

Problem: Perpetual seepage. *This seepage/drainage area is a growing problem and will continually push trail users farther toward the edge, causing trail creep. A simple boardwalk could remedy this situation.*



Problem: New trail too steeply traverses a rocky slope. *The trail will capture all of the rainfall on the tread, plus that from the slope above it (right). This will cause unsustainable erosion and, ultimately, the trail will have to be redesigned.*



Problem: Growing impact to driveway approach. *One of the most pressing concerns associated with forest access routes and right-of-way trails is the impact to driveway and road approaches. This example is close to the threshold for being unacceptable. If it gets worse, closure of the route by the local government engineer is likely.*



Problem: "Social" play area. *This sandy area is undoubtedly fun to spin around in. At an OHV recreation site, this might even be acceptable in a controlled area. But as part of a forest access route system, this would be the sign of a growing problem that if not controlled would result in the eventual closure of the area.*

Important qualifier!

The initial finding of an unsustainable trail condition does not have to automatically lead to closure. Instead, it should trigger a very assertive process of trying to solve the problem by working with user groups and law-enforcement agencies. If that good-faith effort proves unsuccessful, then more dramatic action which could include trail closure is indeed required to avoid further degrading of ecological systems.

Notably, the time frame on taking action can be very short if the situation is of major concern, such as illegal cross-country travel through a wetland. In such situations, temporary closures can also be used to limit further degradation, call attention to the situation, and allow enough time to work toward a solution.

Unsustainable Trail Characteristics – Action Mandated

Trails reach an unsustainable threshold when a problem cannot be reasonably solved and/or past maintenance has not proven successful. Trails are considered unsustainable if one or more of the conditions are found:

- Tread is not stable and does not retain a surface capable of supporting the intended use (most often exhibited by rutting of 6 inches or more in depth)
- Displacement of soils from the trail tread is excessive, causing extensive berming on the outside of curves beyond that which was intended in the design of the trail
- Trail does not drain well and erosion is occurring on an ongoing basis
- Trail tread is restricting site hydrology, causing changes in surface and sub-surface water flows, and/or creating mudholes
- Impacts to ecological systems (especially wetlands and rare and endangered species) are caused by poor trail alignment or cross-country travel and bypassing

Unsustainability can be caused by a single event or a collection of events. Of all the factors that create an unsustainable condition, illegal bypassing and cross country travel are the most likely to lead to trail closure due to the impact they have on adjoining ecological systems and the difficulty of resolving the problem through trail maintenance and enforcement.

The following photographs illustrate unsustainable conditions associated with a variety of natural trails.



Problem: Compacted and displaced tread in lowland area makes the tread unstable. *Attempting to drain this tread would drain the entire area, unacceptably changing the hydrology of an adjacent wetland. Rerouting or closure of the trail is mandatory.*



Problem: Severe soil erosion adjacent to a hillside due to poor trail design. *This will indefinitely continue and cause increasing levels of downstream sediment. Rerouting or closure of the trail is mandatory.*



Problem: This ATV trail goes across a shallow drainage that has been deepened through use. *This will continue until the hole is too deep to go through, which will force riders to bypass the area, which will cause further problems. Proactive rerouting is the best solution, although closure might be necessary if the problem is persistent in the area.*



Problem: Compaction and displacement on a near-level site deepening the tread of this relatively new ATV trail. *Water ponds on the tread because it is the lowest point. Fixing the problem by improving drainage and perhaps hardening the tread through this section are possible solutions.*



Problem: Trail sprawl. *If seemingly minor holes and ruts are left unchecked, it is inevitable that a trail will keep expanding and/or new bypasses will be created. These problems are common in areas of organic soils and solving them is no small challenge. Avoiding organic soils is the best solution. Where that is not possible, careful alignment using rolling grade techniques and site anchors to keep riders on the trail can help curtail problems.*



Problem: Severe, ongoing erosion on a modest slope. *Disregarding the drainage characteristics of a site is a prescription for this kind of problem. This trail will have to be redesigned using rolling grade techniques if it is to be sustainable. Otherwise, closure will ultimately be necessary as the problem gets worse.*



