Guidelines for Closing and Restoring Trails in NYS Parks

A primary goal for all New York State Parks Trail Systems is to develop sustainable trails that have minimal impacts on the environment, require little maintenance, and meet the needs of the users. This document is one of a series of technical documents developed by State Parks to provide standards and guidelines for trail design and development, accessibility, and trail assessment and maintenance techniques that help ensure a sustainable trail system. Additional topics include guidelines for trail signage, trail monitoring, and trail closure and restoration. The complete list of technical documents is provided on the web at: http://www.nysparks.state.ny.us/recreation/trails/technical-assistance.aspx.

These documents were designed for use within New York State Parks but can be used as resources for trail projects outside of the Parks. Within State Parks, use of these documents for implementation of trail projects will be done in conjunction with a review and approval process as laid out in Technical Document 7 - Trail Project Approval Process for NYS Parks. These documents may be updated periodically. Additional documents will be developed in the future as part of this series.

This document provides a step by step process for the closure and restoration of trails which includes appropriate design of any rerouted sections, education about the benefits of the trail closure, removal of structures along the trail, stabilization and naturalization of the trail tread, and monitoring.

The Closure Process

Sometimes it is necessary to close or reroute a trail due to poor initial design, overuse, illegal use, or other natural factors having caused some type of degradation. Trail erosion, the most common reason for the need to relocate a trail or trail section, can be caused by a combination of trail use, gravity and water. Relocating a trail may be hard work and time-consuming, but in the long run, closing a poorly sited trail may be the best strategy for management and maintenance, for the user and for the environment. The decision to close a trail or section of a trail can be the result of a trails planning process which considers the trail system as a whole or on a case by case basis. Closure of a trail or trail section will require the approval of the park manager as discussed in Technical Document 7.

Reclamation strategies include closure, stabilization, recontouring, revegetation, and monitoring. Each site should be evaluated individually for its potential to be rehabilitated. Trail closure and restoration needs to be carefully planned, and the consequences of each strategy should be evaluated. Restoration can be as simple as blocking a closed section of trail and passively allowing the vegetation to recover, or include more complex projects, such as removing any trace of the tread, actively planting native vegetation, and constructing check dams to help stop erosion. Careful monitoring of a restored section of trail is then needed to ensure that little evidence remains of the old trail.
**STEPS:**

1. **Design:** If you are rerouting a section of trail, the new section needs to be well-designed (including sustainable) and better than the section that is being closed. If the new trail doesn't provide a better experience than the old trail, trail users will likely continue to use the old trail. Design the relocated trail so as to create a seamless transition from the existing trail. Trail users shouldn't be able to recognize where the re-route begins.

2. **Closure:** Each closed trail section should be restored, whether an entire trail is abandoned or a section with multiple paths is being narrowed to one tread. If the abandoned trail is not blocked to prevent further use, it may persist indefinitely.

3. **Education:** Most conflict surrounding trail closures can be avoided if people understand why a route must be closed. Be positive and focus on the benefits of the re-route. Remove abandoned trails from trail maps. Recruit volunteers to work on the new section of trail.

4. **Removal:** Remove culverts, bridges, stepping stones, and other structures and materials that were installed to harden the old trail surface. When work is conducted in or near water resources, precautions should be taken to minimize impacts to the water resources. In some cases, permits will be required. This will be determined during the approval process for the project by Regional Staff.

5. **Stabilization and/or Scarification:** Stabilization should be performed on eroded sections of trail tread. This will help prevent future erosion and promote natural revegetation. This includes adding drainage control and/or erosion control measures to prevent erosion from increasing; and adding slash to eroded ruts to keep visitors out and create protection for seeds. Restoring the natural contour of the slope reestablishes the local drainage patterns. Recontouring helps eliminate the temptation to use the old trail. Check dams (see Methods below) are used on sections of trenched tread to stop erosion and hold material in place during site restoration. Scarification may be necessary when the trail tread is compacted. Completely break up, or scarify, the compacted soil to a depth of 4 inches to allow the seeds and roots of new plants to penetrate. This is an important step to aerate the soil and promote natural revegetation.

