alpine areas throughout the mountain ranges across United States. In some of the most remote locations, climbers may be the only human visitors. Alpine environments—including alpine meadows, talus slopes, and water sources—and their associated wildlife can be particularly sensitive to human disturbance since concentrated visitor use coincides with the short growth and reproductive season during the prime climbing months of July and August. Minimum-impact camping and travel practices should always be encouraged in alpine areas.

The effects of climbing in alpine areas will accrue largely from the hiking and camping in the backcountry necessary for the activity. In many areas it will be hard to distinguish the effects of climbers from the effects of other users, except in the case of obvious approach and descent routes to and from climbs. Often, climbers will use bivouac sites in high boulder fields or other locations seldom used by non-climbing visitors. In some popular climbing areas, primitive camping or bivouac sites have been designated to focus or disperse overnight visitor use. See the backcountry camping and bivouac policy described in the public education brochure: Rocky Mountain National Park Technical Climbing and the Bivouac Permit (1999).

Climbing in alpine areas where the ground is covered with snow and ice may require special management considerations regarding human waste disposal. Clear guidance on waste-disposal practice should be provided. **See - Human Waste Disposal, page 11.** Management responses in alpine areas may include climber education, pack-out waste requirements, suggested or mandatory bear-proof or other wildlife food containers, and use limits to mitigate effects in sensitive areas or allow rehabilitation of impacted areas.

Wilderness lands often feature dramatic topography and unusual scenic qualities that often make wilderness of interest to climbers. Some of America's most historic, scenic, and challenging climbing routes are found in wilderness. As a rule, the climbing experience in wilderness should afford: a primitive and unconfined type of recreation; opportunities for adventure and exploration that offer a different (sometimes greater) degree of risk and physical and mental challenge; opportunities for solitude; and a minimum of administrative oversight in the field. Climbing is considered a historic and appropriate use of wilderness by federal wilderness managers.

Climbers such as John Muir, David Brower, and Norman Clyde were instrumental in developing a "wilderness ethic" in this country; Brower played an important role in drafting and passing the Wilderness Act. Climbers have a century-long history of activity in some areas that have only recently been designated as wilderness. For a list of climbing locations in designated wilderness see *Climbing in Wilderness: An Inventory of Recreational Climbing use in the National Wilderness Preservation System* (Bartlett 1995). Managing climbing activity in designated wilderness will involve special attention to preserving the wilderness qualities of an area, and preserving values on classic and historic routes that make the wilderness climbing experience unique. For a general discussion on how philosophical and practical issues of visitor management can be integrated in wilderness areas, see the publication *Wilderness Management* (Hendee et al. 2005).

Managing climbing activity in wilderness may address issues such as:

- camping and bivouac practice in pristine environments
- possible disturbance to wildlife, vegetation, and soils
- human waste disposal
- the development of climber trails
- the use of fixed anchors
- climber visitor levels
- effects of climbing activity on other visitor experiences.

Specific management responses may include:

- education and outreach strategies promoting minimum-impact practices and raising awareness of wilderness values
- seasonal wildlife restrictions; establishment of designated camp or bivouac sites
- establishment of exclusion zones to protect sensitive environments.

For an example of how a federal agency has addressed climbing management in backcountry and wilderness, see the *Backcountry & Wilderness Management Plan for Joshua Tree National Park, California* (U.S. Department of the Interior 1998).



Climbing on Mt. Hooker in the Wind River Range, Wyoming usually requires several days of camping or bivouacking in this alpine location. Photo: © K. Pyke

DESIGNATED WILDERNESS

Legal definitions of wilderness are provided under the 1964 Wilderness Act and various state statutes. "Wilderness" generally describes lands that have not been noticeably modified by man and which possess outstanding ecological values. Congress may also designate wilderness formally through legislation and each federal land management agency promulgates regulations to fulfill the mandate of the 1964 Wilderness Act and specific wilderness bills.

WILDERNESS AND SOLITUDE

Climbers are drawn to wilderness in part because of the opportunities for solitude. The sense of solitude while climbing in wilderness is enhanced by the positions on the landscape that climbers visit. These may include high, wild, trail-less places with spectacular views, and places where people cannot go unless they are skilled in climbing techniques. Management considerations will include the effects that climbing may have on general opportunities for solitude in an area, and the level of solitude preferred by climbers. Since solitude is an essentially subjective quality relative to the preferences and background experiences of the individual visitor, its value can be difficult to assess.

Solitude is usually quantified in terms of social encounters (meetings with other visitors) over a selected period of time. Such information can be gathered by visitor exit surveys. Social-encounters standards may be developed by evaluating preferences of climbers and other visitors through surveys or questionnaires. These standards may then be included in a resource management plan. If desired standards are exceeded, education and outreach can encourage visits at alternative times, seasons, and locations within the area. If necessary, restrictions such as trailhead quotas can be implemented.

Quotas are put into place to limit the number of visitors to an area to help mitigate social and ecological impacts, especially in popular areas like the Enchantment area of Washington's Alpine Lakes Wilderness, Wenatchee National Forest. For this area, the USFS has implemented a seasonal quota permit system for overnight camping from June 15 to October 15 (Alpine Lakes Wilderness 2006).

Recent management decisions on solitude indicate that it may be preferable to condense visitor levels (raise social-encounters standards) in a few popular areas in order to preserve greater opportunities for solitude elsewhere. For example the South Climb route on Mount Hood in Oregon's Mount Hood National Forest, is a very popular non-technical climb. During peak season, visitor numbers reach over 200 people per day, which exceeds forest-wide social-encounters standards. A decision was made to allow high levels of use on this route and the trailhead serving it, while lowering use levels in other areas (U.S. Department of Agriculture 2000). Climbing advocates have noted that the conventional "human encounter" methodology for developing solitude quotas may not be as applicable to vast wide-open alpine landscapes. See Access Fund and American Alpine Club administrative comments at <http://www.accessfund.org/pdf/AFdenali.pdf> and <http://www.americanalpineclub.org/pages/page/32>.

For further information on established guidelines and existing policy for wilderness management, see the USDA publication, Forest Service Manual, Section 2300 http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2300 and the National Park Service Natural Resource Management Reference Manual #77 <http://www.nature.nps.gov/rm77/> and Wilderness Preservation and Management policies (U.S. Department of the Interior 2006).



Climbing in wilderness is a unique experience. Climbers value wilderness for its greater solitude, remoteness, higher adventure and scenic qualities. Shown here is the Weaver's Needle in the Superstition Wilderness, AZ. Photo: © Access Fund Collection

WILDERNESS AND FIXED ANCHORS

In recent years some wilderness managers have expressed concern that the use of fixed safety anchors may not be consistent with the 1964 Wilderness Act, and that their use should be prohibited. This has led to the development of management policies in some locations that restrict the continued placement of fixed anchors (e.g., Sawtooth National Recreation Area, Sawtooth National Forest, Idaho). Other wilderness managers have not found such restrictions to be necessary for compliance with the Wilderness Act. For example in the Mount Charleston Wilderness, Toiyabe National Forest, NV, placement of new bolts is permitted subject to limits on the number of climbing routes in a given area.

In 2006 this US Forest Service unit began planning with the BLM on an interagency wilderness plan that will also encompass Red Rock canyon National Conservation Area. By the end of 2006 the Bureau of Land Management (BLM) was the only federal agency that had issued specific guidelines on the legality and management of fixed-anchor use. In 2006 the BLM issued an internal memo to assist the Las Vegas Field Office with fixed anchor management direction for an upcoming wilderness plan. The US Forest Service and National Park Service will likely provide language for policy and regulations on fixed anchors in 2008. Contact the Access Fund regarding fixed anchor policies that are pending.

Some environmental organizations have taken an interest in the fixed anchor issue. The Sierra Club, Wilderness Society, and National Parks and Conservation Association have adopted positions favoring management rather than prohibition of fixed anchors in wilderness. Historically, climbers have used fixed anchors in wilderness, most commonly to enable rappel descents from difficult summits where there is no walk-off, or to descend mid-route in case of bad weather or medical emergency. The most common type of fixed anchor in wilderness is a small loop of nylon sling left around a horn of rock, tree trunk, or other natural feature. Slings deteriorate over time, requiring climbers to periodically remove and replace them.

Bolts are less frequently used in wilderness because of the special equipment and significant time and physical effort required in their placement. In some front-country areas, concentration of fixed anchors (associated with certain types of climbing activity) has led to changes in use patterns including an increase in number of climbers visiting an area.

The effects on natural resource values associated with such use change has sometimes led to a perceived need to regulate fixed-anchor use in backcountry or wilderness areas in order to avoid similar effects. This type of high-impact use pattern, however, is extremely rare in wilderness climbing areas. These areas are generally protected from high climbing-visitor levels by long approaches, descents, and a requirement for a high level of climbing skill and self-sufficiency. Also, high densities of fixed anchors generally develop only where battery-powered drills are permitted for bolt placement. Power drill use is specifically restricted in designated wilderness, and such restrictions have proven effective for controlling excessive proliferation of fixed anchors without prohibiting the occasional use of fixed anchors.

Management responses to fixed-anchor concerns in wilderness may include gathering of baseline data in order to determine acceptable change thresholds. Local climbing groups or representatives may be able to assist agencies with gathering information on the history and density of fixed anchor use in the management area. Education and outreach should inform climbers that power drills are illegal in wilderness. If more direct action is deemed necessary, public meetings can assess the potential for cooperation in decision-making and assess possible points of conflict. Techniques to address fixed anchor use may include requests for voluntary compliance with fixed anchor standards (guidelines developed through consultation with local climbing representatives and/or climbing working group), regulation through a permit system for new fixed anchors, requirements for use of earth-tone colored anchors to reduce visual prominence, establishment of zoned areas for types of fixed-anchor use, and restrictions or moratoriums to limit or prohibit additional fixed anchors.

Examples of wilderness areas that are unusually accessible and receive heavy climbing use include portions of Joshua Tree National Park, CA. The Backcountry and Wilderness Management Plan for this area (U.S. Department of the Interior, 1998) provides examples of public involvement in fixed-anchor issues, as well as examples of how restrictions on fixed anchors may be considered and implemented. **Table 4** provides a chronology of the fixed anchor in Wilderness issues.

Table 4.
**CHRONOLOGY OF MANAGEMENT RELATED
 TO FIXED ANCHORS IN WILDERNESS**

1988

Public complaints to US Forest Service managers of Arizona’s Superstition Wilderness, Tonto National Forest, about chalk and bolts located in a cluster of pinnacles near popular hiking trail. Managers respond by posting a sign at the trailhead banning all new fixed anchors in the Superstition Wilderness.

January 1991

USFS convenes a National Task Group on Fixed Anchors in Wilderness to study the management fixed anchor use in wilderness areas throughout the country.

May 1991

Task group issues a report but the Forest Service never acts on the recommendations.

June 1996

USFS issues an “Advance Notice of Proposed Rulemaking” on establishing a national policy on fixed anchor use. The proposed fixed anchor rule receives strong opposition from climbers, causing the Forest Service to retract policy.

1997

Sawtooth National Forest, ID, bans the use of fixed anchors in the Sawtooth Wilderness area.

June 1998

USFS uses a “discretionary review” of a wilderness plan ruling in the Sawtooth Wilderness to impose a ban on the use of fixed climbing anchors in all Forest Service-administered wildernesses in the United States. The ruling affects all forms of fixed anchors (bolts, pitons, and nylon slings placed around rocks and trees). Implications: (1) no new fixed anchors could be placed, and (2) existing fixed anchors were to be removed.

August 1998

Forest Service stays the national ban up to one year so that negotiated rulemaking could occur in hopes of reaching a compromise. This means that fixed anchors remain legal in all wilderness areas except the Sawtooth Wilderness (where the original ruling was judged to be appropriate). No new rules regarding fixed climbing anchors were to be implemented until the negotiated rulemaking was completed.

February 1999

A US Forest Service facilitator issues a report indicating that negotiated rulemaking may be useful to solve the fixed anchor problem.

Summer 2000

The negotiated rulemaking committee meets for four two-day sessions and fails to reach full consensus on a proposed regulation. However, most members support a principle of limited fixed anchor use in wilderness and agree to a set of general principles for managing fixed anchors.

2001

The Interagency Wilderness Policy Council, comprised of senior wilderness officials from the NPS, USFS, BLM, USFWS meet and adopt in principle general and specific guidelines for consistently managing fixed anchors in wilderness per the principles acknowledged by the majority of the negotiated rulemaking committee.