Problem: Excessive displacement. *Heavy use, erodible soils, and lack of rolling grade have combined to excessively displace soils along this trail. Rerouting and/or closure is necessary since fixing this is almost impossible.*



Problem: Ignoring gated areas causes damage to other trails and reinforces a poor public image. *Lack of respect for closed areas only leads to increased pressure to restrict use. Peer pressure is the most successful means of instilling responsibility in trail users.*



Problem: Bypassing causing unacceptable ecological impacts. *Immediate closure of the trail will be necessary to curtail this from getting worse. The area is simply not well suited for an ATV trail.*



Problem: Cross-country travel through sensitive natural area, creating unacceptable impacts. *Immediate closure of this trail is in order to avoid continued degradation.*



Problem: "Social" cross-country trail follows steep fall line on erodible soils. *Continued erosion of this trail on sandy soils is almost assured, eventually causing riders to create yet another bypass that will result in the same outcome. Unchecked cross-country travel is not sustainable, and efforts to curtail this activity through peer groups and enforcement are necessary if long-term access to an area is to be assured.*



Problem: Bypassing. *The deep rutting on the right encouraged riders to create a new route, which over time will also likely rut in these organic soils. Since this is a designated OHV trail, realigning the trail to higher and more stable ground is the best solution.*

If natural trail systems are monitored on an ongoing basis, many unsustainable conditions can be caught and resolved before damage becomes severe. By staying abreast of changing conditions and working with user groups to solve problems, resource managers help ensure continued access to designated and forest access routes. Lacking this attention to sustainability, it is reasonable to expect that public pressure to curtail the use of public lands for recreation will mount and ultimately result in more restricted access.

Use of road rights-of-way for ATV travel is an increasingly challenging issue due to public concerns about safety, aesthetics, and impacts driveway approaches, vegetation, and soil stability. In select situations, rights-of-way are being used as a legitimate part of a larger OHV trail system, primarily serving as a means to provide reasonable access to designated OHV or forest access routes. Equally common is not allowing any ATV travel in roadway rights-of-way due to unacceptable levels of impacts.

At present, local jurisdictions determine the degree to which ATVs are allowed in road rights-of-way based on technical evaluations of impact and public opinion. Given the increasing public concern about this issue, local jurisdictions are encouraged to clearly define and enforce restrictions on the use of road rights-of-way for OHV use. The following photos highlight increasingly unsustainable conditions that, if left unchecked, often lead to more restrictive policies on ATV access.





Problem: Increasingly unsustainable impacts to driveway approaches. *In each of these cases, the loss of stabilizing vegetation and rutting/displacement of soils is exposing the pavement edge and undercutting its structural integrity. Of all the conditions that concern local roadway engineers, this is the one that gets the most immediate attention simply because of the safety concerns and ongoing maintenance costs.*







Problem: Excessive impacts to roadway rights-of-way. *In each of these examples, ATVs are illegally using rights-of-way as de facto corridor trails, which impacts the roadside aesthetic and often causes varying degrees of environmental degradation. Damage to roadside wetlands (top left), steep, erodible slopes (above), and arbitrary roadway crossings (bottom left) are all cause for concern and often result in broader restrictions on the use of ATVs in these areas.*

Acceptable Conditions Related to Sustainability

In certain prescribed situations, seemingly unsustainable trails are acceptable within specific space and design parameters. This is almost exclusively limited to designated OHV recreation areas and very select OHV trails, as the following photos illustrate.



This water crossing challenge area is purposefully isolated to prevent sediment from getting into larger hydrologic systems. The whole area is less than an acre and is sufficient to meet this limited need.



This scramble area allows riders to mess around in a confined space. This helps prevent such activity from happening somewhere else where it would be less controlled and pose a greater environmental concern.



This fall-line trail challenges rider and machine climbing ability. Although steep, this trail is relatively stable due to soil conditions and routine maintenance.



This rock crawl area provides hours of entertainment to a select group of ORVs who otherwise would have a hard time finding a legal place to use their vehicles.