6. **Naturalization and Revegetation:** Naturalization may include filling or reshaping trail ruts and site scars to blend with or match the original landform and covering bare soil with forest duff and fallen trees as appropriate using a natural pattern to seamlessly blend the site into the surrounding area. Revegetation of the trail can be a passive or an active process. Ideally, the whole length of all closed trails would be renaturalized as thoroughly as possible to replicate surrounding natural systems, but realistically, this can be difficult or even undesirable because of associated costs, risk of introducing invasive 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.

* **Passive Revegetation:**
  Passive restoration, or natural recovery, allows local vegetation to re-establish itself on an abandoned section of trail once the conditions preventing vegetative recovery have been abated (stabilization/scarification). Sometimes active restoration may not be necessary once the human impact has been removed, especially in areas that are wet, where the soil
is in good condition to serve as a seedbed, and that have a suitable native seed source nearby.

• **Active Revegetation:**
  Active restoration usually involves transplanting native plants onto the old trail surface or importing seed that is appropriate for the area. Disturbed soil often provides an opportunity for invasive plant species to take hold. Transplanting native species of shrubs and trees (including those from your re-route construction) can combat these invasives. Use proper transplanting techniques. Rake or sprinkle duff and leaves on bare ground; these may contain seeds that will help promote active revegetation. (More details on active revegetation are provided below under **Methods**.)

7. **Disguise:** The best way to keep people off the closed trail is to make it look like it was never there. Brush, rocks, branches and other natural material should be placed on the abandoned trail for a distance so the linear characteristic of the trail can not be readily identifiable. Use material excavated from a new trail to fill in the closed trail, as needed. Fill in the visual opening of the old trail corridor by planting trees and shrubs. Rake or sprinkle duff and leaves on bare ground. Some type of physical barrier (trees, shrubs, branches, rocks) and reduction in the visibility of the old trail tread and trail corridor are both necessary to effectively close a trail. Relying solely on fences and gates to block entrances of closed trails has not been found to be very effective. Lacking other visual cues that the trail is closed, users tend to bypass a barrier to continue accessing a trail.

8. **Monitor:** A monitoring program for closed trails will include occasional inspections of closed trails. This will allow early detection of any problems (ex. users bypassing the closed entrance, effectiveness of check dams, continued erosion).

**METHODS**

The following provides additional details on two methods mentioned above. Check dams are used during the stabilization phase of trail closure. The section on active revegetation provides a sequence of steps to follow when the decision has been made to actively revegetate a trail and details the advantages and disadvantages of different methods of onsite and offsite propagation.

• **Check Dams** *(From the US Forest Service *Trail Construction and Maintenance Notebook)*:

  Check dams are intended to slow and hold surface water long enough for the water to deposit sediment it is carrying. Check dams are best used as holding structures for fill to help recontour the old tread. The material used in the dam should be seated in an excavated footing that extends into the sides of the gully. As material behind the dam builds up, additional levels can be added to the dam with enough batter to keep the dam stable against the pressure of the fill. The top of the dam should be level or slightly higher than the excavated footing. For watertightness, the uphill face of the dam should be chinked and covered with tamped fill. These trenches take a long time to fill up. Most never do. If they do, add fill below the dam to finish the process.

  Spacing between dams depends on the steepness of the old grade and the degree of restoration desired. If the check dams are intended only to slow down erosion on a 25-percent grade, relatively wide spacing is sufficient, every 20 meters (65 feet). If the intent is to fill in half of the old trench, the bottom of each dam should be level with the top of the next lower
dam. On steeper grades, the dams need to be closer together. If the intent is to approach complete recontouring of the trench, the dams should be closer still, especially on grades steeper than 25 percent. A point of diminishing returns is reached on grades steeper than 40 percent. Check dams would have to be built right on top of each other to retain soil at the full depth of the trench.

