A greenway or trail, once established, becomes an institution in your community requiring management and maintenance. These needs will vary greatly from project to project, depending on the goals and functions of the greenway and the level of development and use of a trail. For example, while a conservation greenway with a “hands off” policy may require little management and maintenance, a recreational trail will require major maintenance tasks, such as periodic resurfacing.

Recreation professionals should have identified the needs of your project and addressed them in the master plan. This section is intended to provide an overview of general management and some maintenance guidance from greenway and trail managers with practical field experience in various recreation facilities throughout Virginia.
Managing the Greenway or Trail

Administration is easiest if the greenway or trail is operated by an existing NGO or a local governmental department. Otherwise, appropriate administrative structures and policies must be created. Management activities can be grouped into the following categories:

<table>
<thead>
<tr>
<th>MANAGEMENT ACTIVITIES</th>
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</thead>
<tbody>
<tr>
<td>Supervising staff and volunteers</td>
</tr>
<tr>
<td>Raising operational funds</td>
</tr>
<tr>
<td>Administering the operating budget</td>
</tr>
<tr>
<td>Managing Use Conflicts</td>
</tr>
<tr>
<td>Implementing policies</td>
</tr>
<tr>
<td>Conducting public relations activities</td>
</tr>
<tr>
<td>Planning future work</td>
</tr>
</tbody>
</table>

Maintaining the Greenway or Trail

In the maintenance plan section of the master plan you identified maintenance tasks, specified a timetable, and identified who will carry out each activity. Maintenance tasks generally fall into one of three categories listed and the described below:

**Routine Maintenance Tasks** - Routine maintenance tasks will be scheduled and performed by staff and volunteers at various intervals. The following are some routine maintenance tasks that will commonly be needed:

**Long-Term Maintenance** - The master plan should
ROUTINE MAINTENANCE TASKS

Activity:  
Security patrol  Daily  
Clean comfort stations  Daily  
Refuse removal  Weekly  
Vegetation control, grass  Weekly  
Inspect for maintenance  Monthly or after storms  
Clear culverts, drains  Every fall or after storms  
Vegetation control, brush  Twice per season  
Snow and debris removal  As needed  
Minor repairs  As needed  

indicate likely long-term maintenance needs. To prepare for these expenditures, your annual operating budget should include contributions to a long-term maintenance fund. Alternatively, a fundraising campaign may be needed in advance of any major maintenance work. Be aware that some long-term maintenance activities may require construction permits and must be conducted in compliance with local ordinances and codes.

Long-term maintenance may involve upkeep such as

LONG-TERM MAINTENANCE TASKS

Activity:  
Repaint blazes  Every 5 years  
Repaint buildings  Every 5 years  
Renovate buildings  Ever 10-20 years, or as needed  
Resurface trail  Every 10 years, or as needed  
Inspect bridges and tunnels  Yearly  

Emergency Repairs - Emergency repairs may be necessitated by storm damage, flooding, or other accidents. A wise management plan will include contingency plans to quickly deal with these calamities and effect repairs. Contingency plans for storm damage, for instance, might include preparing a list of volunteers who own chain saws, winches, trucks, and other equipment necessary for clearing downed trees from a trail. Contingency plans to protect a greenway from a chemical spill could include mobilizing fire departments, VDOT, and DEQ spill response teams.
repainting buildings or replacement of items with a limited life expectancy. For example, picnic tables should be replaced every five or ten years. Buildings, in particular, require considerable care and occasional renovation. Competent maintenance staff or volunteers on a properties committee can advise on proper care and maintenance. Numerous manuals for the homeowner and contractor are available through bookstores and libraries.

The following are some items on greenways and trails that should be scheduled for long-term maintenance:

**Budgeting for Operating and Maintenance Costs**

The operators of a greenway or trail will need to raise funds for an annual operating and maintenance budget. In the case of public ownership, the administering agency will dedicate some of its annual appropriations to maintenance. If multiple municipalities are involved, each might be assessed some portion of the maintenance costs based on a predetermined formula. Occasionally, matching funds are provided to individual municipalities that earmark a percentage of their annual budget for trail operation and maintenance. As with development costs, annual operating and maintenance costs vary greatly depending on the level of development and usage.

The balance of this section is taken from the *Trail Development and Management Standard Operating Procedures Manual* developed by DCR, Division of State Parks.