This short but very challenging ATV technical course provides an outlet for advanced riders to test their skills. Again, this is in a controlled space where runoff and erosion can be reasonably managed. The heavily anchored trail (tree cover) also keeps riders from straying from the designated corridor.



This seemingly impossible OHM climb would likely never be provided outside the confines of a designated OHV recreation area.

These examples highlight that providing an outlet for high impact activities reduces the likelihood of them occurring elsewhere in an unauthorized manner. Such facilities make it possible to hold users more accountable for the responsible use of trails and public lands where such activities would be less sustainable and inappropriate.

Taking Action on Unsustainable Trails

Occasionally, trails will become unsustainable due to poor design, improper use, or higher-than-expected use levels for the given classification. Whatever the cause, action is necessary to avoid further degradation of the trail and surrounding ecological systems.

When an unsustainable threshold is reached, the options are to restrict use, reclassify, or decommission the trail.

Restricting Use of a Trail

Restricting use is one option when trails become unsustainable. Of all of the options, use restrictions offers the most flexibility in that they can be applied as warranted by a given situation. With respect to recreational pursuits, options for restricting use of trails and forest access routes include the following:

- Temporary closure to allow time to resolve the situation with user groups
- Limited restrictions on the type of use allowed on either a seasonal or specified-time basis (e.g., closing an area for a year or two to allow it to recover)
- Full restrictions on a given type of use

Reclassifying a Trail

If a trail is found to be unsustainable, reclassifying it to a higher or lower level trail is an option as long as the consequences are understood. If a trail classification is raised, that usually entails a higher level of design, management, and stewardship, each of which has cost implications. If a trail classification is lowered, it typically means some former use will no longer be allowed. The difficulty of either of these options underscores the importance of making sure that trails are properly classified in the first place and that if sustainability cannot be assured to begin with, then the viability of a trail should be closely scrutinized.

OHV trails require the most planning and design diligence because they are most prone to becoming unsustainable; followed by trails for horseback riding, mountain biking, and hiking in descending order.

For OHV uses, the most likely scenario for reclassifying a trail relates to forest access routes, which are typically existing low-maintenance or lower-level routes and old logging trails through county, state, and federal forests or other public lands that are open to general recreational use. Under this classification, these trails are made available to motorized and nonmotorized activities only *as long as those uses remain sustainable with limited maintenance* since these routes can be very extensive and it is unlikely that resource managers would ever be able to go beyond very basic maintenance. As long as use levels are relatively low and users are responsible, these trails can be sustainable.

Should a forest access routes become unsustainable, there are two options:

- Raising the classification level to "designated OHV trail," which brings with it higher design and stewardship requirements needed to achieve a sustainable condition
- Lower the classification to "hunter/walker trail," which eliminates motorized uses and therefore greatly reduces the likelihood of further impacts

Notably, classification should be raised to a designated OHV trail only if the route is needed as part of a larger OHV trail system plan. Otherwise, arbitrarily raising it without the capacity to redesign and manage the new trail only leads to more impacts and more dramatic restrictions to access later on. This same logic holds true for other types of trails as well, albeit the likelihood of unsustainable conditions occurring is smaller.

Decommissioning a Trail

Decommissioning a trail simply means taking it out of use and restoring it to some semblance of the pretrail conditions. The goal is to enable nature to reclaim the site quickly and in a cost-effective way. The following Guiding Principle #7 – Formally Decommission and Restore Closed or Unsustainable Trail Corridors covers this issue in greater detail.

Guiding Principle #7 – Formally Decommission and Restore Closed or Unsustainable Trail Corridors

Decommissioning relates to closing a trail and returning it to a natural state consistent with the surrounding landscape. Whether due to an unsustainable condition or the need to reroute a trail to improve performance, formal closure and some level of site restoration is necessary to prevent further use of the corridor. This is especially the case with natural surface trails that have well-established use patterns, where it can be quite difficult to change existing use patterns.

When a trail is closed or a trail segment is rerouted, at a minimum the visible ends of the old trail should be regraded back to the original slopes, the eroded soil there should be replaced, and the trail end should be replanted with native plants. The use of a physical barrier *and* reducing the visibility of the old trail tread are both necessary to effectively close a trail. Experience has shown that relying solely on fences and gates to block entrances of decommissioned trails is not very effective. Lacking other visual cues that the trail is closed, users tend to bypass a barrier to continue accessing a trail, as the following photos illustrate.