- **Active Revegetation**

Successful revegetation may require tending over an extended period of time. The table below is from the US Forest Service *Wilderness and Backcountry Site Restoration Guide (2006)* which provides advantages and disadvantages for a variety of onsite and offsite propagation methods. Different methods may be appropriate in different situations depending on local terrain and ecological community type, weather conditions, associated costs, and available resources including staff and volunteer time, among others.

The following sequence of events is used when implementing an active restoration project:

1. Select an appropriate plant community as a model for the restoration prescription.
2. Assess soil conditions and formulate treatments.
3. Select appropriate plant species and propagation methods.
4. Identify methods for protecting the project from damaging environmental forces and human use.
5. Determine how the project will be documented and monitored.
6. Identify ongoing maintenance needs.
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<thead>
<tr>
<th><strong>Onsite propagation method</strong></th>
<th><strong>Advantages</strong></th>
<th><strong>Disadvantages</strong></th>
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<tbody>
<tr>
<td>Common to all methods of onsite propagation.</td>
<td>All methods, if successful, are less expensive than offsite propagation and generally eliminate the time required to propagate plants.</td>
<td>Plant materials for propagation often are limited. Success can be limited in many environments.</td>
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<td>Onsite seeding – Native seeds are collected and sown directly onto the area to be restored.</td>
<td>If successful, this method is relatively inexpensive. For small areas, onsite seeding can be accomplished without special equipment. Most seeds would not require special treatment to break dormancy. Treatment can be done without delay while plants are growing in a nursery. The genetic diversity of the plant community is maintained.</td>
<td>Germination rates are low in many environments, such as in arid lands and in the subalpine zone. Seeds sown on arid lands could be dormant for years before rainfall is adequate to induce germination. Seed production and viability can vary tremendously from year to year. Seed may have to be collected several years in advance. It can take many years for seedling plants to mature and establish stand structures similar to the target plant community. Rodents, birds, or insects can eat the seeds.</td>
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<td>Onsite rooting of cuttings – A limited number of species will root when the cuttings are planted directly in moist soil on the area to be restored.</td>
<td>If successful, this method is relatively inexpensive. Treatment can be done without the delay of growing plants in a nursery. Onsite rooting of cuttings works well with bioengineering methods of slope stabilization. Larger plants are more visible at the restoration site and could deter use.</td>
<td>This technique requires that the soil be moist long enough for the seedling to develop an adequate root system; generally limited to riparian areas. Success is limited to genera and species that root readily, such as willow (Salix spp.), some dogwoods (Cornus spp.), cottonwood and poplar (Populus spp.), some alder (Alnus spp.), some elderberry (Sambucus spp.), and honeysuckle (Lonicera spp.). Plant material for cuttings may be limited. New plants are a clone of the parent plant, limiting genetic diversity. This technique is more labor intensive than seeding.</td>
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<td>Onsite divisions – Species with fibrous root systems, rhizomes, or stolons can be dug up, broken apart at the roots into multiple plants, and transplanted. Sprigging is a variation where small plant parts are scattered across the site and raked or tilled into the soil without planting each part individually.</td>
<td>If successful, this method is relatively inexpensive. Treatment can be done without the delay of growing plants in a nursery.</td>
<td>Plant material to be broken apart may be limited. New plants are a clone of the parent plant, limited diversity. Onsite divisions require more labor than seeding. Onsite divisions can damage undisturbed areas where material is collected. Holes need to be filled after transplants are dug up.</td>
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| Onsite layering – The attached branch or shoot of a parent plant is rooted. | Works well on trails that have shrubs growing alongside the trail. | Success is limited to species that layer or root readily.  
Onsite layering generally is useful only where appropriate shrubs, trees, or vines are growing alongside the site being treated.  
The new plants are a clone of the parent plant, limiting diversity. |
| Transplanting wildlings – Native local plants are dug up and transplanted. | Ground-disturbing projects that are occurring nearby, such as trail or road construction, can be a source of transplants.  
Local plants are adapted to the area.  
This technique produces results immediately with more mature plants.  
Larger plants are more visible at restoration site and could help deter use while the site is recovering. | Not all wildlings will transplant well, especially large plants, plants with taproots, or plants with very specific requirements for establishment.  
Unless transplants are salvaged, transplanting damages the undisturbed area where the transplants are collected.  
Salvage operations often require holding plant materials until they can be replanted.  
This increases the labor required and can complicate the logistics. |

