

**MOUNT HUMBOLDT CLIMBING ROUTE IMPROVEMENT AND RESTORATION
PROJECT: A CASE STUDY IN ADDRESSING RECREATIONAL IMPACTS ON
COLORADO'S WILDERNESS PEAKS**

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ABSTRACT

A primary focus of the Rocky Mountain Field Institute is to develop strategies and techniques for mitigating climbing impacts in wilderness environs and restoring and/or reclaiming disturbed sites. RMFI has been working since 1992 to address the issue of climbing impacts on Colorado's alpine peaks and basins. RMFI has conducted hiking and climbing impact studies on all of the peaks over 14,000 ft. and completed extensive trail construction and restoration work on three peaks: Mt. Belford, La Plata Peak, and Mount Humboldt. RMFI has also completed considerable work in South Colony Lakes Basin where Mt. Humboldt is located. The majority of this work has to date been conducted under the auspices of the Colorado Fourteeners Initiative, a partnership between several nonprofit organizations and the US Forest Service that was founded under RMFI's leadership. RMFI is presently completing trail construction and restoration work on Mount Humboldt and Handies Peak, and conducting research in South Colony Lake Basin to assess visitor impacts and to identify effective restoration strategies and techniques.

During the period 1997- 1998, the Rocky Mountain Field Institute completed an extensive erosion control and restoration project on Mount Humboldt (14,064 ft.) in the heart of the Sangre de Cristo Wilderness. The project involved the stabilization and revegetation of a climber created erosion gully between 12,000- 13,000 ft., and the construction of a new summit trail.

The paper summaries why the project was developed, the methodology that the project is based upon, and the accomplishments to date.

INTRODUCTION

Accurate statistics on the numbers of persons currently climbing Fourteeners (peaks over 14,000 ft. in elevation) and the rate of increase in the popularity of this recreational activity are lacking. However, reviews of trailhead and summit registers and field observations indicate that roughly 75,000 persons ascend the Fourteeners in Colorado annually. This represents an increase of as much as 300% over the past 10 years on some peaks. Visitation varies dramatically from mountain range to mountain range, and from peak to peak. For instance, isolated or more technically difficult peaks in the Sangre de Cristo and San Juan Ranges receive as few as 500 ascents per season, whereas peaks located in the Front Range receive this many ascents in a busy weekend.

Alpine ecosystems are vulnerable to low levels of human disturbance. The impact recovery rates for some alpine flora communities in the Southern Rockies, once damaged or compromised, are long: in the order of ten to a thousand times that of lower elevation

ecosystems (Willard, 1996). This is due to several factors that include alpine climatic characteristics including short growing seasons, low seasonal increase in biomass, and unpredictable diaspore production (Chambers, 1995). Alpine mountains are by nature unstable environments. Boulder, scree, and fell-fields constantly move and shift. The estimated time for the revegetation of a kobresia meadow at a minimum, is 500 years (Willard, 1996). Recovery is based upon the assumption that a disturbed area is stabilized and that disturbance is controlled or eliminated. On steeper slopes, seasonal run-off or snow melt, and high winds radically accelerate soil and vegetation loss in disturbed sites. These factors create a positive feedback system that effectively prevents recovery to pre-disturbance conditions.

The current levels of use are having a significant impact on the peaks. Major soil erosion and vegetation loss have occurred on many of the popular hiking and climbing routes. Inventories completed by the Colorado Natural Heritage have indicated that on many peaks, hiking and climbing is posing a risk to rare plant species.

These impacts and disturbances present a special concern in wilderness and wilderness study areas where preservation standards are high. Thirty-eight of the fifty-four peaks over 14,000 ft. in elevation in Colorado are located in wilderness. It is fair to say that many of the popular climbing route corridors have already reached and, in many cases, surpassed acceptable or desirable levels of disturbance. The continued growth in the popularity of climbing Fourteeners and the potential for even greater levels of disturbance in the future have made this an important land management issue.

If Colorado's wilderness peaks are to be preserved, it is important that steps be taken to mitigate the impacts that are presently taking place. Furthermore, climbers have already heavily impacted many of the peaks. It is important as well that damaged areas be stabilized and restored to the greatest degree possible.

PROGRAM METHODOLOGY

It is RMFI's position that climbing route improvements in wilderness should be undertaken for the purpose of achieving preservation and restoration goals and not to make routes less tame or safe. Leaving climbing routes as undeveloped as possible is consistent with wilderness designation and protects the nature and challenge of the wilderness climbing experience. On the other hand, it is unrealistic to expect that heavily visited peaks and alpine areas remain totally unimproved. Route improvements can serve to focus use and impacts, reduce the level of impact from climbers, and direct visitors away from sites of critical or special concern. Also, in cases where multiple "social trails" (visitor created trails worn into the landscape) or trail braiding is occurring, the establishment of a single path creates opportunities for restoration, thus improving wilderness conditions.