**Maintenance of Trails**

Trail maintenance begins immediately following construction and is an ongoing regular aspect of park operations. An objective in trail construction is to minimize the need for maintenance. However, in order to insure visitor safety and resource protection, a system of regular inspection followed by routine and necessary maintenance is imperative. Maintenance is the key to keeping your investment in the trail. Routine trail maintenance often suffers during times of budget reduction, yet the trails typically remain open. This is an unwise practice, often resulting in substandard and poorly marked trails, and as time passes, the cost of restoring the trail to acceptable standards has substantially increased.

The condition and resulting maintenance demands of a trail is affected by the amount and type of use the trail receives. Each trail has a usage limit. The usage limit however, is determined by more than just the amount of use. The usage limit is influenced by the following factors: environmental conditions impacting the trail, quality of site selection, ground cover and terrain, trail construction, adherence to maintenance requirements, and the volume and types of trail use.

Changes to any of the influencing factors may require modifications in the usage limit through the assessment and inspection process. Modifications could include re-routing the trail, restrictions on type of use (bikes, horses), improvements to tread surface or water drainage structures, and potentially even closing the trail.

In today’s litigious society, trail users may be tempted to sue the managing agency for any accident that occurs
on a trail. Fortunately in the Commonwealth, the Virginia Tort Claims Act (8.01-195.1, Code of Virginia) (Appendix XV) defines the scope of governmental liability. Furthermore, the Recreational Use Statute (29.1-509, Code of Virginia) (Appendix H) more clearly defines the liability of government agencies when providing recreational opportunities for the public. These laws shift the burden of responsibility from the land manager to the trail user. This by no means completely relieves the agency from all liability. Government agencies are liable when found to be negligent. Negligence is predicated on the knowledge of a dangerous condition. For example, if a land manager knew about a hazard and failed to make repairs or post warnings, before an accident occurred, the agency could be found liable.

The best solution to liability problems is to perform periodic inspections and maintenance to trails and support facilities. Documenting these regular inspections can prove adherence to legal duties and significantly reduce the chance of incurring liability claims.

To ensure that trail standards are met and visitors and resources are protected, a systematic approach of regular inspection and maintenance shall be undertaken on all open trails. Trails that fail to meet standards will be closed until such time that they can be brought up to standards.

**Standards**
The standards are described in 6 categories—Trail Log and Inspections, Vegetation Maintenance, Tread Maintenance, Drainage Maintenance, Structure Maintenance and Sign Maintenance.

**Trail Log and Inspection**—A trail log is prepared for each trail. Inspection of each trail is conducted at least twice a year, utilizing the Trail Log and Inspection Form. Log and inspections are dated when conducted and kept on file.

Conditions identified through the inspection that fail to meet standards are corrected in a timely manner, or the trail is closed.

**Vegetation Maintenance**—Vegetation shall be cleared such that the Trail Corridor has the required vertical and horizontal clearance dictated by the type of trail.

Trimming and pruning activity should be done in a responsible manner, minimizing impacts/hazards to users and the resource. See Work Instructions for Vegetation Maintenance under Routine Maintenance Activities section of this chapter.

Areas devoid of vegetation and subject to erosion, particularly slopes, shall be seeded and revegetated with appropriate native plants or other erosion control measures implemented.

Trees identified as posing a hazard to trail users shall be removed by certified tree fellers.

Appropriate vistas are maintained by periodically removing or thinning vegetation.

**Tread Maintenance**—The trail foundation and the trail tread shall be in good condition and free of hazards.

The tread shall be maintained in the original design condition and/or outsloped with intact surface. See
Work Instructions for Tread Maintenance under Routine Maintenance Activities section of this chapter.

Surface material shall be replaced and/or added, when its absence causes erosion, ruts, or other undesirable conditions.

Rail-trails shall be graded at a minimum, every 2 to 3 years, and the finish surface, or impact surface, reapplied.

**Drainage Maintenance**—Surface water control measures must be sufficient and adequately functioning to prevent erosion, sedimentation, and loss of the trail tread, and serve to preserve the integrity of the trail construction. This includes regular cleaning and repair of culverts, drains, ditches and waterbars, and the installation of new devices to eliminate standing water or erosion problems when reshaping the tread does not solve the problem.

Structures are constructed as described in the Basic Construction Standards section of this manual. See Work Instructions for Drainage Maintenance under Routine Maintenance Activities section of this chapter.

**Structure Maintenance**—All structures are functional and intact, and must not subject the user to any hazard. This includes Wet Area Crossing Structures, Water Crossing Structures, Special Structures and Support Structures. Routine inspections indicate where repair and replacement is needed—check for structural integrity, user safety and resource protection.