2001-2006

Federal land management agencies develop draft regulations and policies for managing fixed anchors.

June 2006

BLM issues internal memo to Las Vegas Field Office intended to guide fixed anchor management in an ongoing BLM wilderness plan for Red Rocks National Conservation Area.

CAVES

Caves can have high ecological, geological, or cultural values. The Federal Cave Resources Protection Act of 1988 provides general guidelines for the preservation and management of caves (Jones et al. 2003). In general, caves are of little interest for climbing since their structure rarely provides the necessary height and rock type. Exceptions include certain cave entrances, for example the lava tubes near Bend, Oregon, and the limestone caves in the USFWS Desert Wildlife Refuge, Nevada. There has been limited documentation of how climbing in the outer fringes of a cave affects cave resource values. Current federal law or agency manuals contain no clear definition of a cave, and certain climbing sites, such as large cliff alcoves, may have cave-like characteristics. At Nevada's Mount Charleston in the Toiyabe National Forest, bat populations are protected from disturbance through seasonal restrictions on climbing access. If resource managers have concerns about a particular site, they may wish to contact the Access Fund and the National Speleological Society for assistance with development of management response.



Sport climbing in Rifle, CO. Photo: © Keith Ladzinski

CHAPTER 6: CLIMBING MANAGEMENT METHODS

This chapter outlines philosophies and tools that land managers use to manage climbing and address specific management concerns such as visitor capacity, increases in climber visitation, and the development of new climbing routes.

PHILOSOPHIES AND TOOLS

Climbing presents unique management challenges due to its historic associations, the equipment used, the different forms of climbing activity, and the diversity of environments where climbing takes place. Management response to the effects of climbing activity will depend on many factors, including the mission of the agency or field unit, and staffing or budgetary resources. Each natural area is unique, requiring land managers to exercise broad discretion in managing recreational activities. This discretion is encoded in law and policy directives. If legislation such as the National Environmental Policy Act of 1969 (NEPA) is applicable to the area where a change in management approach is being proposed, then a formal use plan will be prepared which will present a range of management alternatives or responses. Other legislation such as the Endangered Species Act, 1973; the National Historic Preservation Act, 1966; the Native American Graves Protection and Repatriation Act, 1990; or other forms of state or special designations may also affect management approaches.

Beyond the requirements of law, hard rules are seldom possible, but one useful document that can give direction on developing a management response is NPS-77 Natural Resources Management Guidelines (U.S. Department of the Interior 2006) especially Chapter 3, “Backcountry Recreation Management.” These guidelines outline a management scheme where action is implemented on a graduated scale, from indirect measures such as education and outreach, to direct measures such as area restrictions and closures. In general, recommended actions are the minimum necessary to protect resources.

Climbing activity, as with any use of a natural area, creates impact. It may be useful to consider impact in terms of a threshold, and differentiate acceptable or inconsequential effects on the resource from detrimental impact or impairment. The specific threshold between effects and impairment will depend upon complex factors including the mission of the agency and the status of the area. Degree of impact will be weighed with considerations such as the significance of resource values within the contextual environment, and high-quality occurrences of resource values or important populations.

Land managers can expect above-average concern for the environment from participants in climbing activity. Findings from a sample of climbers in Montana’s Bitterroot Valley found that the way people are

introduced to climbing has an important influence on their attitudes towards low-impact practices. Results found significant differences between those climbers who learned to climb indoors and those who learned to climb outdoors. And those who were introduced to the sport using fixed anchors (sport climbing) and climbers introduced to the sport using removable protection (traditional climbers) (Borrie and Harding 2002). Research by Indiana University, Department of Recreation and Park Administration (Ewert, personal communication 2000) has shown that participants in “adventure recreation” (including climbing, paragliding, and spelunking) have above average awareness about environmental concerns and minimum-impact practices. These groups, which are relatively easily identified by their activity and equipment, respond well to targeted education, outreach and voluntary restrictions on use.

Opportunities for outreach include guidebooks, outdoor retail stores, climbing gyms, guide services, magazines, and local climbing groups. Climbers have been visiting parks and natural areas for a long time, and may be in the habit of assuming a protective attitude of stewardship toward areas that have had little direct administrative oversight. This notion is supported by research conducted in the Grandfather Mountain Corridor (GMC) of North Carolina’s Blue Ridge Parkway and home to a number of world-class bouldering destinations where over three-fourths (77%) of the climbers interviewed reported being active in one or more climbing or conservation organizations, read one or more popular climbing publications, exhibited strong stewardship practices, and placed an importance on maintaining the area’s climbing and natural resource base (Attarian 2005).



Education brochures such as this one for New River Gorge National Recreation Area, West Virginia are produced jointly with the National Park Service and the local climbing group.

They focus on special practices to minimize climbing impacts and raise awareness on special access or resource issues in the area. Funding for education brochures can be provided by climbing organizations on a cost-share basis.

Climbers' compliance with new management approaches is generally good in areas where management priorities are well publicized and there have been opportunities for public involvement in development of management policy. Poor compliance often arises in situations where there has been limited communication between climbers and resource managers, where management policies show poor understanding of climbing activity and use patterns, or where new restrictions have arisen without the identification of problems through field observation. As with other types of outdoor recreation, there are climbers with extreme philosophical positions or uncooperative attitudes. Often, it is the behavior or statements of such individuals that first come to the attention of resource managers. It should not be assumed that this behavior or attitude is characteristic of the user group in general. Better information on local climber attitudes and preferences will be obtained by consulting with local climbing representatives.

The Access Fund manages databases on climbing and resource-management contacts and may be able to assist with identifying helpful individuals. Information on climbing use patterns can be gathered through visitor registration. Typically this takes place at the trailhead. Climbers have responded well to both voluntary and mandatory registration. See the climbing management plan for Devils Tower National Monument, WY (National Park Service 1995) for an example of how climber registers can assist in an area's comprehensive management strategy.

Comprehensive information about climbing and the equipment required can be found in many publications available from outdoor retail stores. Local information such as specific climbing locations, approach trails, or campsites will be found in local climbing guidebooks, also available from outdoor retail stores.

More current information and news stories can be gleaned from the nationally distributed climbing magazines and by reviewing back issues on their websites: *Alpinist* (www.alpinist.com), *Climbing* (www.climbing.com), *Rock & Ice* (www.rockandice.com), and *Urban Climber* (www.urbanclimbermag.com). Other valuable climbing websites that receive considerable online traffic include www.mountainproject.com, www.rockclimbing.com, and www.supertopo.com. Perhaps the best source of information on climbing, however, will be local climbers. The level of resources available for management oversight will vary. Managers will want to evaluate whether resources are available for direct management intervention, or whether resource protection objectives can be met through indirect measures such as education. With either approach, resources must be committed to support the proposed action and costs determined for this.

A checklist of considerations to assess effects from climbing activity may include:

- What is the agency mandate?
- Is climbing activity affecting resource values?
- Given the contextual environment, what is the threshold of impairment?
- Do other non-climbing users contribute to the effects in question?
- What are the patterns of use and types of climbing activity present? Where, during the climbing visit, is the resource value impacted?
- Can user groups help gather information?

Management intervention considerations may include:

- Is it possible to build stewardship through community involvement in the development of management response?
- What mechanisms are available for involving the user group in development of the management decision, and subsequently for involvement in monitoring, evaluation and review?
- Can education and outreach strategies be developed as part of any implemented management action?
- What budgetary or staffing constraints will affect management response?

VISITOR CAPACITY

The visitor or carrying capacity of an area can be defined as the maximum number and type of visitors that an area can accommodate, given desired future natural and cultural resource conditions, visitor experience opportunities, and the management program. In a climbing context, visitor-capacity issues may arise when visitor levels increase to the extent that visitor use adversely affects the climbing experience, the experience of other visitors, or natural and cultural resource values (Figure 6). Managers may be concerned about a specific climbing location, or they may be concerned about climber visitor numbers within the area as a whole. This concern is evident at Hueco Tanks State Historical Park, TX. The park contains thousands of painted rock images from several cultural groups, archeological sites, and significant natural resources. The park is also an internationally known bouldering destination. Because of a variety of impacts and other problems, Texas State Parks initiated a Public Use plan in 2000 to help preserve the park's natural resources and accommodate recreation use. The park allows 70 persons in the park per day—60 through reservation and 10 walk-in. Currently climbers can climb almost everywhere on North Mountain, without a guide (Hueco Tanks State Historical Park 2000). For more information on climbing in Hueco Tanks go to: <http://www.huecotanks.com/>.

For a discussion on visitor capacity with respect to recreation management in general, see the National Park Service manual, Management Policies, NPS-77, Natural Resources Management Guidelines (U.S. Department of the Interior 2006). This document describes and employs the Limits of Acceptable Change (LAC) method of assessing and mitigating user impacts, providing for both resource protection, and recreation-management goals. The LAC method provides for opportunities to interface with the climbing public about management goals and priorities, proposed changes in policy and/or regulation, and cooperative solutions to visitor-impact problems. This document describes and employs the Limits of Acceptable Change (LAC) method of assessing and mitigating user impacts, providing for both resource protection and recreation-management goals.

The LAC process consists of 9 steps (1. Identify area issues and concerns, 2. Define and describe opportunity zones, 3. Select indicators of resource and social conditions, 4. Inventory resource and social conditions, 5. Specify standards for both, 6. Identify alternative opportunity zone allocations, 7. Identify management actions for each alternative, 8. Evaluate and select a preferred alternative, 9. Implement actions and monitor conditions and provides for opportunities to interface with the climbing public and other recreationists about management goals and priorities, proposed changes in policy and/or regulation, and cooperative solutions to visitor-impact problems. This approach is currently being undertaken by the USFS at the Red River Gorge in Kentucky where land managers initiated the process during summer 2004 and are currently (2007) working on Steps 5 and 6. The climbing community has played a significant role throughout the process (United States Department of Agriculture 2006).

Climbing organizations generally welcome this and other planning strategies such as the Visitor Experience and Resource Protection (VERP) for the development of climbing management concepts. Recent work by the Federal Interagency Task Force on visitor capacity on public lands has also developed guidelines to assist decision-makers on visitor-capacity issues (U.S. Department of the Interior 2001). Additional planning strategies such as the Visitor Experience and Resource Protection (VERP) may be used for the development of climbing management concepts. Another management “tool” Visitor Impact Management (VIM) was developed by researchers to address three basic issues relating to impact: problem conditions; potential causal factors; and potential management strategies. VIM provides for a balanced use of both scientific and judgmental considerations, and places emphasis on understanding causal factors to identify management strategies. The process also provides a classification of management strategies and a matrix for evaluating them (Kuss,

Graefe and Vaske 1990). Recent work by the Federal Interagency Task Force on visitor capacity on public lands has also developed guidelines to assist decision-makers on visitor-capacity issues (U.S. Department of the Interior 2001).

INCREASE IN CLIMBER VISITATION AND CHANGES IN USE

More people than ever are participating in climbing activities. (Outdoor Industry Foundation 2006). Increase in climber visitor numbers is often the driving factor leading to the production of a climbing management plan. Climbing’s new popularity can be attributed to a variety of factors. These include newer, safer, and more available equipment; more college and university outdoor programs that offer climbing; new instructional texts and videos; the growth of commercial guide and instructional programs; coverage of climbing by television, newspapers, and advertising; and greater availability of information on climbing areas through new publications and the internet; and the widespread appearance of indoor climbing walls (Attarian 2001).

An indication of the numbers of U.S. climbers is available from the Outdoor Industry Foundation (OIA)—8th Annual Outdoor Recreation Participation Survey (2006). The 2006 study shows that during the year 2005, 5 million Americans 16 years of age and older participated in some form of climbing on natural rock. Males outnumber females 5 to 1 and over half (54%) are between 16 to 24 years of age. More than one third (36%) live in the Western United States. Income averages \$40-\$79,000.00 for almost half of participants (48%). In addition, it’s estimated that 6.7 million Americans climbed on an artificial wall and 1.0 million climbed ice.