Route improvements on alpine mountains or peaks within wilderness should be viewed, first and foremost, as restoration actions, the goal of which is to achieve a meaningful and quantifiable reduction in present levels of disturbance. In the alpine zone, additional stabilization, revegetation, or habitat improvement or protection actions is often required. In fact, for routes where impacts are significant, these actions may require far more resources and constitute a larger portion of the project than route improvements.

RMFI has developed the following of a program to provide a structure for mitigating climbing impacts. It includes the following components:

Mitigation and Restoration

- Phase 1- Impact assessment.
- Phase 2- Development of mitigation and restoration plan.
- Phase 3- Completion of impact mitigation and restoration actions.
- Phase 4- Continued monitoring of impacts and assessment of mitigation and restoration actions taken.

Visitor Education/ Stewardship

- Development and implementation of site specific visitor information program.
- Creation of programs and opportunities for public participation in mitigation and restoration work.

Again, the fundamental premise of the program is that climbing route improvements should be completed within the context of a thorough and comprehensive plan to restore the route corridor.

RMFI has proposed a classification system to provide guidance and direction for making improvements on climbing routes in wilderness. This classification system ties improvements directly to disturbance levels and the physical and biological characteristics of the areas or terrain through which the climbing route passes. In cases where existing disturbance levels or threats are minimal, little if any action is required. However, in cases where disturbance levels or threats are high, more aggressive or substantial improvements are needed.

Class I: Open Route Corridor

Environmental Conditions -Corridor in pristine condition and few if any human disturbances. Minimal threat to sensitive cultural and/or biological resources exist.

Route Management - Disperse use along the route corridor.

Mitigation or Restoration Action- None required.

Class II: Identified/Defined Route

Environmental Conditions - Human disturbance along the route corridor is overall minimal and within acceptable limits; however, trail braiding, soil erosion, and/or slope destabilization and/or damage to sensitive cultural or biological resources is likely to occur at select locations along the route corridor.

Route Management- Direct hiking/climbing along an identified/defined route.

Mitigation or Restoration Action- Mark preferred route with cairns.

Class III: Developed Route

Environmental Conditions- Human disturbance is evident. Trail braiding, soil erosion, and/or slope destabilization has occurred and there is a serious for continued degradation.

Route Management- Travel along a developed route located on the most stable terrain and away from sensitive sites.

Mitigation or Restoration Action- Make select improvements to reduce soil erosion and vegetation loss, and construct necessary soil retention and water drainage structures. Make the route easily identifiable. Restore social trails and/or disturbed sites.

Additional Actions:

The following actions apply to each class of climbing routes:

- Provide information at trailhead or beginning of route on Leave No Trace protocols for hiking and camping in pristine terrain with attention given to minimum impact hiking in alpine terrain. Work with guidebook authors to include this information in publications.
- Monitor environmental conditions in areas of concern and maintain all improvements.

It is important to note that, in theory, a climbing route may have unimproved sections as well as improved sections. In particularly sensitive locations, a fully developed trail or path may be needed. However, in locations where the climbing route passes through areas where climbing or hiking does not pose a significant threat, like alpine boulder fields for instance, climbers can be left to choose their own way or can be directed with cairns which keep them on route. Again, the intent of the classification system is to address resource threats while maintaining the pristine and undeveloped character of the climbing route. The following route improvement guidelines are recommended:

- Develop and complete route improvements within the context of a protection/restoration plan for the route corridor and/or mountain.
- Keep the level of improvement to a minimum. Do only what is necessary to achieve resource protection goals.
- Work within existing disturbances and do not disturb new ground unless there is a compelling reason to do so, and only as a matter of last resort.
- Utilize all material removed during construction (rocks, soil, and vegetation) to restore or reclaim disturbed sites.
- Monitor environmental conditions along the route corridor, and maintain all improvements or structures.

There are a number of considerations that need to be considered when aligning or improving a climbing route. These are:

- Unique or special characteristics or features of the route.
- Existing use patterns or trends.
- Areas with sensitive biological and/or cultural resources.
- Fragile ecosystems, i.e. fell-field, snow-bed and wet meadow communities.
- Unstable terrain prone to soil displacement or erosion.
- Areas of high objective hazard, i.e. rock fall and avalanche zones.

MOUNT HUMBOLDT PROJECT

Project Description;

Mount Humboldt is located in the heart of Southern Colorado's Sangre de Cristo Wilderness southwest of Westcliffe, Colorado. The mountain is one of the famed Crestone group peaks. Mount Humboldt is a popular climbing objective. Estimates are that approximately 2,000 to 3,000 climbers ascend the peak each year. The overwhelming majority of climbers access the peak via the South Colony Lakes basin, a relatively narrow alpine cirque valley with two main lakes. The basin is surrounded on three sides by rugged and spectacular alpine peaks: Broken Hand Peak, Crestone Needle, Crestone Peak, and Mount Humboldt. These peaks tower over 2000 ft. above the basin floor forming an area of outstanding natural beauty. From the basin, the standard ascent route climbs up to a col or saddle at 13,000', then follows the west ridge of the peak to the summit.