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### Table 5-1: Summary of Trail Corridor Clearing Standards

<table>
<thead>
<tr>
<th>Type of Trail</th>
<th>Vertical Clearance</th>
<th>Trail Width</th>
<th>Horizontal clearance beyond trail width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>8 feet</td>
<td>2 feet single lane, 5 feet double lane</td>
<td>2 feet</td>
</tr>
<tr>
<td>Biking</td>
<td>8 feet</td>
<td>4 feet single lane, 8 feet double lane</td>
<td>2 feet</td>
</tr>
<tr>
<td>Mountain Biking</td>
<td>8 feet</td>
<td>2 feet single lane, 5 feet double lane</td>
<td>2 feet</td>
</tr>
<tr>
<td>Equestrian</td>
<td>10 feet</td>
<td>4 feet single lane, 8 feet double lane</td>
<td>2 feet</td>
</tr>
<tr>
<td>Multiple Use</td>
<td>10 feet, 8 feet if no equestrian</td>
<td>8 feet, 10 feet if heavy use</td>
<td>2 feet</td>
</tr>
</tbody>
</table>

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The Virginia Greenways and Trails Toolbox
Structures must be constructed as described in the Basic Construction Standards section of this manual. See Work Instructions for Structure Maintenance under Routine Maintenance Activities section of this chapter.

**Sign Maintenance**—All trailheads, intersections and junctions are clearly marked, and signs are maintained in good condition.

**Evaluation and Inspection**
Systematic, documented and regular inspection of all trails provides the mechanism to insure that visitor safety and protection of the resources is achieved. However, unless inspections are followed by actual maintenance it is only an exercise in documenting unacceptable conditions. If actual maintenance cannot follow the identification of unsafe or unacceptable conditions the trail should be temporarily closed until corrections can be made.

**Methods**—Trails shall be inspected at a minimum of twice a year. Suggested times would be after the winter to assess any winter damage, and then in late summer to assess use impacts. Ideally, all trails of moderate to heavy use would be inspected quarterly. At parks with well-developed volunteer programs that include trail maintenance volunteers, monthly inspections may be possible and are recommended.

The Virginia State Parks Standard Trail Log and Inspection System uses the Trail Log and Inspection Form found in Appendix XIV. As the name implies, the form is both a log and an inspection. Initially, the log information is completed describing and inventorying the physical features of the trail. The log is completed one time in the life of the trail, unless changes to the trail occur, requiring an updating of the log. The log provides important details to efficiently maintain the trail.

Trail features should be located and described using a measuring wheel, measuring distances from the beginning of the trail. The inventoried information is entered on the form and serves as a reference to complete the inspection.

When inspections are conducted, the form has the log information preprinted on it. Inspection results are recorded in the spaces provided. A new form may be completed each time an inspection is done, or a spreadsheet could be set up and used showing the conditions of previous inspections at each subsequent inspection.

When inspections are conducted, any routine work should be completed at the time of inspection, such as removing down wood, trimming overhanging branches, picking up trash and performing minor repairs to structures. This not only precludes the need to list this work as “needed”, but efficiently utilizes the time of the person conducting the inspection, and saves time of a second trip.

The completed Trail Log and Inspection Forms shall then be kept on file to serve as documentation of the inspections, reference for maintenance work when performed, and as a handy reference of a description of the trail when inquiries are made. Park management is responsible for insuring that the Inspection files are kept up to date.

**Forms**—The Trail Log and Inspection Form appears in Appendix XIV.

**Usage Limits**—The following table illustrates the usage levels that can be designated for each trail. This should assist in trail maintenance and management decisions.
If it is not feasible to adequately repair the trail to within its usage level, then other alternatives shall be considered, such as temporary or permanent closing, constructing a new trail to disperse the volume of traffic, resurfacing the trail, or changing the types of use(s) allowed on the trail.

**Routine and Preventative Maintenance**

**Equipment and Personnel Considerations**—Nothing can be more critical to the success or failure of a maintenance program than properly preparing for the job. Common tools needed for trail maintenance include lopping shears, chain saws, brush-axes, rakes and/or leaf blowers. In addition, fuel, oil, and safety equipment must be carried along. If available, a small all terrain vehicle (gator, workmaster) can make routine cleanups a one-man operation.

Additionally, specialized equipment will likely be required during some trail maintenance. This includes tractors, post augers, stump grinders or backhoes. Always follow manufacturer’s operating and safety instructions when using this type of equipment, and be sure that all personnel are trained before they attempt to operate.