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| Common to all methods of offsite propagation. Nursery stock types range from bareroot plants, to small containers or plugs, and to larger containers. The preferred stock type is based on predicted survival requirements and project goals. | For many environments, offsite propagation allows for much more rapid stabilization of the site and establishment of the plants at the site.  
Offsite propagation is the best way to propagate plants that are difficult to establish with onsite techniques.  
Offsite propagation prevents damage to the collection site caused by overcollection of materials that are needed for most onsite propagation techniques. | All offsite propagation techniques require varying amounts of facilities, equipment, staff expertise, and daily care, raising costs considerably above those for onsite treatments.  
The time needed to propagate species may range from 6 months to several years.  
Pathogens or other nonnative insect or plant species may be introduced.  
Transportation of plants to roadless project locations increases the cost and adds logistical difficulties.  
Plants may need to be held at the nursery until they can be outplanted.  
This increases logistical difficulties and the possibility that plants may not survive.  
Animals are most likely to eat fertilized nursery-grown stock once it’s outplanted. |
| Offsite seedlings – Native seeds are collected and sown into nursery beds, flats, or containers. | Offsite propagation can produce better germination and survival rates than onsite seeding.  
The diversity of the plant community is generally maintained. | Seed production and viability can vary tremendously from year to year.  
It may be necessary to collect seed several years in advance.  
Offsite germination and growing conditions may select for or against certain traits, changing the genetics of propagated plants. |
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<td>Offsite rooting of cuttings – A portion of the plant, usually the stem, is cut off and rooted. Different species respond to different types of cuttings.</td>
<td>Offsite rooting of cuttings is a good method when seed is unavailable or difficult to work with. A wide variety of species will root from cuttings. Many species grow faster from cuttings.</td>
<td>New plants are a clone of the parent plant, limiting diversity.</td>
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<tr>
<td>Offsite divisions – Species with fibrous root systems, rhizomes, or stolons can be dug up, broken apart at the roots into multiple plants, and then transplanted.</td>
<td>Offsite divisions is a good method when seed is unavailable or difficult to work with. Divisions can be made over and over in a nursery until it is time to outplant the seedlings.</td>
<td>The new plant is a clone of the parent plant, limiting diversity.</td>
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<td>Seed-increase programs – Native seed is collected onsite and grown offsite to produce a seed crop.</td>
<td>Seed-increase programs are the only way to multiply a small amount of seed into a large amount. This technique is best used when a large quantity of seed is needed. Seed can be used as soon as it is produced, or stored until it is needed for fire rehabilitation or mine reclamation.</td>
<td>The plant’s genetic makeup can shift based on growing conditions, harvest timing and methods, and seed-cleaning techniques. It is difficult not to introduce weed seed.</td>
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<td>Tissue propagation – Plants are propagated from very small pieces of plant material, such as the growing tips of shoots.</td>
<td>Tissue propagation is generally used with species that are difficult to propagate or with rare plants with limited vegetative material available for propagation.</td>
<td>This technique is very expensive. New plants are a clone of the parent plant, limiting diversity.</td>
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**RESOURCES**

International Mountain Bicycling Association. “Closing and Reclaiming Damaged Trails.”  


[http://www.treesearch.fs.fed.us/pubs/26795](http://www.treesearch.fs.fed.us/pubs/26795)