An impact assessment program completed by RMFI in 1992 and 1993 revealed that many sections of the Mount Humboldt west ridge route had become heavily eroded. The likelihood of even greater degradation was also deemed to be very high. The Mount Humboldt Project was initiated by the Rocky Mountain Field Institute and the USDA Forest Service to mitigate the damage.

Project History;

A site analysis, resource inventory, and environmental assessment for the proposed project was completed by the Forest Service with the assistance of RMFI in 1995. This was followed up by a planning study of South Colony Lakes Basin in 1996. This study was completed so that the Mount Humboldt project could be developed within the context of overall resource protection and restoration needs in the basin. The study reviewed ecological resources and recreational use in the basin; queried visitors about environmental conditions; and, identified management needs for the area at large.

The erosion gully between 12,000 and 13,000 ft. was identified as the highest priority for the project. This gully was located on a 40- 50%, south facing slope. The slope is a mesic alpine meadow dominated by *Acomastylis rossii*, *Potentilla subjga*, and *Carex elynoides*. (Conlin, 1999). A plan was devised to improve as much of the gully as possible for climbing use and to stabilize and reclaim those sections that were judged to be too steep or unstable for climbing. For the latter sections, the plan called for the construction of an alternate route. One of the challenges of the project was harvesting rock or site to accomplish both the stabilization and improvement of existing sections and the reclamation of the remaining sections. During 1996, RMFI designed, built, and tested a rock transport system or tram that could safely and efficiently deliver rock from near-by boulder or rock fields. The system was also designed to reduce the impact of the project on the surrounding vegetation.

In respect to restoring and reclaiming the section from 12,000 ft. to 13,000 ft. the following strategies were identified:

- Where possible, fill the gully with rock to replicate naturally occurring rock streams.
- Construct terraces in the most deeply eroded sections of the gully into which vegetation from the new alternate route could be transplanted.
- Stabilize and revegetate all other remaining impact areas.

For the section of the route from 13,000 ft. to the summit, a plan was developed to mark or identify a route up the ridge with cairns (Class II), to make selective improvements as needed (Class III), and to monitor impacts.

During the summers of 1997 and 1998, RMFI spent a total of 24 weeks reclaiming the section of the route between 12,000- 13,000 ft. Approximately 200 tons of rock was moved from adjacent boulder fields to reclaim the gully and construct the new alternate route. RMFI also marked the route up the west ridge from the saddle to the summit with cairns. In total, approximately 3,000 ft. of the existing route was improved and 2,000 ft. of the gully and social trails were reclaimed. Approximately 1,000 ft. of new trail was built. The west ridge was defined with cairns 150 ft. apart.

Seasonal crews hired and trained by RMFI with the assistance of over 300 volunteers completed the work. These volunteers devoted nearly 1,000 volunteer days to the project. The volunteers included individuals recruited by the Colorado Fourteeners Initiative as well as persons involved with the CFI partner organizations. These organizations included: the Colorado Outward Bound School, America's Adventures, the Colorado Mountain Club, Mountain Trails Youth Ranch, the Rocky Mountain Youth Corps, and Volunteers for Outdoor Colorado.

The work in 1998 and 1999 was funded through contributions and grants from a number of sources including CFI and its partner organizations, Great Outdoors Colorado, the National Forest Foundation, the US Forest Service, the Conservation Alliance, and numerous companies within the outdoor industry.

The effectiveness of the restoration work on Mount Humboldt is of key concern to RMFI and the US Forest Service. During the summer of 1998, a study was begun by Colorado College to examine the success of the sod transplantation that was completed. After one year of study, it appears that turf-transplantation is an effective method for reclaiming disturbed sites in this particular alpine vegetation community (Conlin, 1999). However, further study is needed to evaluate the full effectiveness of this technique. The success of the two other revegetation techniques that were used to reclaim this section of the route, transplantation of individual tillers and seeding, are presently being studied.

Closing Comments

The work completed on Mount Humboldt to date has succeeded in mitigating a great deal of the climbing impacts on this alpine peak. There is little question that this type of work is greatly needed on other similarly impacted peaks and that it has obvious benefits. However, considerable restoration work remains to be done on Mount Humboldt and additional improvements are still needed on the upper sections of the peak. Furthermore, RMFI does not claim to have fully "restored" the areas of the peak that we have worked on. Full restoration implies a return to pre-disturbance conditions. While this is an important standard to have in wilderness, the Mount Humboldt project is proving the monumental difficulty of achieving this in alpine environs. There is little question that the most important lesson that the Mount Humboldt project has taught, and continues to teach, is the significance of preventing disturbances of the type and magnitude that have taken place on the peak from occurring in the first place.

LITERATURE CITED

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