A single sign mounted to the side of an expanse of seemingly intact trail is nearly always ignored.


A trail closed with a gate remains inviting to use, and the gate, even when combined with fencing, is often bypassed. Although gates are commonly used for seasonal closures, they are not typically enough to formally decommission a trail.


The barrier stones in the foreground are easily bypassed, and ATV tracks are visible where users have gone around the stone on the left. Again, the visible trail is too enticing for some visitors to resist.


Seen from the top of the hill, this grassy area was a former hill climb and scramble area for OHVs. Even though it was planted with grass and closed to motorized use, some users directly penetrate the barriers while others go around them to form new side trails. The temptation is visual and is caused partly by sightlines. Filling the area with planted trees would greatly reduce the temptation and improve compliance.

Given the difficulty of breaking established use patterns, site repair should be performed on all closed trails as soon as possible after decommissioning. The following provides some guidelines for blocking and restoring entrances to reduce the appeal of using decommissioned trails.

Dense Planting at Trail Entrances and Along Trail Corridors

Densely planted trees, shrubs, and herbaceous species (depending on landscape and location) help create a sense of permanence, stability, and naturalness in a decommissioned trail corridor. Most trail users will respect a closed area planted with dense plants, especially large trees.

If the entrance to a decommissioned trail corridor is wooded, site repair should include native trees or woody shrubs to match or even exceed the density of the surrounding site. Since rehabilitation is intended to create a visual repair, tree planting is most effective if the planted trees are of a variety of ages and heights. If possible, transplant large conifers from nearby forest and/or plant balled-and-burlapped trees of any indigenous species in a natural pattern as long as site conditions or regular maintenance can reasonably ensure tree survival. The following photos illustrate this approach.



This band of even-aged conifers was once an OHV scramble area. Trail users repeatedly tore down a chain link fence across the access. After the trees were densely planted on the hillside behind the repaired fence, all illegal usage ceased and no new scramble areas developed.



Transplanted trees, large stones, and piles of dense slash were used to visually and physically block the entrance to this restoration area. Planting more trees would have further blocked the sightline, although visitor compliance has been very good even with the existing effort.



Transplanted trees of various sizes were used to narrow a road/trail that was widened by off-trail OHV use. Visitor compliance is good, but some visitors still enter the area as shown by the ATV tracks on the far right of the photo. Adding more trees or naturalizing bare soil would further improved compliance.



Not enough trees! Although the conifers in the center were planted to block lake access by OHVs, such an enticing destination requires a much more dense blockade of trees. Note how visitors readily formed a new bypass around the trees (right). In this location, many more trees are needed, and trees alone may be insufficient for an effective physical barrier.

Closure Berms to Block Entrances of Selected Decommissioned Trails

Physical closure of roads and trails wider than 6 feet can be reinforced with a constructed earthen berm at least 54 inches high to send a clear message to trail users. Entrances to trails less than 6 feet can be bermed as deemed appropriate.

The intent is to physically and visually block the former entrance with a steep berm that purposefully looks like an intentional, reinforced, "we mean it" closure. The sides of the berm should be left at or near the angle of repose to make them steep and to look like a barrier. Both ends of the berm should extend beyond the former trail entrance for as long as necessary to prevent visitors from seeing a closed trail behind the berm. For at least the first few years, the berm should be posted with signs such as Restoration Area – Keep Off or Seedlings Planting – Keep Off. Multiple signs should be used for each site, and the signs should look utilitarian and authoritative. Construction fence, such as orange plastic mesh fence, should also be used in front of the berm to reinforce the message until vegetation is well established.

Note that much of the purpose of a closure berm is psychological – it needs to send a strong signal that the area behind the berm is permanently closed. Avoid softening the edges, tapering the ends, or making "friendly" signs since these will undermine the psychological signal. Unlike other aspects of trail work described in these guidelines, closure berms should look rigid, unyielding, angular, and authoritative. Some visitors will climb the berm just to see what's on the other side, but the berm still serves as a strong psychological barrier that is more effective than a fence-type barrier. Once the trail has been completely restored, the berm can often be reshaped or removed to blend into the natural setting. The following photos illustrate a variety of closure berms.