Conflicts between climbing and resource protection often arise from surges in use. Factors such as the publication of information about a relatively unknown climbing site may lead to a sharp rise in climber numbers. If a general increase in climber visitor levels is an issue, it may be helpful to gather more specific information. An apparent change in overall visitor levels may in fact reflect a change in use patterns within the climbing area. Impacts may be unevenly distributed, and it may be possible to identify trends and better predict effects on specific resource values and other user interests. Volunteers from local climbing groups may be able to assist agencies in gathering information. The choice and popularity of a climbing site can be affected by a variety of factors **Table 6.**

Table 6. Some Factors to Consider when Choosing a Climbing Site

- Length of climb
 - Type of climbing available
 - Approach time
 - Crowding
 - Overall quality of the climb
 - Difficulty of the climb
 - Scenic Quality
 - Distance from home
 - Presence of other visitors
 - Availability of parking
 - Area ethics
 - Regulations governing use
- (Attarian 2002; Cavlovic 2000; Hanley et. al. 2002)



Exploration of new climbing routes is one of the core values of climbing. These sandstone towers above Castle Valley, Utah were first climbed in the 1960's. Additional climbs at higher technical difficulties have been added since that time. Photo: © K. Pyke

Management tools that have been effective in controlling climber numbers include providing information on alternative climbing locations; imposing restrictions on parking such as time or space limits; increasing the distance or difficulty of walk-in access. For areas where climber visitor levels is not an issue but is anticipated in the future, management efforts can be directed towards gathering baseline information using trailhead registration, trail counters, number counts, or surveys. For an example of how increasing climber visits to popular climbing routes was assessed, see the Mount Hood National Forest Wilderness Protection Plan (U.S. Department of Agriculture 2000). For a discussion of setting up a climbing working group or advisory group of interested parties to work on increased visitor-use issues, see Climbing working groups, [page 56](#).

NEW CLIMBING ROUTES

Exploration of new climbing routes is central to the core values of climbing, and is generally associated with a high degree of adventure and exploration. Climbing previously unknown routes may explore frontiers of climbing skill—on smooth or steep sections of well-known rock faces—or more tangible frontiers such as unclimbed peaks or ranges. In remote areas, solitude and intimacy with nature are highly valued as part of the experience of climbing new routes. In general, new routes are a small but normal part of climbing activity. Oversight need not be rigorous if there is no identified threat to natural resources or other values. Many areas, including Zion and Black Canyon of the Gunnison National Parks, have traditionally kept new route logs at visitor centers to document climbing activity and assist climbers.

The establishment of new climbs occasionally raises management concerns because climbers may be exploring territory that has seen no prior visitation, and such areas may represent pristine environments and habitats.

The unexplored or remote nature of these locations may mean there is little or no record of the resource values of these areas. Hence, the potential of these areas to be impacted from recreation activities is uncertain. Management efforts need to determine: 1) the degree of impact to resource values from new-route activity, and 2) the contextual environment of the impact. In determining impact, distinction should also be made between effects of the one-time activity of establishing a new route, and effects from the potential increase in visitors to the area that may (but does not always) follow.

One-time effects may result from the “cleaning” of new routes (i.e., brushing of lichen or moss from hand- and footholds and the clearing of loose rock). Such activity can make climbs safer, and the need for it will vary with the type of rock, climate, and length and difficulty of the climb. If visual effects or resource values are a concern, climbers can be encouraged to keep brushing to the minimum necessary, or cleaning activity may be restricted. The potential for increase in visitor levels to a new climbing route will vary according to factors such as ease of access, type of climbing opportunity (e.g. sport or traditional), and technical difficulty of the climbing routes. The contextual environment of the impact will vary according to factors such as whether the area represents a significant portion of a resource or habitat, or if the impact occurs in areas of marginal or high-quality occurrence or important habitat. Consult with local climbing representatives about developing a system of self-registration for new routes to assist monitoring of this activity.

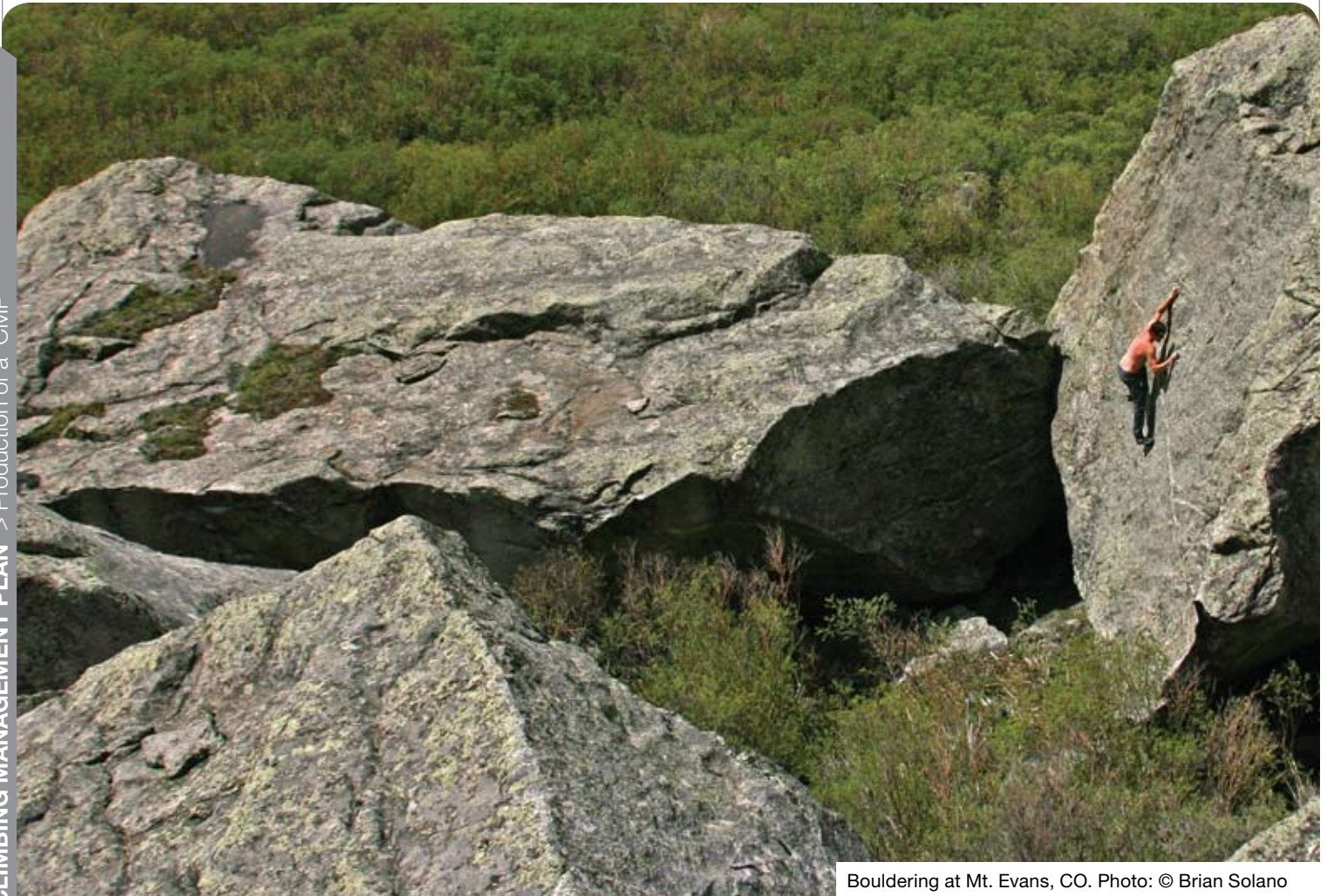
Where new-route activity conflicts with management priorities and mandates, management responses such as zoning of areas for low, medium, or high use may be appropriate, with certain areas closed to new-route activity. This approach has been used at Snow Canyon State Park, Utah (see **Table 5**). The Access Fund can assist with information on policies and management programs at other climbing areas.

Table 5.
Snow Canyon State Park, UT. Zones for Rock Climbing

ZONE TYPE	DEFINITION	CRITERIA
High Impact Zone	Climbing is the primary use of these areas and is anticipated to cause significant impact to biotic and abiotic resources. Impacts are considered to be acceptable since concentrating climbing activity reduces impacts to other areas.	<ul style="list-style-type: none"> •on a busy day several climbing parties in area; •adjacent routes may share the same start and top anchors, but not common holds; •trails to climbs are designated and impacts at the base of routes are contained; •fixed hardware is camouflaged and chains are used for anchor extensions, not webbing; •periodic clean-ups of chalk residue are organized as necessary; •climbers disperse at least 200' from area to urinate or use a portable urine container, human feces are packed out in an appropriate container; •new routes are established without removal of significant vegetation and minimal pruning; •vegetation shall not be used as belay anchors; •the area is kept clean and trash free; and •applications for new routes, which cannot demonstrate compliance with these criteria, will be denied.
Medium Impact Zone	Climbing is one of the uses in these areas and though the impact of climbing on biotic and abiotic resources may be noticeable, it is minor and does not interfere with other park uses.	<ul style="list-style-type: none"> •on a busy day, a couple of climbing parties may be in the area; •and those criteria listed above.
Low Impact Zone	Climbing use of these areas produces minimal impact visually or physically to biotic and abiotic resources as well as scenic and historic resources.	<ul style="list-style-type: none"> •climbers are in the area infrequently—usually no more than one party in the area at a time; •routes are typically not near one another; •trails to climbs may be designated and the impacts at the base of routes are contained; •fixed hardware is camouflaged and webbing is strongly discouraged; •climbers disperse to urinate and human feces are packed out to an appropriate receptacle; •new routes are established without removal of significant vegetation and minimal pruning; •wildlife is not noticeably displaced by climbing activities; •vegetation shall not be used as belay anchors; •the area is kept clean and trash free; and •applications for new routes, which cannot demonstrate compliance with these criteria, will be denied.
Specially Managed Areas	Area identified as a special management area because of the pristine nature of its biotic and abiotic resources.	<ul style="list-style-type: none"> •Climbing resources in this area are considered to be very high with great variety of climbing available; •Unique and undisturbed vegetation, aesthetic beauty and opportunity for solitude are important resources. Desirable for park management and the climbing community to cooperatively manage climbing activity, with the goal to minimize resource impacts while allowing for a high level of use. •Climbers and park management see this area as an opportunity to develop creative and highly effective partnership using the Climbing Advisory Team model.

CHAPTER 7: PRODUCTION OF A CLIMBING MANAGEMENT PLAN (CMP)

This chapter provides guiding information on how to develop a climbing management plan. The material is designed to reach a wide range of audiences with different experience levels in planning, resource-protection mandates, and budgetary resources. See **Chapter 1** of this document, A Guide to Climbing Management, page 6, for information on management concerns and examples of responses. Refer to the bibliography in Appendix G, page 70, for information on the publications cited in this document. See also the Access Fund's website at www.accessfund.org for a detailed list of federal and state agency climbing-management documents, and Memoranda of Understanding (MOUs) between agencies and climbing groups. Also, Climbing Management Methods, page 49, provides a general overview of considerations concerning management responses.



Bouldering at Mt. Evans, CO. Photo: © Brian Solano

THE CLIMBING MANAGEMENT PLAN

A SUGGESTED OUTLINE OF CMP CONTENT

A climbing management document may incorporate the following contents depending on scope and extent of the project:

1. Introduction
2. Purpose and need
3. Goal and objectives
4. Authorities, policies, guidelines for resource and recreation management
5. Description of present condition of natural, historic and cultural resources
 - A. General description
 - B. Vegetation communities
 - C. Wildlife communities
 - D. Specific resources (special-status species/cultural/historic)
 - E. Existing condition of identified resources
6. Description of relevant management infrastructure (trails, camping facilities, waste disposal, parking)
7. Description of climbing activity
 - A. History
 - B. National/regional importance
 - C. Who are the climbers? (user profile)
 - D. Description of existing and potential climbing opportunities
 - E. Description of use patterns
 - F. Potential for new climbing areas
 - G. Maps/location of climbing resources
8. Description/summary of climbing management issues/concerns
9. Desired future resource conditions
10. Description of climbing management, past and present
11. Management recommendations for policy, guidelines, and action
12. Summary of internal/public review process (including any changes made to the draft)
13. Future review/liaison procedures
14. Glossary of terms
15. Bibliography
16. Contacts (interested parties/organizations)
17. Appendices

HALLMARKS OF A SUCCESSFUL CLIMBING MANAGEMENT PLAN

Analysis of successful climbing management plans reveals certain key elements. Successful CMPs:

- Satisfy statutory requirements and internal agency guidance where applicable.
- Provide information about status and contextual importance of resource values, climbing activity and use patterns, and effects of climbing activity on identified resource values.
- Build cooperative relationships between climbers and resource managers.
- Provide management direction that is the minimum necessary to protect resources and is implemented on a graduated scale from indirect measures (e.g. education) to direct measures (restrictions).
- Articulate climbing as a recreational experience, and describe the variety of climbing opportunities as values (see **Appendix A- Types of climbing** - defined, page 61).
- Identify management alternatives that address climbing impacts in a manner that is consistent with management approach to other recreation groups.