Routine trail work may be performed by an individual or a small crew of workers, and parks are often successful in finding volunteers eager to conduct regular trail maintenance. Inmate or other alternative labor sources can be successfully utilized. Routine maintenance shall occur at least following (and/or in

Below  Usage limit is not being met. Although custodial care is needed, maintenance needs are low. Considerations could be made to increase volume of traffic and/or trail use.

Normal  Trail is being sufficiently utilized. Trail maintenance is moderate. Changes should not be made to increase or decrease volume of traffic or trail use.

Above  Trail is being over utilized. Trail maintenance is excessive. Damage is being caused to the trail and to resources within its corridor. Considerations should be made for remediation and to reduce volume of traffic and number of uses (types of uses—hiking, biking, etc.).

<table>
<thead>
<tr>
<th>Usage limit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below</td>
<td>Usage limit is not being met. Although custodial care is needed, maintenance needs are low. Considerations could be made to increase volume of traffic and/or trail use.</td>
</tr>
<tr>
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<tr>
<td>Above</td>
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</tr>
</tbody>
</table>

**Table 8-2: Trail Usage Limits**
conjunction with) the semiannual inspections, and after major storms. Strive for conducting monthly trail maintenance tours.

The routine trail maintenance work instructions are activities one would do to achieve the maintenance standards described earlier in this chapter. The work instructions are organized in categories to parallel the trail standards.

1. Vegetation Maintenance
   1) Side branches extending into the trail corridor should be cut flush with the parent branch or stem, leaving no stubs and allowing for natural healing to take place (do not use an axe).
   2) Trees and brush outside the tread should be cut as close to the ground as possible, leaving no sharp-pointed stumps or stems. Stumps should be treated with herbicides to prevent regrowth and sprouting (approved herbicides only). Holes left from stumps must be filled and tightly packed.
   3) Small trees and shrubs within the tread should be grubbed out to prevent tripping, and holes should be filled and compacted.
   4) If more than half of a tree needs to be pruned, remove the tree.
   5) Any fallen tree lying on or over a trail should be removed, or if a large tree, the portion lying across the trail. Cuts should be made to allow the cut section to be rolled free with minimum effort. If possible, the entire windfall or the portion below the uphill cut should be rolled below the trail.
   6) Debris from clearing and pruning should be disposed of by chipping or removed from the trail corridor. Debris may be used for control of traffic or erosion. Slash should be scattered on the downhill side of a trail.

2. Tread Maintenance
   1) Restore the tread to its original design condition, free of rolling stones, rock points, stumps and shrub roots; it should be smooth and firm; fill any holes creating by rock or stump removal.
   2) Tread should be outsloped so that it is lower on the downhill side.
   3) Remove accumulated slough from the inside slope and reshape the tread to restore outslope.
   4) Remove accumulated berm from the downhill side of the tread and restore outslope.
   5) Check for and prevent trail creep by placement of border logs or rocks (but do not interfere with desired drainage).
   6) Replace surfacing that has been removed; add surfacing when the natural surface has been damaged or destroyed or when the existing material is unstable.

3. Drainage Maintenance
   1) Clean out and repair culverts and drains.
   2) Clear, repair and reseat water bars.
   3) Add surface water control structures where needed to eliminate standing water or erosion problems, when reshaping the tread alone won’t solve.
4. **Structure Maintenance**  
1) Routine inspections should indicate where repair and replacement is needed; check for structural integrity, user safety, and resource protection.

2) Major repairs become a separate project from routine trail maintenance.

5. **Sign Maintenance**  
1) Signs should be cleaned and the supporting frame trimmed around, so that the sign is very visible and readable.

2) Damage to sign or frame should be repaired or replaced.

3) Blazes should be easily visible, and/or repaired or added as needed.

**Preventative Maintenance Projects**—If, during the course of an inspection or routine maintenance tour of the park’s trails, a problem is identified that requires more than routine effort to correct, then these items should be brought to the attention of the person directly overseeing the maintenance crew. Depending on the condition and significance of the item(s) in question, the trail may require temporary closure. For example, a rotten and deteriorating bridge that renders a trail unsafe would require the trail to be closed until repairs have been done.

Projects requiring significant planning, design, and implementation time shall be submitted to the appropriate staff member (Park Manager, Assistant Manager, Chief Ranger) for incorporation into the current operations plan and project schedule. Depending on the scope of the project, it may need to be incorporated into the following year’s budget as a preventative maintenance or resource management project. The annual budget/operations plan shall include trail maintenance activities as both routine operations and preventative maintenance and/or resource management funding projects. A few examples of each type of project are listed below.