A road closure berm with embedded rocks has prevented traffic from entering this closed trail. Planting trees on the berm would help even more. Behind the berm, the forest is filling in through natural processes.



This recently constructed berm closes a rerouted trail. Conifer seedlings were planted behind and on the berm. The sign reads, "Seedlings Planted – Keep Off" and the tops of the wood posts are emphasized with red paint. This berm has kept motorized traffic out of the closed area.



A straight forest road/trail was rerouted to the left (where the vehicle is heading) and the old route was hidden with a low berm (behind the orange fence) and planted conifers. The conifers largely hide the berm and the former route. This closure would have been even more successful if more trees had been planted and if the grade and ground cover in front of the berm were completely restored.



In addition to a closure berm, this road/trail was also closed with intermediate berms and slash. This is most effective in heavily wooded areas where off-trail travel is difficult.

To maximize effectiveness, the berm must be densely planted with native ground vegetation and, if possible, trees. Trees for the site – especially a dense wall of 6- to 10-foot high conifers planted on and around the berm – greatly help to reinforce the closure message and invoke a sense of permanence that enhances compliance in many trail users. If large trees cannot be successfully transplanted, planting many seedlings is an alternative approach. Note that conifers should only be used in sites where they occur naturally. In other locations, area-appropriate trees or shrubs should be used.

Using Slash to Reinforce Trail Decommissioning

Under certain conditions, slash can be used to reinforce closed areas. This is especially the case where restoration efforts will take more time to reestablish native vegetation and an interim solution is needed to reinforce trail closure.

To be effective, slash should be thick, tangled, and obvious so that it forms an unambiguous visible barrier. In order to best disrupt the line of the trail, arrange branches and trunks across the trail at various angles, rather than parallel to or at right angles to the trail. Seeds, preferably collected from a local source, could then be added over time if the slash isn't too thick. The following photos illustrate the use of slashing to reinforce trail closure.



Slash was used to close the entrance to an eroded fall-line OHV trail in the upper center of the photo. Ideally, the entire visible section of the decommissioned trail should have been restored or closed with slash.



The entrance to a forest trail was filled with slash in lieu of backfilling and restoration. Natural processes are restoring native vegetation without seeding.



This deeply eroded horse trail in sandy soil was closed with slash and a trail closure sign pending further action. Further erosion could be reduced by adding considerably more thick slash.



This resource rest area sign explains the concept in a friendly yet authoritative way designed to attempt to elicit cooperation and create stewardship.

Renaturalizing Decommissioned Trail Corridors

Renaturalizing a decommissioned trail refers to restoring the ecosystem and surface drainage of the corridor to reasonably replicate its original condition. Renaturalization cannot fully restore a site to its pretrail condition, but it can significantly enhance natural ecosystem structure and function. Hence, site repair is important and should be performed at some level on all decommissioned trail segments.

General Renaturalization Considerations

Ideally, all decommissioned trail corridors should be renaturalized as thoroughly as possible to replicate surrounding natural systems. Realistically, major re-naturalization can prove difficult or even undesirable because of associated costs, risk of introducing exotic species, or risk of causing excessive damage during repair operations. Therefore, different parts of the same corridor can be repaired to varying standards depending on the extent of impact, location, and type of ecosystem. For instance, the ends of a decommissioned trail may be extensively repaired to restore the original landform and vegetation as much as practical, while in the center of the trail repair may simply involve stabilizing the site and encouraging natural vegetation succession with or without soil amendment, seeding, planting, or transplanting.

If the repair budget is limited, concentrate on stabilizing the most unstable sections, restoring the most visible or ecologically critical sections, and naturalizing sections that lend themselves to recovery. Volunteers may provide valuable assistance.

Limit Impacts of Renaturalizing Operations

The collateral impact of site repair should be kept to a minimum and generally not exceed more than 20 percent of the surface area being repaired. If the desired level of site repair would cause more extensive adjacent impact, a lower level of naturalization or an alternate means of repair should be used. For wet or fragile sites, consider working while the ground is frozen.