GUIDELINES FOR PREPARING A CMP

This section outlines a procedure for developing a climbing management document. Federal agencies will first need to determine if the National Environmental Policy Act of 1969 (NEPA) is applicable to their action. If so, the NEPA will direct agencies to develop procedures to ensure that the natural, physical, and cultural aspects of the environment are given due consideration. Key elements of the NEPA process are documentation of existing resources and the potential effects to these resources as a result of a proposed project or action, and public involvement in planning. The following procedure can either be used if NEPA is not applicable, or incorporated into NEPA analysis. Here, the procedure for developing a CMP is broken down into steps: 1) Initial considerations, 2) The planning process, 3) Preparation of the Draft CMP, 4) Review and revision of the draft plan, and 5) Implementation of the CMP.

STEP 1. INITIAL CONSIDERATIONS

The following questions and considerations will provide guidance for the planning process:

Define the Purpose and the Need for the CMP.

Purpose is a statement of goals and objectives that the land manager intends to fulfill by taking action. These goals can come from management objectives or mission goals, from implementing regulations or other legislation, or a general management plan or other plan. Because some of these objectives should also resolve needs, there may be overlap between purpose and need. Need is a discussion of existing conditions that need to be changed, problems that need to be remedied, decisions that need to be made, and policies or mandates that need to be implemented. In other words, it explains why the land manager is proposing this action at this time. There may be one or several needs that an action will resolve. Need is not a discussion of the need for NEPA or other regulatory compliance, but rather reasons why the land manager must take action at this time and in this place.

Who will help prepare the plan, and who will use it?

Who are the interested parties? How will the climbing public help prepare and implement the plan? Who are the agencies, field units, or special-interest groups that should be involved?

Define the scope and scale of the CMP. The plan should reflect current use conditions as well as probable future conditions. If climbing use of the area is heavy, or is predicted to be heavy, more management issues must be addressed. Other scope and scale considerations include: the size of the management unit, its resource protection mandate, the budgetary resources available, and the commitment of local climbing groups to the management process.

What is the time frame for consultation and production of the CMP? Allow sufficient time for consultation with resource managers and the interested public. Consultation often takes longer than initially planned, and may need special budgetary provision.

Consider the presentation and format of the CMP.

Technical resource management language can be confusing to the public. Consider summarizing into a brochure or pamphlet.



The popularity of the Indian Creek river corridor near Monticello, Utah, led to the development of a recreation plan in 2005 to better protect riparian corridor, desert habitat, and cultural resources. Camping will be restricted to designated sites in order to address human waste issues and minimize impacts on the local environment. Photo: A. Kvale

STEP 2. THE PLANNING PROCESS

The planning process involves gathering information, identifying interested parties, and establishing important relationships that will help with the production of the CMP. The process involves several phases and elements.

Scoping. Scoping is the planning phase that identifies which issues need to be addressed in a plan, and should be completed before Goals and Objectives are determined and described in the draft CMP. Scoping encourages public investment in response to issues, and helps define values, goals, and strategies. A primary benefit of scoping is the opportunity to compile mailing lists and identify interested parties. The scoping process may include consultation with national user groups for assistance in identification of issues and local contacts.

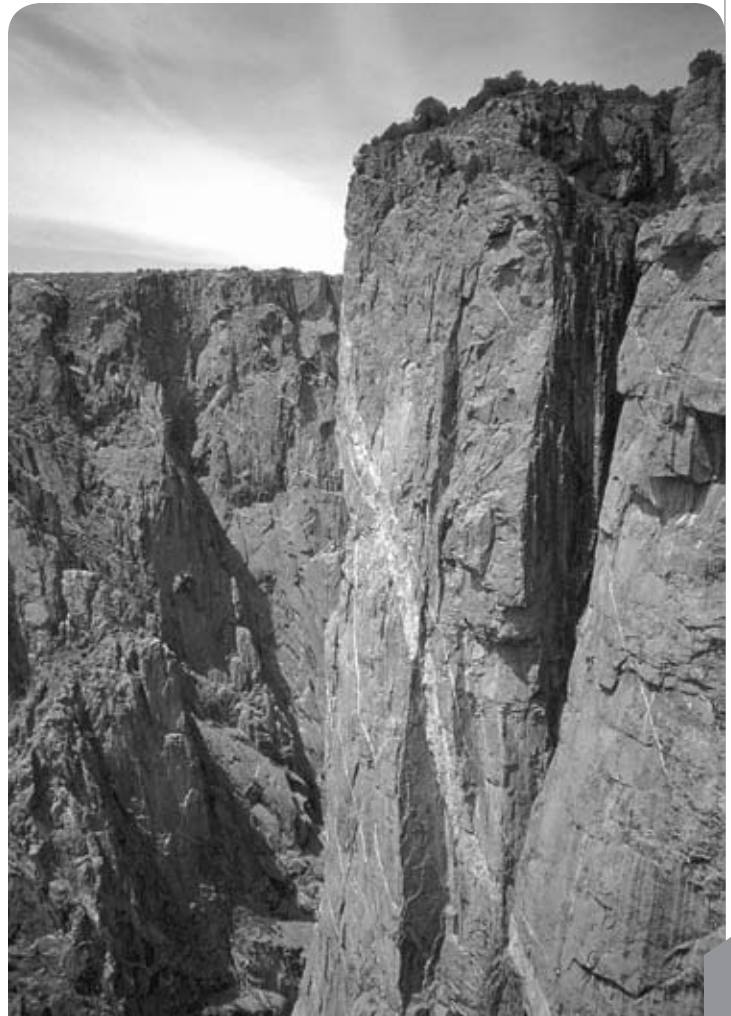
Climbing working groups. The interested public is a management resource, and this resource may be utilized in various forms. Some of the first climbing management plans, produced for locations such as City of Rocks, Idaho (U.S. Department of the Interior, 1988), involved the public through a series of planning meetings, and then subsequently established a climbing committee. A more recent approach has been to form a climbing working group at the start of the planning process to focus on issues identified through scoping. Climbing working groups can be formal or informal. Their role is advisory, and their aim is to consider issues through a cooperative and consensus building approach. Climbing working groups are often established when a CMP is being produced, but they can also assist with the development

of climbing management policy on an ongoing basis. Such groups can help management respond to specific climbing issues such as fixed anchors, developing outreach strategies, and focusing volunteer assistance. A long-term working group should periodically review its membership and provide opportunities for new individuals to serve on the team. Opportunities should also be provided for specialists on subjects related to climbing and resource management to make presentations to the group. Working groups typically range in size from six to fourteen members and may include resource managers, members of environmental organizations, climbing guides, climber advocacy groups, Native American tribes, and historical and cultural experts. The Access Fund can help identify local climbing contacts who may serve as climbing representatives in working groups. Groups will require a management representative to facilitate and serve as liaison. The working group should develop a mission statement, and members should be assigned specific tasks. Decisions should be made by consensus, consistent with statutory requirements. It is possible to establish an informal working group without conflicting with the Federal Advisory Committee Act of 1972.

For a helpful explanatory publication, see: http://www.blm.gov/publications/adr/ADR-FACA_Brochure.pdf.

The climbing working group should:

- Bring together all interested parties and representatives of uses occurring on the designated management area.
- Hold sufficient meetings and exchange background information so that suggestions come forth that reflect the wider management picture.
- Prepare and publish a concise mission statement.
- Define the goal of the project and the objectives of the working group in reaching possible solutions, and alternatives. As this process takes place, ensure that representatives represent their specific user groups.
- Produce recommendations based on consensus decision making.



Access Fund representatives provided input to the National Park Service about climbing in the inner canyon during the information-gathering stage for a Backcountry and Wilderness Management Plan for Black Canyon of the Gunnison National Monument, Colorado. Photo: © K. Pyke

Outreach. An outreach plan is needed to encourage maximum public involvement. Early involvement will help lay the groundwork for good reception of possible changes in access and/or types or patterns of use. Distribute information via local climbing outlets (outdoor retail stores, climbing gyms), climbing media (national climbing magazines), as well as postings on trailhead kiosks, bulletin boards, and direct mailing to “friends and advocates” lists. Use e-mail and websites as an additional mechanism to facilitate public involvement. For further discussion, **see Appendix C - Outreach and the development of education materials, page 65. Summary of scoping results and working group recommendations.**

The initial planning phase of CMP preparation will end with 1) a summary of scoping results, and 2) the incorporation of scoping results and working-group recommendations into an internal preliminary document identifying issues and need for response. Publicize scoping results to demonstrate that the identified issues and planning objectives are in alignment with public sentiment to the extent that this is consistent with management mandates. Use the preliminary summarizing document to set the stage for draft CMP production. This document will provide objective rationale for decision-making, and should include reference to available data regarding resource conditions, visitor preferences, climbing activities, and history.

STEP 3. PREPARATION OF THE DRAFT CMP

Preparation of the draft CMP will involve the development of management strategy, and describe management alternatives to address the issues identified through scoping. Climbing representatives or a climbing working group may be able to provide assistance at this stage by helping with issues of terminology, and by serving as a sounding board for clarification of the intent of various management alternatives. The draft CMP document is prepared by a designated agency staff member and will be subject to internal agency review.

COMMENTS ON WRITING THE CMP

Not only the content but also the written form of the CMP will influence its success. If the draft document contains a high level of technical language, it may be useful to consider a summary document that allows the public to better understand the plan’s intent. The first three sections of the CMP will introduce the document to the affected user groups and can help set the tone for the reception of the plan. The following suggestions and comments are based on management plans that have been well received by user groups and have proven

successful in their implementation.

1. Introduction

The introduction sets a positive, proactive tone for the plan. It refers to climbing as a value, and defines the need to preserve a high-quality climbing experience consistent with the protection of other values. The unique character and history of climbing in the area is described, and general issues and concerns are raised. The introduction will refer to a timeframe for planning, the importance of public input, and flexibility of the final document to respond to changing conditions, use patterns, and statutes or regulations.

2. Purpose and Need

This section is important not only as a compass for the planning process, but also as a “sales pitch” to the public. It highlights management concerns; legislative and regulatory mandates; and changes in resource conditions, visitation, administrative resources, facilities, and public opinion that compel a management response. It will make a case for present action rather than postponing management response. The “Purpose and Need” of the CMP document is to respond to changing conditions, which may threaten values; these should not be confused with the “Goals and Objectives,” which will be to protect natural and cultural resources and provide climbing opportunities.

3. Goals and Objectives

Goals may be introduced in a hierarchy. The primary goals of the CMP will be to preserve and protect natural resources and other values and provide for a diversity of enjoyable recreational experiences. Secondary goals may be to engage the climbing community in cooperative stewardship; to build a foundation of data (status of natural resources, climbing use patterns, visitor effects on resource values) as a basis for decision-making; and to articulate and preserve area climbing traditions and historical values. Other goals and objectives may include: clarifying management concerns, needs, and priorities; analyzing and describing administrative requirements for climbing activity; providing a clear decision-making framework and action timetable; initiating or continuing a planning process to address recreation issues (e.g., The National Park Service Limits of Acceptable Change procedure); assuring regular monitoring of use and resources; and providing for timely plan review.

STEP 4.
REVIEW AND REVISION OF THE DRAFT PLAN

PUBLIC REVIEW AND COMMENT PERIOD

NEPA will require a public review period if the CMP falls under its jurisdiction. Such a review period is recommended even if the CMP is not subject to NEPA requirements. Post the draft plan on the agency website and distribute it to interested parties. Set a 60-days minimum period for submission of comments. National and local climbing organizations may be able to assist agencies by promoting notice of the plan. Indicate how public comments can be accepted (e.g., by letter and/or e-mail). Revisions to the draft CMP will incorporate feedback from the public and other resource-management agencies received during the review period. The resulting document will be the completed climbing management plan.

such as land acquisition. The Access Fund has nationwide MOUs with both the BLM and USFS which solidify relationships to expand a framework of cooperation upon which mutually beneficial programs, projects, training, and other recreation activities may be planned and accomplished at climbing areas nationwide. These documents can be found at <http://accessfund.org/advoc/mous.php>. Similarly, an MOU between Red River Gorge Climbers Coalition and the USDA Forest Service, Daniel Boone National Forest, for example, outlines a framework for planning and accomplishing projects specifically in the Red River Gorge Geological Area, Kentucky. This document is available at the website: http://www.seclimbers.org/uploads/mou_sample_rrgcc.doc.