Preventative Maintenance Projects could include:
1) Painting/staining/sealing bridges, benches and walks
2) Replacement of rotten or deteriorating structures
3) Sign replacement and upgrade
4) Addition of culverts, waterbars, or other structures
5) Replenishment or addition of gravel or other surfacing material

Resource Management Projects could include:
1) Construction of bridges or elevated walkways over sensitive or eroded areas
2) Herbicide application to eliminate or reduce unwanted plant species (Kudzu)
3) Construction of retaining walls, cribbing, tiles, and other structures to manage drainage problems
4) Re-routing of trails to avoid unstable or sensitive areas

**Trail Closing**  
When closing a trail, whether temporarily or permanently, the trail should be given the opportunity for its natural features to rehabilitate or for areas that have undergone maintenance or construction to properly stabilize. A common reason for closure is to allow for unsafe conditions to be corrected or eliminated. Simple
restoration may consist of blocking new shortcuts and allowing the vegetation to recover. Complex restoration projects include obliterating the trail, re-contouring, and planting native species. Careful monitoring and follow-up are necessary to ensure that the goal is achieved.

Naturalizing strategies include: closure, stabilization, re-contouring, re-vegetation, and monitoring. Each abandoned trail shall be closed. This is true whether an entire trail or portion of a trail is permanently or temporarily abandoned. If the trail is not blocked to prevent use, then the goal of the closure, whether temporary or permanent, may not be achieved. Closure is particularly important if stabilization and re-vegetation are being attempted. The abandoned tread shall be blocked to all traffic, re-contoured, and disguised to prevent users from being tempted to take it. This work shall be conducted for all segments of an abandoned trail that is visible from trails that remain open.

**Techniques for Closing a Trail**—If the closed trail has eroded into a trench, fill the visible ends to bring the level back up to the original ground level and install check dams and erosion control blankets as necessary to protect the fill. Checkdams can be logs from dead trees on site, low stone walls, or charred logs (surface charring preserves the wood without chemical treatment).

In other areas of severe erosion which are not visible from other established trails or access points, build checkdams in the bottom of the trench to prevent it from becoming any deeper.

In less-eroded areas, scarify (break up and loosen) compacted soil and reseed it with a native grass mix matching onsite grasses and vegetation.

If possible, blend the visible ends of the closed trail into the surrounding undisturbed area by extending adjacent rocky areas, vegetation patterns, fallen trees and branches, and other natural objects into the closed end.

Emulate natural patterns — plant dead stumps with their roots buried, drop dead branches under trees as if they fell off the tree, and cover the bare ground with a natural layer of organic debris (needles under conifers, leaves under deciduous trees, dry grass in grassy areas). Often, these techniques can visually erase a trail without vegetative plantings.

**When the Trail Fails to Meet Standards**—In cases where the trail standards cannot be met, closure should be considered as an alternative to attempting to repair the trail. Closure is then an attempt to naturalize the trail and its surrounding resources and either bring the trail back to standards or to eliminate the trail altogether. The Trail Log and Inspection Form should reflect substandard conditions that led to the closing.

**Temporary closure** may allow for areas that have undergone maintenance to be left undisturbed for a period of time to allow for adequate stabilization. Also, temporary closure will allow for the area to rehabilitate to a condition that will bring the trail back up to standards. If a portion of trail needs to be temporarily closed, re-routing may be necessary for that period of time unless the whole trail is to be closed. It is important for the temporary closure to last long enough for proper stabilization and re-vegetation.

**Permanent closure** will allow for the trail to be influenced to convert back to its original habitat and appear as if the trail never had existed. This alternative should be chosen if the trail’s condition is beyond repair,
if usage is too low, or if impacts of the trail despite routine maintenance are unacceptable.

**Seasonal Closing**—Seasonal closure would allow for the trail to be closed during times of the year that may impact the quality of the trail, or to wildlife resources. Examples of reasons for seasonal closure are reducing impacts during wetter times of the year or when there may not be enough staff during the off-season to maintain the trail, or to eliminate human interference with bald eagle nesting efforts.

**Trail Evacuation**—There are occasions when the park’s trails need to be temporarily closed, such as during various severe storms, emergencies or other incidents. Often, the entire park is evacuated or closed. Each park shall have a plan for efficiently closing and evacuating the trails within the park during these situations.

Refer to Lake Anna Nuclear Power Plant Evacuation Plan, First Landing/Seashore’s Hurricane Evacuation Plan, and any others that may exist on file in Resource Management & Visitor Protections Section office.

**References**