On deeply eroded trails too narrow to be repaired with ground machinery, or in sites where machine access would cause excessive further impact, helicopters may be a feasible way to transport bulk materials without further damaging the site. Depending on the site, ATVs and/or pack animals can sometimes be used without creating additional damage. Volunteers can also do small-scale site repair by hand or with ATVs (where appropriate) with minimal impact.

Develop a Vegetative Management Plan

All renaturalizing activities should follow a vegetative management plan to encourage growth of native plants and control exotic species. The larger the impact area, the more comprehensive the vegetative management plan should be.

During excavation and new construction, organic soil should be stockpiled for revegetation. To be effective, the organic soil layer should be at least 4 inches thick and preferably match that of the surrounding undisturbed area.

Avoid Introducing or Spreading Exotic Plant Species

The following practices will limit the introduction and spreading of exotic plant species:

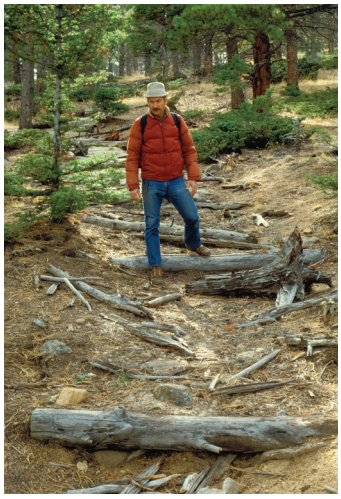
- Soil for fill should be obtained nearby to avoid importing exotic seeds or organisms
- All imported seeds and mulch should be certified as weed-free
- Hand-harvested native local seed and/or transplants can be used when restoring vegetation in highly sensitive areas or areas to be kept as biologically undisturbed as possible.
- Seeding a nurse crop that will die off over time can also help prevent exotic species from becoming established, especially if native seeds are seeded along with the nurse crop. The nurse crop creates a quick vegetative cover which improves germination and survival for slower-growing natives while occupying the ecological niche that might otherwise be filled with exotics
- In ecologically sensitive sites, all seeding can optionally be avoided, with revegetation relying on transplanting nearby plants, scarification, and natural regrowth
- The vegetative management plan should address exotic species eradication or control, including exotic species that are already be growing on the site

Nonvisible Decommissioned Trail Segments Brought to Various Levels of Renaturalization

Decommissioned trail segments not visible from any access point can be renaturalized to different levels depending upon the character of the site, the level of damage, and the risk of creating additional physical or ecological damage during repair. The following criteria should be used for determining which level is most appropriate for a given site:

- **Stabilization** – at a minimum, this is required along the full length of decommissioned trails and surrounding areas. This includes adding drainage control and/or erosion control measures to prevent erosion from increasing; adding slash to eroded ruts to keep visitors out and create protection for seeds; and draining introduced mudholes
- **Scarification** – should be performed where soil is compacted to the point where natural revegetation will be slow, stunted, or will likely consist mostly of weeds. This includes loosening of compacted soil by manual or mechanical means and partially restoring the predamage landform by reshaping and/or through the use of erosion control devices. The soil surface is typically left relatively rough so seeds have many protected and moist niches in which to sprout. The area may or may not to be reseeded
- **Naturalization** – should be performed where accelerated revegetation, quick visual concealment of damage, and reestablishment of historic surface water movement is needed. This includes filling or reshaping trail ruts and site scars to blend with or match the original landform; seeding with indigenous plants or transplants from the surrounding areas according to the vegetative management plan; covering bare soil with forest duff and fallen trees as appropriate using a natural pattern to seamlessly blend the site into the surrounding area; and planting or transplanting indigenous live trees of various age classes as appropriate for the ecosystem

The following photos highlight the various levels of trail corridor renaturalization.





Stabilization of gullied fall-line trail with check dams made from dead trees (left) and with check dams plus erosion control blanket in steeper areas (right). Erosion control blanket doubles as mulch.