STEP 5. IMPLEMENTATION OF THE CMP

Ensure that sufficient administrative resources have been allocated for implementation and periodic review of the CMP. Designate an agency staff member as a climbing liaison contact, and if resources permit, consider establishing a seasonal or full-time climbing ranger position. Monitor progress of planning actions and of changes in use and condition of the climbing area(s). Use volunteer resources where available, and consider maintaining and using the working group for help with education outreach and coordinating volunteer assistance.

REVIEW AND ADAPTIVE MANAGEMENT

Review the CMP for successes and shortcomings. Incorporate adjustments or possible amendments according to an established timetable. Plan to review the CMP regularly, typically every five years, but more frequently if use patterns or other key factors change dramatically.

MEMORANDA OF UNDERSTANDING (MOUs)

Consider formalizing the relationship with a local climbing group with the development of a Memorandum of Understanding (MOU). A Memorandum of Understanding (or Memorandum of Agreement - MOA) is a written understanding that frames a cooperative relationship between two or more parties. The MOU defines the common interests that parties share, and defines the way they will work together to reach common goals. These brief documents (typically less than five pages) can cover a range of objectives, from very broad partnership and stewardship responsibilities to very specific applications

APPENDICES

- A** – Types of Climbing - Defined
- B** – Glossary of Climbing Terms
- C** – Outreach and Educational Materials
- D** – Funding and Volunteer Assistance
- E** – Contacts on Climbing Issues
- F** – Utilizing the Resources of the Access Fund
- G** – Bibliography and References



Climbing in Kolob Canyon Zion, UT.
Photo: © Jim Thornburg

APPENDIX A

TYPES OF CLIMBING - DEFINED

This section defines the different types of climbing activity (sometimes referred to in strategic planning documents as “climbing experience opportunities”). Definitions are included here not just for general reference, but because different types of climbing opportunity may warrant different management concerns and responses. The sport of climbing hosts a spectrum of experiences. These can range from the adventure into the unknown of wilderness mountaineering, to the relatively controlled environment of the indoor rock gym. While climbers may align themselves more closely with one type of climbing than another, many climbers will practice a range of different disciplines depending on time, season, and access to climbing locations.

Aid Climbing: Aid climbing is the direct use of climbing equipment (pitons, wired nuts, “camming” devices) for upward progress. The challenge of aid climbing is to ascend very smooth faces with minimal tools. This type of climbing is particularly associated with “big-wall” areas such as Yosemite and Zion national parks, where traditional climbing techniques (both aid and free) are utilized to ascend long routes on sheer rock walls. These ascents may take many days, entail hauling personal and climbing equipment, and can require overnight bivouacs on the climb. “**Clean**” aid climbing entails the use of hand-placed protection only, instead of using pitons or other types of protection that require being drilled or hammered into the rock.



Aid climbing directly uses climbing equipment for upward progress
Photo: K. Pyke

Alpine Climbing: see Mountaineering

Bouldering: Bouldering is the term given to ropeless climbing that concentrates on short, sequential moves on rock usually no more than 15 feet off the ground. Typically, falls are very short (a few feet) and inconsequential. Each climb-able sequence of moves is called a “boulder problem.” Boulder problems vary in difficulty, and are usually given difficulty grades from V1, V2 . . . and on up to V15 and above. Boulders typically will try difficult moves many times before succeeding on a given boulder problem. Since it takes place near the ground, bouldering can be a very social form of climbing, and requires relatively little equipment other than rock shoes. Use of a bouldering “crash pad” is common. These are placed below climbs to soften falls.

Free Climbing: see Traditional climbing

Guided Climbing: This term is given when an experienced climber (the guide, who sometimes has special training qualifications) takes on a supervisory role and the responsibility for the safety of less-experienced individuals, to guide them up a rock-climbing or mountaineering route. Guided climbing may occur in a one-to-one ratio, or a guide may instruct a group, usually of no more than six individuals. Guide services are usually provided on a commercial basis with a client exchanging a fee to be guided up a route or instructed in a technique of his or her choice.

Ice Climbing: Ice climbing takes place on frozen water ice or very hard snow, using ice axes and crampons. For protection, climbers screw metal tubes into the ice. This activity can occur in a variety of environments, from relatively small frozen waterfalls with easy access, to mountaineering situations with long approaches and involving multiple pitches of climbing. More recently, the development of ice parks has presented a different type of climbing opportunity. In this situation ice formations are artificially constructed from dripping water hoses positioned on cliff edges at sites with winter temperatures below freezing. An internationally known site is Ouray Ice Park, CO, developed in 1995 by the County of Ouray and the local climbing group, Ouray Ice Climbers Coalition.

Indoor climbing: Indoor climbing takes place on walls covered in artificially molded hand- and footholds, typically in venues known as climbing gyms. Commercial climbing gyms were first developed in the 1980s, and have become so popular that they can now be found in most major towns and cities in the United States.

Climbers are attracted to indoor gyms because they offer a convenient place to practice and train, and they can be used at night and in bad weather. Gyms have contributed to an enormous increase in the average standard of climbing ability in recent years, and often serve as the entry point for individuals wanting to take up rock climbing. Climbs in gyms are bolt protected, so the knowledge developed in gyms allows a relatively easy transition outdoors to sport-climbing venues. Gym climbing has become a legitimate activity in itself, and some gym climbers rarely climb outdoors.



Typically mountaineering routes take place in an alpine setting, entail long approaches and take a day or more to complete such as Warbonnet in the Cirque of the Towers, Wind River Range, Wyoming. Photo: K. Pyke

Mountaineering: Mountaineering can be defined as traditional climbing skills (see **Traditional climbing**) applied in an alpine or mountain setting. Typically, such climbs entail long approaches, take a day or more to complete, and can include an overnight bivouac. The term “**Alpine**” usually implies that the climber is equipped and experienced to deal with snow and ice conditions and objective hazards such as rock falls and shifts in weather conditions in a remote setting.

Soloing: Some climbers occasionally tackle a route alone—either without a rope or self-belayed with a rope and protection. Neither type of solo climbing is common. Roped soloing is much like ordinary roped climbing with a partner in terms of protection, though the system of rope management is more cumbersome. In unroped soloing (often called “free soloing”), however a fall will almost certainly result in death. Nevertheless, such climbing is simple and unencumbered, and many climbers regard it as a reasonable way to climb on routes that are well within a climber’s ability. Free soloing is not the same as “free climbing” (see **Traditional climbing**), although the two are frequently confused.

Sport Climbing: Climbs that are protected exclusively with fixed protection, usually bolts, are called sport climbs. Sport climbs are typically short—generally a single rope-length (50 to 60 meters) or less. They rarely continue to summits, but end at fixed anchors where the sustained difficulty of the climb diminishes, the character of the rock changes, or simply at the half-rope point to allow the climber to descend by being lowered. Sport climbing is relatively easy to learn, and requires less equipment than traditional climbing. Due to the fixed bolted protection and limited height, it provides a safer climbing environment than that found in a traditional climbing venue. These qualities have made sport climbing very popular. Another important and attractive factor is that sport climbing has also allowed climbers to push their ability to very high standards of difficulty with little fear from repeated falls. It is common for boulderers to preview and practice boulder problems repeatedly, with an emphasis on technical difficulty.

Traditional Climbing: Traditional climbing (sometimes also referred to as “free climbing”), is how the sport of rock climbing has been practiced since its inception, and has strong historic associations. It is the foundation for the development of the different types of climbing activity that we see today. The term applies to a style of climbing where protection is placed by the ascending climber and removed by the seconding partner. Value is placed on unpracticed ascents. Traditional climbers progress up the rock face using natural hand- and footholds, with the rope and technical climbing equipment used only for safety in case of a fall. Typically, traditional climbs are protected by climbing equipment that is removable and does not impact the rock surface. Traditional climbing can be practiced on small cliffs or in remote mountaineering or alpine locations. It generally involves multi-pitch climbs with the summits as common objectives, and is still what most climbers do most of the time. Many traditional climbs may have an occasional fixed piton or bolt, and they often have fixed anchors for rappels or belays. On a traditional route, however, climbers are always prepared to arrange most of their own protection, which distinguishes this type of climbing from sport climbing.

Bivouac or Bivy: A night spent at the base of a climb or on the route itself. Big-wall climbers sometimes carry a collapsible hanging cot, called a “portaledge,” which can be suspended from the cliff. Portaledges are designed to withstand minor storms and are hauled up routes that can take many days to complete.

Bolt: Bolts are small anchoring devices (usually 3/8” diameter by about 3” length) used to protect climbers where there are no cracks for other types of protection. They are placed by drilling a hole, using either a hand-turned or battery-powered drill, and then driving in the device, which is designed to hold through mechanical expansion, forced compression, or (rarely) an epoxy adhesive. The placement of bolts allows climbers to attempt extremely difficult and previously unprotected rock faces, and to place fixed anchors for descent via rappel. The term “fixed” means they are permanently placed in the rock, although deterioration will occur over time, depending on the bolt specification and local weathering processes.

APPENDIX B

GLOSSARY OF CLIMBING TERMS

Aid route: A route where the method of ascent involves some piece of equipment—the rope, a piton, a nut, or sling—is hung on or pulled on to aid the climber’s ascent.

Anchor: Any piece of protection used to secure climbers to a cliff face for belaying or rappelling. Most are removable. “Fixed anchors” are left in place permanently for all climbers to use.

Belay or belaying: The method by which one climber secures the rope to safeguard another climber in the event of a fall. Typically one climber (the belayer) remains on the ground and belays the other climber (the leader) while he or she ascends the rock and places protection. Once the leader reaches the top, or an intermediate ledge, that person then belays the other climber up. The rope, which serves as a safety line while climbing, is usually fed through a device controlled by the belayer. These friction-creating “belay devices” attach to climbers’ harnesses and allow small climbers, even children, to stop the falls of much larger climbers so long as the lighter climber is adequately anchored to the ground or rock.



Examples of camming devices used by climbers for protection in large cracks. These spring-loaded devices are removed by manually retracting the spring and leave no trace on the rock. Photo: K. Pyke

Camming devices: Mechanical, spring-loaded devices used for protection from falling. They are designed to expand once placed in a crack and are removed by manually retracting the spring. They should leave no trace of use on the rock. “Friends” and “Camalots” are examples of brand-name camming devices.

Carabiners: These are snap-links, generally of aluminum alloy, used to connect a climber's rope to intermediate protection and anchors.

Chains: Short lengths of metal chain are sometimes used instead of slings at a rappel or belay station. Chains are attached permanently to anchor bolts and climbers thread their ropes through them while rappeling.

Chalk: This is the common name for magnesium carbonate powder, which climbers carry in a pouch (chalk bag) at the waist. It dries the hands and is used in rock climbing in the same way it is used in gymnastics to improve grip.

Climb (or "Route"): As a noun, this is any independent line of ascent on a rock face. A climb may follow a crack system or other natural features, or it may strike out across a "blank" face. A climb is considered to be created when it is first ascended, and is usually given a name by the first ascensionist. The climb is typically recorded and described in a guidebook so that other climbers can identify and climb the route.

Climbing shoes: Snug-fitting shoes with high-friction rubber soles and carefully designed edges that allow climbers to stand on tiny footholds.

Fixed anchors: see **Anchors** and **Bolt**

Gear: Equipment used for anchor protection (see **Anchors** and **Hardware**).

Harness: Nylon straps and sewn fittings, buckled around the waist and thighs, providing a safe, comfortable way to tie into the rope for climbing, rappelling, and belaying.

Hardware: Climbing equipment placed in cracks or on faces to protect climbers from falling, including wired nuts, camming devices, hexes (hexcentric-shaped metal wedges), pitons and bolts.

Multi-pitch: A climb of two or more roped pitches (see **Pitch**) in length.

Natural gear: Removable, non-hammered protection equipment. In addition to sharing the broad definition of "gear," natural gear placement can also include slings around trees, horns of rock, or rock chockstones in cracks.

Pitch: The distance a lead climber ascends before he or she stops to belay the second climber's ascent. The distance of a pitch is limited by the length of rope and the location of ledges and belay stations. Typically a

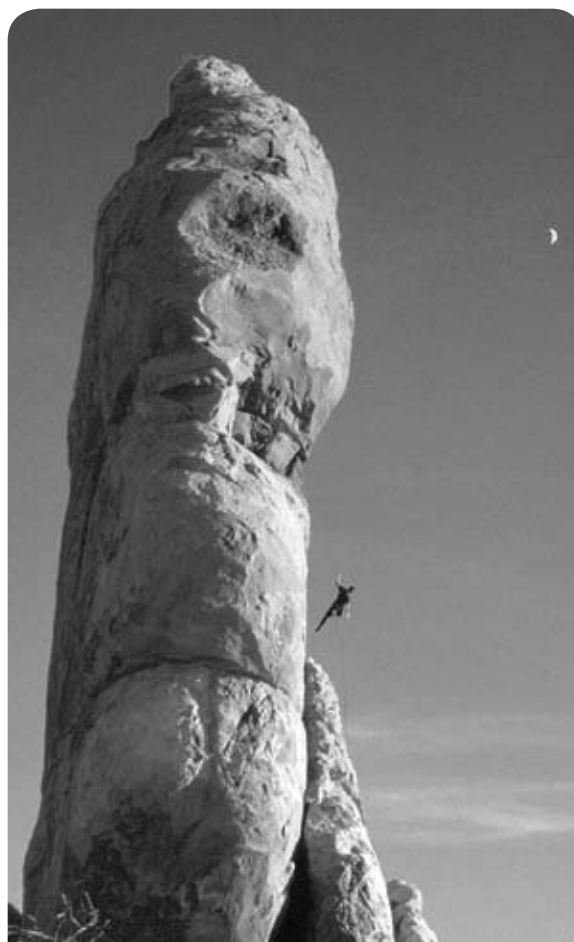
60-meter rope length constitutes one pitch. Some climbs are single-pitch, others have many pitches.

Piton: These anchors are small metal spikes, generally two to four inches long, that are placed by hammering them into existing cracks in the rock. Once the only form of climbing safety protection, pitons have been supplanted by easily removable protection such as metal stoppers or cams. Today, pitons are used only when no other form of protection is available, and are typically left in place for other climbers to use.

Protection: Any form of anchor removable or fixed used between belays to protect a climber.

Rack: The assortment of protective hardware (see **Gear**) carried on a climb.

Rappel: The method by which a climber descends a rope, usually by using a mechanical friction device. The descent is made on either a doubled rope, or two ropes tied together, looped through a fixed anchor. After the rappel is finished, the rope is retrieved by pulling on one end.



Rappelling off Dark Angel tower in Arches National Park, UT. Photo: K. Pyke

Rating: A numerical value assigned to indicate the difficulty of the climbing on a particular route. The rating is typically estimated by the first ascensionists, then revised by subsequent parties if necessary. The most commonly used rating index for free climbing ranges from 5.0 to a current maximum of 5.15. (The “5” is a constant in most of the difficulty ratings used in rock climbing, and indicates that the type of climbing is technical free climbing rather than easier scrambling class 3 or class 4 climbing). Virtually any able-bodied person can climb 5.0 with little practice, but only extremely fit climbers can climb 5.12 or above. Aid climbs are typically rated A1 through A5, and bouldering problems rated from V0 to V15 and above.

Scrambler: a person who is not a trained climber, and is not using climbing equipment for protection on a cliff.

Slings: Knotted or sewn loops of nylon webbing that have many climbing uses. Slings are occasionally left behind when a climber descends from the top of a route by rappelling. At high-use sites, metal chains may be used instead of slings because they are easier to use once in place, last longer, and are less conspicuous.

Top rope: Technique of practice climbing where the rope is anchored above the climber.

APPENDIX C

OUTREACH AND EDUCATIONAL MATERIALS

Education outreach is referenced in all sections of this document. Any climbing management intervention should be backed up by outreach to the climbing community. Too frequently, climbing management problems are associated with lack of information, misinterpretation, or untargeted information. While all of the federal land management agencies have endorsed education as the primary tool for achieving their objectives, few programs dealing with recreation user groups use this tool to its full potential.

Climbing organizations also advocate education as the most important tool in climbing management. Carefully designed education programs that focus on minimizing impacts can reduce the need for regulation and strengthen community support. Any direct management intervention should be accompanied by outreach, and sufficient funding should be allocated for this purpose. Leave No Trace education principles and an ethic of personal responsibility should be incorporated into all education materials.

DEVELOPMENT OF MATERIALS

The challenge of outreach is to explore as many different means of communication as possible to reach target audiences. Innovative approaches should always be welcomed, as every situation is unique. No matter how straightforward the education effort, the following approach is encouraged:

1. Sharing information to develop understanding

Information gathering is key to the process of developing education materials, and enough time should be built into the process to ensure thorough consultation. Different interest groups should collaborate in sharing information, identifying the pattern of activity and land use, and determining the target audience. Different departments from the same land-management agency may be involved in education outreach, and each should be involved in the planning process. For example, in producing an education brochure for some of the larger resource management agencies, initial discussions may include personnel from interpretation and design divisions, recreation or ranger services, as well as natural-resource specialists. The Access Fund has produced outreach brochures for climbers at the City of Rocks, ID, and Indian Creek, UT. For copies, see <http://accessfund.org/pubs/index.php> and <http://friendsofindiancreek.org/ICbrochure.pdf>.

Different situations call for different levels of effort. Some situations may be dealt with by a local climbing representative working with a resource manager over the telephone or by meeting on site. Where the issues are more complex and affect a number of different interest groups, a useful approach may be to set up a small working group meeting (See **Chapter 7– Production of a Climbing Management Plan, Climbing working groups, page 56**). Although working groups can become unwieldy it is important to consult every user group that is likely to be targeted with the education message. E-mail can serve as a useful tool to assist with communication and consultation. The importance of local climbing stores, indoor gyms, and guide services should not be underestimated; climbing outlets have a high visitor throughput and serve as good focal points for information distribution and feedback.

2. Identification of the education message

Sharing information will clarify common aims for an education message, and identify the style of wording to be used and key components of the message. Defining the target audience will help suggest the appropriate visual aspects of the educational materials, such as symbols that are understandable to children, or foreign-language components.



Climber access trail sign at a bouldering area on City of Boulder Open Space, CO.
Photo: K. Pyke

3. Use of joint logos

Where possible, partner logos should be incorporated in education materials. The presence of a user-group logo alongside the managing agency logo indicates an endorsement to the message or access arrangement, as well as a easily identified contact point for the user.

4. Effective distribution of education materials

Education materials should be designed to suit the chosen method for dispersing the education message. For example, a newsletter, signs and website posting will require different approaches to the design and content of the education message. The 1999 Access Fund membership survey indicated that notice boards and on-site signs were the most effective way to inform the climbing community about changes in access or wildlife restrictions. Newsletters and websites were also regarded as important ways to gain information. The following is a list of different modes for education outreach. The most effective information and education program will be implemented by using as many different methods as appropriate.

MECHANISMS TO PROVIDE INFORMATION ON CLIMBING

1. LOCAL OUTREACH

- **Brochures**—on websites, in climbing stores and at trailheads.
- **Trailhead signs**—at the start of approach trails.
- **Trail-side signs and trail markers**—on approach trails.
- **Notice boards**—at parking lots, cliffs, campgrounds, restrooms.
- **Information kiosks**—at the parking lot, visitor facilities, or visitor center. dispensers on notice boards, information kiosks, visitor centers, and climbing outlets (e.g. retail stores, indoor gyms).
- **Posters and flyers**—displayed on notice boards at parking lots, visitor facilities, and climbing outlets.
- **Ranger presence**—staff personnel presence to assist with outreach (e.g., at Yosemite National Park, the seasonal ranger assists with outreach on bear-proof food storage, camping practices, and general climbing management policies).
- **Ranger interpretative program**—Programs coordinated by rangers can assist with outreach (e.g., at Joshua Tree National Park, CA, coffee sessions titled “Meet the Climbing Ranger” were held in climber campgrounds provided information on management issues).
- **Visitor center**—Notice boards that display weather forecast information are a good focal point to provide climbing information.
- **Talks and slide presentations in the local community**—Where there is a high climbing population, resource managers have presented slide shows and run open question sessions at venues such as a climbing gym or outdoor retail store. Presentations have focused on a specific climbing-management issue or have been part of a public-planning process.



Example of signage at Arches National Park, UT, to raise awareness about protecting desert soils. Some climbs at Arches National Park require off trail access to reach their base.
Photo: K. Pyke

2. NATIONAL OUTREACH

- Direct mailing or e-mail circulars**—to climbing representatives or individuals on a mailing list.
- Newsletters**—Some parks run their own newsletters where it is possible to include a climbing outreach section.
- National climbing magazines**—National climbing magazines (published typically every six to eight weeks) provide opportunities to disperse climbing access and conservation information through articles and dedicated columns on access issues and information.
- Press releases**—to newspapers, climbing magazines, and special-interest group newsletters.
- Agency websites**—Many federal and state parks and local authorities now have websites devoted to specific locations or activities and can incorporate climbing access information.
- Telephone information lines**—Some agencies and parks (e.g., City of Boulder Open Space and Mountain Parks, CO) run a dedicated 24-hour information line to provide details on their program of seasonal raptor climbing restrictions.
- Climbing guidebooks**—Climbing guidebooks are produced on an irregular basis with intervals of five to ten years or more. Although information in these publications can change and become out of date, it is possible to incorporate general access information and provide a telephone contact for an update. Local climbing representatives may be able to help resource managers find out if a new guide is being produced for their area, and assist with contacting the author.
- Recreation or climbing organization websites**—An increasing number of local climbing clubs and organizations have websites (e.g. Friends of Pinnacles National Monument website: <http://www.pinnacles.org> provides information to climbers about this popular California climbing area). These groups can work with land management agencies to provide current access updates (e.g., on seasonal climbing restrictions to protect cliff nesting raptors), outreach on special education or management issues, and links to agency websites. Videos, which can easily be posted on websites, are an effective way to entertain the user community while also providing an educational message. See <http://accessfund.org/extras/tic.php>.

Also see **Appendix E** - Contacts on climbing issues, page 68 and **Appendix F** - Utilizing the resources of the Access Fund, page 69.

APPENDIX D

FUNDING AND VOLUNTEER ASSISTANCE

Many field units face budget shortfalls, which may mean postponement of improvements to area infrastructure and implementation of management plans and programs. There are substantial and growing resources in the non-profit and private sectors that can ease these hardships. The Access Fund works with other recreation and conservation advocacy groups to boost federal and state appropriations for public lands administration (for example, support for the Land and Water Conservation Fund in 2001, which can be used for land acquisitions and resource protection). In addition, climbing organizations can provide some grants for resource protection in the climbing environment, including funds for land acquisition. Typically, the Access Fund Climbing Preservation Grants Program makes available over \$100,000 annually for conservation projects at or near cliff environments. See the website:

<http://www.accessfund.org> to download a copy of the grant guidelines. The American Alpine Club also has funds for conservation projects in U.S. climbing areas. See the website: <http://www.americanalpineclub.org>. Local climbing organizations can also contribute funds and services in-kind towards climbing management projects.

The funding, design, and installation of this climber education booth at Coopers Rock State Park, West Virginia was carried out by the local climbing organization. Photo: C. Samples



VOLUNTEER ASSISTANCE

In addition to funds, climbing organizations can provide technical and volunteer assistance for climbing-related management projects. For example, they can support or assist with volunteer recruitment for projects such as wildlife monitoring and vegetation surveys, trail construction and maintenance, education and public outreach, and resource mitigation. Examples include: West Virginia where the New River Alliance of Climbers and the NPS-managed New River Gorge National River have worked together on trail maintenance and a bird fledging project; Oklahoma where the Wichita Mountain Climbers Coalition and US Fish & Wildlife Service jointly developed education brochures and signs at the USFWS-managed Wichita Mountains Wildlife Refuge. Contact information for Access Fund representatives, climbing organizations, or local climbing representatives can be obtained from the website: <http://www.accessfund.org> or by calling the Access Fund at 303-545-6772.

APPENDIX E

CONTACTS ON CLIMBING ISSUES

The following national organizations have been referred to in this document as sources of information or advice on specific climbing management issues.