(Left) Scarification of a former compacted trail surface was mechanically ripped and topsoil and organic material from the replacement trail were added to partially fill the old tread.

(Right) Compacted soil was loosened and the tread was reshaped to more closely match the surrounding hillside, with dead logs and some erosion control blankets used for stabilization (right).





(Left) Naturalization extends the duff and moveable site features (soil, fallen trees, branches, rocks) into the repair area in naturalistic ways. The area behind the stone wall is a decommissioned trail recently naturalized without planting. The stone retaining wall supports a new trail in a higher alignment, foreground.

(Right) The foreground trail was just naturalized with soil removed from the reroute (visible horizontally across the top of the photo). The small spruce near the center of the photo was planted in the old trail rut. The backfilled trail was not seeded.

Blend Trail Back Into the Original Landform

For naturalization and rehabilitation, the trail bed, trail ruts, and associated earthwork should be blended back into the original landform. In level areas, this often requires substantial filling of trail ruts and erosion.

On a sideslope alignment, the cutslope and fillslope (below the tread) should be considered impacts. Even if these slopes have revegetated, renaturalization may require pulling the fillslope back up onto the cutslope in order to restore the original surface drainage and landform. Since this creates a larger scar in the short term, the extent to which this should be done can be decided on a case-by-case basis. It can also be done intermittently so that some existing trees or plant species of concern can be preserved.

Vegetated berms, including superelevated curves on OHV and mountain bike trails, may form on one or both sides of many trail segments. These berms should also be considered as a site impact and be removed during renaturalization.



Good and poor trail blending. *(Left) Since the edges of the rut on this trail were filled to the top, the physical trail scar will largely disappear with revegetation. (Right) With the vertical edges of the trail rut left exposed, this trail tread will remain visible. More fill and/or shaving down the vertical edge is needed to form a gradual edge that would revegetate without leaving a telltale scar.*

Remove Structures Requiring Ongoing Maintenance

Culverts, boardwalks, bridges, and other structures that are no longer needed or that will fail over time should be removed when a trail is decommissioned. Exceptions can be made for well-crafted structures or those of historic significance, such as stone bridge abutments or a stone-paved drainage crossing.

Regulatory Reminder!

In Minnesota, there are specific regulatory and permitting requirements associated with trail work impacting water bodies. These are considered in more detail in *Section 1 – Framework for Planning Sustainable Trails.*

Reshape Stream Crossings and Creating Breaks in Floodprone Areas

When removing water crossing structures, the crossings should be reshaped to approximate the original channel and stabilize the stream-banks and approaches. If the decommissioned trail has any long fills across floodplain areas, removal of sections of fill should be considered to accommodate natural water fluctuation.

Backfill Decommissioned Trails With Material from New Trails

If a new trail is being constructed nearby, use excavated material to backfill the old trail as needed. Although some organic soil should be reserved for topping cuts and fills associated with the new trail, some can often be used for nearby site repair.

Native plants salvaged from the new trail can also often be transplanted into the decommissioned trail. If heavy equipment is used, salvageable plants should be removed by hand and transplanted as quickly as possible. If plants have to wait, their soil should be kept moist. Plants should also be watered thoroughly after transplanting.

Managing Drainage and Erosion When Renaturalizing Decommissioned Trails

A variety of techniques can be used to manage drainage and control erosion when trails being renaturalized are most vulnerable to stormwater runoff. Many of these techniques complement the BMPs associated with protecting adjoining natural areas as previously considered in this section. The following considers the most common techniques for this purpose.

Drainage Dips and Crests

Shaping drainage dips and/or crests into the closed trail tread can be an effective way of managing stormwater runoff to prevent erosion of the restored corridor while new vegetation is taking hold. This usually requires cutting through a berm on the outside edge of the trail. The principles of rolling grade as defined in Section 6 – Sustainable Natural Surface Trails can be used to determine spacing between dips.

Although discouraged on active trails, timber waterbars can be used on decommissioned trails as a stopgap measure to prevent erosion while the site is revegetated and stabilized. Because timber waterbars are more prone to failure than are trenches, some of the drainage dips should be dug in and made permanent so the treadway will always drain at manageable intervals.