American Safe Climbing Association
 PO Box 1814
 Bishop, CA 93515
 Tel: (650) 843 1473
 E-mail: greg@safeclimbing.org
 Website: <http://www.safeclimbing.org>

The Access Fund
 P.O. Box 17010
 Boulder, CO 80308
 Tel: (303) 545-6772
 Fax: (303) 545-6774
 E-mail: info@accessfund.org
 Website: <http://www.accessfund.org>

The American Alpine Club
 710 10th Street, Suite 100
 Golden, CO 80401
 Tel: (303) 384-0110
 Fax: (303) 384-0111
 E-mail: getinfo@americanalpineclub.org
 Website: <http://www.americanalpineclub.org>

The American Mountain Guides Association
 PO Box 1739
 Boulder, CO. 80302
 Tel: 303-271-0984
 E-mail: info@amga.com
 Website: <http://www.amga.com>

Leave No Trace, Inc.
 PO Box 997
 Boulder, CO 80306
 Tel: (303) 442-8222
 Tel: 1-800-332-4100
 Fax: (303) 442-8217
 Website: <http://www.LNT.org>

National Outdoor Leadership School (NOLS)
 284 Lincoln Street
 Lander, WY 82520
 Tel: (307) 332-5300
 Fax: (307) 332-1220
 E-mail: info@nols.edu
 Website: <http://www.nols.edu>

APPENDIX F

UTILIZING THE RESOURCES OF THE ACCESS FUND

This section outlines how the Access Fund can provide assistance to management agencies and field units.

1. INFORMATION

Access Fund office staff can provide advice on such subjects as liability, land acquisition, conservation easements, agency and climbing representative contacts, seasonal raptor climbing restrictions, and education and outreach strategies. Samples of outreach material from different climbing management projects can be provided on request. Staff also field general inquiries on access from the climbing public and provide updates to queries on climbing access arrangements.

2. EDUCATION AND OUTREACH

Text—Access Fund representatives can assist agencies in producing technically correct wording and presentation of text compatible with current usage and information in climbing guides.

Logo—The Access Fund can supply a logo template via mail or e-mail.

Distribution—Local Access Fund representatives can provide advice on distribution outlets and display points for education materials. For example, they can assist with determining the best location for signing trailheads with seasonal raptor climbing restrictions.

Publications—The following publications are available from the Access Fund website:

<http://www.accessfund.org>:

- Bouldering: Understanding and Managing Climbing on Small Rock Formations (2004);
- Climbing and natural resources management: An annotated bibliography —Access Fund and North Carolina State University (2000)
- Supplement to Climbing and natural resources management: An annotated bibliography (2001) (Update from April 2000-April 2001);
- Risk management for climbing (2000);
- Climbing in wilderness: An inventory of recreational climbing use in the National Wilderness Preservation system, Bartlett, A. (1995);
- Raptors and Climbers: Guidance for managing technical climbing to protect raptor nest sites, Pyke, K. (1997).

Website—The Access Fund website (<http://www.accessfund.org>) provides information about special access issues, wildlife and conservation issues, news updates, forthcoming events and projects and local contacts. For example, the website lists U.S. locations with seasonal raptor and other wildlife climbing

restrictions, climbing and resource management publications, and federal and state public lands planning initiatives.

E-mail news—Monthly e-mail news sent to individuals who have registered through the Access Fund website, provides access information and updates, details of new agency planning initiatives and management plans, and upcoming events.

Newsletter—The Access Fund’s membership newsletter, The Vertical Times, is produced quarterly and covers climbing access and conservation issues.

Membership handbook—The Access Fund’s membership handbook, sent out to all new members, provides general access information about climbing on federal and state-owned public lands, and how to work with land managers on access issues.

3. REGIONAL CONTACTS

The Access Fund supports a national network of volunteer regional coordinators and works closely with local climbing organizations. Regional climbing representatives can provide input on climbing management issues and assist with the production of climber-education materials. They can also have a key role in the development of a climbing management plan and are usually available to provide input on local management issues. The Access Fund website lists current contacts. In addition, the Access Fund can help provide other local contacts (e.g., individuals from climbing gyms, guide services, retail stores, and web and guidebook publishing).

4. PROJECT SUPPORT

Grants Program—The Access Fund provides funding for access and conservation projects. Project funding categories include education, mitigation, research, facilities, and acquisition. See website: <http://accessfund.org/cons/guidelines.php> for details and to download a copy of the grant guidelines.

Special events/stewardship projects—The Access Fund supports projects such as conservation work-days and clean-up events by assisting with publicity and donations of climbing equipment and other prizes. For example, the Access Fund’s national Adopt-a-Crag Day is held every year (previously held annually during the month of September, this stewardship event now occurs year-round). Refer to the Access Fund website for more information about this event. Access Fund representatives can also work with land managers to organize other local projects or assist with community involvement.

APPENDIX G

BIBLIOGRAPHY AND REFERENCES

Access Fund. "The Boulder Project." <http://www.accessfund.org/boulderproject/teamworks/index.php> (accessed June 3, 2008).

Access Fund. *Supplement to Climbing and natural resources management—An annotated bibliography*. Boulder, CO: The Access Fund, 2001.

Access Fund. Risk management for climbing - *Advice for public land owners and managers*. Boulder, CO: The Access Fund, 2000.

American Alpine Club. "The American Alpine Club E-News - February 2005." http://www.americanalpineclub.org/pubs/enews/enews_2005_February.htm (accessed June 3, 2008).

Anzelmo, J. and J. Skaggs. "Grand Teton National Park News Release. Backcountry toilet to be removed from lower saddle of Grand Teton." <http://www.nps.gov/grte/news/2002/02-53.pdf> (accessed June 3, 2008).

Attarian, A. "Survey of rock climbing in the Grandfather Mountain Corridor, Blue Ridge Parkway, North Carolina." Unpublished manuscript, 2005.

Attarian, A. "Managing rock climbing groups at Crowder's Mountain State Park, North Carolina." Unpublished manuscript, 2003.

Attarian, A. "Trends in outdoor adventure education." *Journal of Experiential Education* 24(3) (2001): 141-149.

Attarian, A. and K. Pyke. *Climbing and natural resources management—An annotated bibliography*. Boulder, CO: The Access Fund, 2000.

Attarian, A. "Collaborative resource management: The Stone Mountain Project. North Carolina Division of State Parks." *Parks and Recreation* 38(7) (1999): 75-79.

Baker, B. "Controversy over use of rock-climbing anchors may be missing the mark." *Bioscience* 49 (7) (1999): 529.

Bartlett, A. *Climbing in wilderness. An inventory of recreational climbing use in the National Wilderness Preservation System*. Boulder, CO: The Access Fund, 1995.

Borrie, W. T. and J. A. Harding. "Effective recreation visitor communication strategies: rock climbers in the Bitterroot Valley, Montana. Research Note, RMRS—RN-15." Fort Collins, CO: U.S. Forest Service, 2002.

Camp, R. J. and R. L. Knight. "Effects of rock climbing on cliff plant communities at Joshua Tree National Park, California." *Conservation Biology* 12(6) (1998): 1302-1306.

Carr, C. "A model of environmental impact at rock climb areas, Red River Gorge Geological Area, Daniel Boone National Forest, Kentucky." Presented at 28th Southeastern Recreation Research Conference, February 26-28, Wilmington, NC, 2006.

Cavlovic, T. A. "Valuing the loss in access: An institutional and welfare analysis of rock climbing on U. S. public lands." PhD diss., University of New Mexico, 2000.

Cecil, J. P. and C. McGrath. *North Carolina Peregrine Falcon Restoration and Monitoring, Nongame Project Report*. Raleigh, NC: North Carolina Wildlife Resources Commission, 2000.

Cilimburg, A., C. Monz. and S. Kehoe. "Wildland recreation and human waste: A review of problems, practices and concerns." *Environmental Management* 25(6) (2000): 587-598.

Cole, D. N. "Resource impacts caused by recreation." In *A literature review: The President's Commission on Americans Outdoors*, 1-11. Washington, DC: The President's Commission on Americans Outdoors: Management, 1986.

Cordell, H. K. *Outdoor recreation in American life: A national assessment of demand and supply trends*. Champaign, IL: Sagamore Publishing, 1999.

Cymerys, M. and B. J. Walton. "Raptors of the Pinnacles National Monument: Past and present nesting and possible impacts of rock climbers. Technical Report No. 30." Davis, CA: University of California, 1988.

Davis, T. "Ruling to halt forest fee will be appealed-\$5.00 requirement for Mt. Lemmon Canyons at Stake." <http://www.azstarnet.com/allheadlines/146907.php> (accessed June 4, 2008).

DeBenedetti, S. "Impacts of rock climbing and mitigation actions taken at Pinnacles National Monument." Paper presented at the George Wright Society Conference on Research and Resource Management in Parks and Public Lands, El Paso, TX, 1990.

Driese, K. and D. Roth. *A description of the vascular flora and mammal fauna and the effects of human disturbance on the summit of Devils Tower*. Department of Plant, Soil and Insect sciences, Report number UWY-21. Laramie: University of Wyoming, 1992.

Douchette, J. E. and D.N. Cole. "Wilderness Visitor Education: Information About Alternatives Techniques." In *Intermountain Research Station, General Technical Report-INT-295*. US Department of Agriculture Forest Service, 1993.

Ells, M. D. "Impact of human waste disposal on surface water runoff—The Muir Snowfield, Mount Rainier." *Environmental Health* (1997): 6-12.

Ewert, A. W. "Gateways to adventure tourism: The economic impacts of mountaineering on one portal community." *Tourism Analysis 1* (1996): 59-63.

Farris, M. A.. "The effects of rock climbing on the vegetation of three Minnesota cliff systems." *Canadian Journal of Botany 76* (1998): 1-10.

Friends of Indian Creek. "The Wag Bag Movement." <http://www.accessfund.org/extras/tic.php> (accessed June 4, 2008).

Gander, H. and P. Ingold. "Reactions of male alpine chamois (*Rupicapra r. rupicapra*) to hikers, joggers and mountain bikers." *Biological Conservation 79* (1997): 107-109.

Hammitt, W. E, and D. N. Cole. *Wildland Recreation—Ecology and Management*. New York, NY: John Wiley & Sons, 1988.

Hanley, N., R. E. Wright, and G. Koop. "Modelling recreation demand using choice experiments: Climbing in Scotland." *Environment and Resource Economics 22* (2002): 449-466.

Hendee, J. C., G. H. Stankey, and R. C. Lucas. *Wilderness management*. Honolulu, HI: University Press of the Pacific, 2005.

Jefferson County Open Space. "Re: Jefferson County Open Space Climbing Guidelines." http://www.co.jefferson.co.us/news/news_item_T3_R156.htm (accessed June 4, 2008).

Jones, C. D. "Evaluating Visual Impacts of Near-View Rock Climbing Scenes." *Journal of Park and Recreation Administration 22*(3) (2004): 39-49.

Jones, C. D. and S. Hollenhorst. "Toward a resolution of the fixed-anchors in wilderness debate." *International Journal of Wilderness 8*(3) (2002): 39.

Jones, W. K., H. H. Hobbs, C. M. Wicks, R. R. Currie, L. D. Hose, R. C. Kerbo, J. R. Goodbar, and J. Trout. *Recommendations and guidelines for managing caves on protected lands*. Charlestown, WV: Karst Waters Institute, 2003.

Joshua Tree National Park, The Access Fund, & The California Native Plant Society. *Vertical Vegetation: A Partnership project to address resources protection and quality visitor experience in rock-climbing areas of Joshua Tree National Park*. Twenty-nine Palms: National Park Service, 2000.

Kelly, P. E. and D. W. Larson. "Effects of rock climbing on presettlement eastern white cedar on cliffs of the Niagra Escarpment." *Conservation Biology 11*(5) (1997): 1125 -1132.

Knight, R. L. and K. J. Gutzwiller, editors. *Wildlife and Recreationists: Coexistence through management and research*. Washington, DC: Island Press, 1995.

Kuntz, K. L. and D. Larson. "Influences of microhabitat constraints and rock-climbing disturbance on cliff face vegetation communities." *Conservation Biology 20*(3) (2006): 821-832.

Kuss, F. R., A. R. Graefe and J. J. Vaske. *Visitor Impact Management, Volume 1: A Review of Research*. Washington, DC: National Parks and Conservation Association, 1990.

Lanier, J. W. and R. A. Joseph. "Managing human recreational impacts on hacked or free-nesting peregrines." In *Proceedings of the Northeast Raptor Management Symposium and Workshop*, B. G. Pendelton, editor, 149-153. Washington, DC: Institute of Wildlife Research, 1989.

Larson, D. W. "Effects of disturbance on old-growth thuja occidentalis at cliff edges." *Canadian Journal of Botany 68* (1990): 1147-1155.

Larson, D. W., U. Matthes, and P. E. Kelly. *Cliff ecology - Pattern and process in cliff ecosystems*. New York: Cambridge University Press, 2000.

Leave No Trace, Inc. *Skills and ethics for rock climbing*. Boulder, CO: Leave No Trace Center for Environmental Ethics, 2001.

Leung, Y. F. and J. Marion. "Rail degradation as influenced by environmental factors: A state of the knowledge review." *Journal of Soil and Water Conservation 51*(2) (1996): 130-136.

Loomis, M. "'Denial' National Park—Special use fee targets climbers." *Rock & Ice*, July, 2006.

Lucas, J. "Perceptions of non-motorized recreational impacts: A review of research findings." In *Recreational Impacts on Wildlands*, 24-31. Seattle, WA: USDA Forest Service and USDI National Park Service, 1979.

Malkin, D. R. "Effects of rock climbing on populations of *Silene seelyi*, a rare perennial plant." Unpublished master's thesis, University of Washington, 2002.

Margetts, L. S. and I. Fowler. "Use of chalk in rock climbing: sine qua non or myth?" *Journal of Sport Sciences* 19(6) (2001): 427.

Martin, R. "Reducing the visual impact of bolt hangers and other fixed gear." <http://www.safeclimbing.org/education/visualimpact.htm> (accessed June 4, 2008).

MacGowan, D. "Reliving the chalk wars, a geochemical view." *Climbing*, April, 1987.

McAvoy, L. and D. Dustin. "Indirect versus direct regulation of recreation behavior." *Journal of Park and Recreation Administration* 1(4) (1983): 12-17.

Mohonk Preserve. "Research Studies Underway: Black vultures expand northward." <http://www.mohonkpreserve.org/index.php?researchstudies> (accessed June 4, 2008).

Monz, C., J. Roggenbuck, D. N. Cole, R. Brame, and A. Yoder. "Wilderness party size regulations: Implications for management and a decision making framework." In *Wilderness Science in a Time of Change Conference—Volume 4: Wilderness Visitors, Experiences, and Visitor Management*. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 2000.

Monz, C. A., D. N. Cole, L. A. Johnson, and D. R. Spildie. "Vegetation response to trampling in five native plant communities in the Wind River Range, Wyoming." *Bulletin, Ecological Society of America* 75 (1994): 158.

Moser, S. "A tenuous hold." *Outside Business*, April, 1990.

Mountaineering Council of Scotland. "Scottish Winter Climbing: A Code of Good Practice." <http://www.mountaineering-scotland.org.uk/council/wintercode.html> (accessed June 4, 2008).

National Park Service. "Clean Mountain Cans." <http://www.nps.gov/archive/dena/home/mountaineering/cmchtm> (accessed June 4, 2008).

National Park Service. "Things To Know Before You Climb." <http://www.nps.gov/mora/planyourvisit/things-to-know-before-you-climb.htm> (accessed June 4, 2008).

National Park Service. *New River Gorge National River climbing management plan and environmental assessment*. Glen Jean, WV: United States Department of the Interior, 2005.

National Park Service. *Obed Wild and Scenic River final climbing management plan*. Wartburg, TN: United States Department of the Interior, 2002.

National Park Service. "Management Policies, Natural Resources Management Reference Manual #77." <http://www.nature.nps.gov/rm77/> (accessed June 4, 2008)

National Park Service. *Final climbing management plan, Chickamauga and Chattanooga National Military Park*. Fort Oglethorpe, GA: United States Department of the Interior, 1998.

National Park Service. *Joshua Tree National Park—Supplement to the draft general management plan amendment—supplemental environmental impact statement: Backcountry and wilderness management plan*. Twenty-nine Palms, CA: United States Department of the Interior, 1998.

National Park Service. *City of Rocks National Reserve climbing management plan*. Almo, ID: United States Department of the Interior, National Park Service, 1988.

New Hampshire Fish and Game. "New Search and Rescue Rules Could Be Costly for Reckless Hikers." www.wildlife.state.nh.us/Newsroom/News_2001_and_previous/news_search_and_rescue_99.htm (accessed June 4, 2008).

Nickel, J. "No shit!" *Rock & Ice*, September/October, 1994.

Noe, F. P., W. E. Hammit, and R. D. Bixler. "Park user perceptions of resource and use impacts under varied situations in three national parks." *Journal of Environmental Management* 49 (1997): 323-336.

North Carolina Department of Transportation. "Learn the Facts About Litter." http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/Beautification/America/litterfacts.html (accessed June 4, 2008).

North Cascades National Park. "Climbing Notes -1997 Season." www.nps.gov/noca/climbing-1997.htm (accessed June 4, 2008).

Nuzzo, V. A. "Effects of rock climbing on cliff goldenrod (*Solidago sciaphila* Steele) in Northwest Illinois." *The American Midland Naturalist* 133 (2) (1995): 229-241.

Nuzzo, V. A. "Structure of cliff vegetation on exposed cliffs and the effect of rock climbing." *Canadian Journal of Botany* 74 (1996): 607-617.

- North Carolina Department of Transportation. "Learn the Facts About Litter." http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/Beautification/America/litterfacts.html (accessed June 4, 2008).
- North Cascades National Park. "Climbing Notes -1997 Season." www.nps.gov/noca/climbing-1997.htm (accessed June 4, 2008).
- Nuzzo, V. A. "Effects of rock climbing on cliff goldenrod (*Solidago sciaphila* Steele) in Northwest Illinois." *The American Midland Naturalist* 133 (2) (1995): 229-241.
- Nuzzo, V. A. "Structure of cliff vegetation on exposed cliffs and the effect of rock climbing." *Canadian Journal of Botany* 74 (1996): 607-617.
- Ortiz, M. "El Capitan meadow restoration project." *Yosemite National Park Planning Update* 29 (2006): 5.
- Osius, A. "Waste Case." *Rock & Ice*, July, 2006.
- Outdoor Industry Foundation. *Outdoor Industry Foundation outdoor recreation participation study*. Boulder, CO: Outdoor Industry Foundation, 2006.
- Outdoor Recreation Coalition of America. *Outdoor Recreation Participation Study for the United States*. Second Edition. Boulder, CO: Leisure Trends Group/ Gallup, 2000.
- Outdoor Recreation Coalition of America. *The journalist's guide to climbing*. Boulder, CO: Outdoor Recreation Coalition of America, 1997.
- Parikesit, P., D. W. Larson, and U. Matthes-Sears. "Impact of trails on cliff edge forest structure." *Canadian Journal of Botany* 73 (1995): 943-953.
- Pisgah Commercial Climbers Association. "'Industry Standard' Guidelines for Pisgah National Forest." http://www.pisgahclimbers.org/Climbing_Standards.htm (accessed June 5, 2008).
- Pyke, K. *Raptors and climbers: Guidance for managing technical climbing to protect raptor nest sites*. Boulder, CO: The Access Fund, 1997.
- Rocky Mountain National Park. *Raptor protection closures*. Estes Park, CO: U.S. Department of the Interior, 1998.
- Rocky Mountain National Park. *Technical climbing and the bivouac permit*. Estes Park, CO: United States Department of the Interior, 1999.
- Rocky Mountain National Park. "Task force findings: Climbing in Rocky Mountain National Park." Unpublished manuscript, Rocky Mountain National Park, 1990.
- Rusterholtz, H. P., S. W. Muller. and B. Baur. "Effect of rock climbing on plant communities on exposed limestone cliffs in the Swiss Jura mountains." *Applied Vegetation Science* 7 (2004): 35-40.
- Scholl, J. and A. Wichman. *Draft climbing management plan*. Boulder, CO: City of Boulder Mountain Parks and Open Space, 1990.
- Schuster, R. M., J. G. Thompson, and W. E. Hammitt. "Rock climbers' attitudes toward management of climbing and the use of bolts." *Environmental Management* 28(3) (2001): 403-412.
- Shaw, W. D. and P. Jakus. "Travel cost models of the demand for rock climbing." *Agricultural and Economics Review* (1996): 131-142.
- Skrzypczynski, J. "Environmental management of rock climbing." Unpublished Master's thesis, University of Calgary, Alberta, 1994.
- Smith, P. "A vegetational characterization of cliff faces in the Linville Gorge Wilderness area." Unpublished master's thesis, Appalachian State University, Boone, North Carolina., 1998.
- Smith Rocks State Park. "Attention park visitors and pet owners." <http://www.smithrock.com/flash/news/dog.html> (accessed June 5, 2008).
- Spear P. W. and M. J. Schiffman. "Rock climbing and endangered plants: A case study." In *Proceedings of the Specialty Conference, National Conference on Recreation Planning and Development*, 630-636. New York: American Society of Civil Engineers, 1979.
- Stannard, J. "Too much of a good thing." *Summit*, June/ July, 1978.
- Steelhammer, R. "At the end of their rope: Success of New River Gorge rock climbing brings overcrowding." *Charleston Gazette*, October 27, 2000.
- Swineford, S. "Chalk talk." *Rock and Ice*, July, 1994.
- Taylor, K., P. Anderson, R. Taylor, K. Longden, and P. Fisher. *English Nature Research Reports: Dogs, Access and Nature Conservation*. Peterborough, UK: Northminster House, 2005.
- Toula, T. *Rock 'n Road: An atlas of North American Rock climbing Areas*. Guilford, CT: Falcon Press, 2003.
- United States Department of Agriculture. "Alpine Lakes Wilderness—Wilderness permit information and application." <http://www.fs.fed.us/r6/wenatchee/passes/enchantments/> (accessed June 3, 2008).

United States Department of Agriculture. "Daniel Boone National Forest, Red River Gorge - Cumberland Ranger District." http://www.fs.fed.us/r8/boone/districts/cumberland/redriver_gorge.shtml (accessed June 5, 2008).

United States Department of Agriculture. Environmental assessment: *An analysis of commercial guided rock climbing at Seneca Rocks, West Virginia. Monongahela National Forest, Seneca Rocks Opportunity Area #57.002*. Petersburg, WV: United States Forest Service, 1996.

United States Department of Agriculture. Forest Service Manual—Section 2300. *Agency resource management guidelines*. Washington, DC: United States Forest Service, 1997.

United States Department of the Interior. "Minimum Requirements References in National Park Service Policy, 2006 NPS Management Policies, Chapter 6: Wilderness Preservation and Management." www.wilderness.net/MRDG/documents/MRDG_NPS_wilderness_policy.doc (accessed June 5, 2008).

United States Department of the Interior. *Visitor capacity on public lands and waters—Making better decisions. Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands*. Washington, DC: United States Department of the Interior, 2001.

United States Department of the Interior, Bureau of Land Management. Use of fixed anchors on BLM designated wilderness areas, 65 Fed. Reg. 78358, (to be codified at 40 CFR parts 6300 & 8560) (proposed December 14, 2000).

United States Department of the Interior. Final climbing management plan, *Chickamauga and Chattanooga National Military Park*. Fort Oglethorpe, GA: National Park Service, 1998.

United States Department of the Interior. *Final climbing management plan, Devils Tower National Monument*. Devils Tower, WY: National Park Service, 1995.

United States Department of the Interior. *Wichita Mountains Wildlife Refuge final environmental assessment for technical rock climbing: Decision notice and finding of no significant impact*. Indianahoma, OK: United States Fish and Wildlife Service, 1995.

United States Forest Service. "FY 2004 Recreation Fee Demonstration Program Summary: Visitation, Revenue, Cost, and Obligations Information." <http://www.fs.fed.us/passespermits/docs/accomps/wo-rpt-congress/fy04.pdf> (accessed June 5, 2008).

Wagstaff, M. C. and B. E. Wilson. The evaluation of litter behavior modification in a river environment. *Journal of Environmental Education* 20(1) (1988): 39-44.

Walker, G. "Characterization of plant community structure and abiotic conditions on climbed and unclimbed cliff faces in the Obed River Gorge." Unpublished manuscript, Appalachian State University, Boone, NC, 2004.

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