How to Use This Chapter

John Dugger of the Coalition for the Capital Crescent Trail once stated, "Just because the trail gets built, doesn't mean the work stops." This chapter reinforces Dugger's thought by providing information about operating and maintaining your trail after construction is completed and it has been opened for use. Utilizing appropriate management and maintenance techniques is the surest way to promote the long-term success of your trail.

Operating or managing your trail means dealing with day-to-day and periodic tasks that keep trail users and adjacent landowners happy, raise funds, address risk management issues, mitigate user conflicts, and deal with a host of other needs. With luck, you already have a good group of volunteers or agreements with public entities to assist with these duties. You will find guidance in this chapter concerning common management issues including budgeting, policing and risk management, enforcing rules, and emergency procedures.

Volunteers collecting litter. Courtesy of Roanoke Valley Greenways

Maintaining your trail refers to the physical upkeep of trail features in order to provide an enjoyable trail experience for visitors. Maintenance is a constant concern for trail managers because trails and paths are located in ever-changing outdoor environments. Maintenance tasks may be as simple as clearing leaves from a trail or as complicated as repairing wide-spread storm damage. You will find guidance in this chapter regarding maintenance tasks, schedules, and costs.

The Toolbox is considered a general guide and clearinghouse and not a how-to manual and therefore you must also seek additional sources of information that directly pertain to your specific situation. Use the knowledge provided in this chapter to begin conversations, gather ideas, and organize your thoughts before seeking more detailed and in-depth recommendations.

TOOLBOX TIP:

The National Recreation and Park Association (NRPA) has a new, web-based tool called PRORAGIS that compiles annual snapshots of departments' jurisdiction, organization, finances, resources, staffing, and programs with online mapping capabilities for parks, trails, and facilities. NRPA members can acquire valuable information in order to benchmark themselves with others, create and justify budgets and strategic plans, and enhance their overall operations and services.

Park and Recreation Operating Ratio and Geographic Information System (PRORAGIS)

- http://www.nrpa.org/PRORAGIS/

Trail Operations and Management

Operations and management require daily tasks. While your organization may not address pressing issues every day, you are likely the first point of contact when problems arise…and problems may arise at any time. Whether it is a vandalized sign or an injured trail user, your organization must be prepared to deal with all types of concerns 24 hours a day. This is not meant to discourage trail builders from moving forward with their projects, but is a reminder that operating a trail requires as much forethought and planning as trail design.

Who Manages A Trail?

People tasked with operating and managing the trail are often the same people who initially brought the trail to fruition. The people or groups who were most involved with planning, design, and construction often choose to stay involved because they have an interest in the trail's long-term success.

In most cases, trail management is undertaken by the non-profit groups who pushed for trail construction or by local governments, within whose jurisdiction the trail was completed. In some cases, management

is shared by organizations and governments. Management responsibilities must be outlined and agreed upon before construction takes place—preferably before design consultants are hired—so the transition from construction to management is seamless and with limited conflict. Many funding agencies require that management responsibilities are written out prior to approvals and construction.

TOOLBOX TIP:

Common management activities include:

- Supervising Staff and Volunteers
- Raising Operational Funds
- Administering the Operating Budget
- Managing User Conflicts
- Defining and Implementing Policies
- Conducting Public Relations Activities
- Planning Future Work

When considering a public-private partnership method of trail management and maintenance, investigate utilizing a memorandum of understanding or agreement (MOU or MOA). MOUs or MOAs are formal agreements that stipulate individual responsibilities and terms of a partnership. They are useful tools to legally assign maintenance responsibilities to a particular group. An example noted by the Rails-to-Trails Conservancy states that, "it is not uncommon for a friends group to start a trail by convincing a municipality to purchase the corridor, after which the friends group accepts management of the trail and coordinates the maintenance of the trail via municipal equipment and volunteers."

Resources:

Crimmins, Tom. "Management Guidelines for OHV Recreation."
• http://www.nohvcc.org/Files/ohvguidelines.pdf

Flink, Charles; Kristine Olka, and Robert M. Searns. *Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails*. 2nd ed. Washington, D.C.: Rails-to-Trails Conservancy, 2001.

Morris, Hugh. "Rail-Trails and Liability: A Primer on Trail-Related Liability Issues & Risk Management Techniques." Washington, D.C.: Rails-to-Trails Conservancy, 2000.

Rails-to-Trails Conservancy Toolbox: Management and Maintenance
• http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/management-maintenance.html

Operations and Maintenance Plan

The Operations and Maintenance Plan (O&M Plan) is a good way to collect your policies, strategies, budgets, and staffing data in one place. A well-executed O&M Plan reduces negligence claims by demonstrating forethought, shows potential funding sources that you are organized and pragmatic, and serves as an excellent resource to manage and protect your trail corridor.

TOOLBOX TIP:

An effective O&M Plan should address the following topics:

- Maintenance
- User Safety and Risk Management
- Programming and Events
- Resource Stewardship and Enhancement
- Marketing, Promotion, and Fundraising
- Oversight and Coordination

An O&M Plan is typically a written narrative that is compiled into a binder. Incorporate maps, pictures, or drawings to help illustrate key concepts and locations. For instance, you may include a map of all emergency access points or a diagram showing how to remove bollards for service access. Be sure to provide binders to everyone involved in trail management and maintenance. In addition, review your O&M procedures at least once a year and after any major event or emergency to be sure the plan is up-to-date and working.

As noted earlier, it is becoming more common for planning commissions, councils, and funding

agencies to require some type of O&M plan or agreement prior to approving the trail plan or disbursing funds. Elected officials and plan-reviewing agencies want to know who is going to manage your trail, how it will be managed, and how much management and maintenance will cost… particularly if they are paying the bills.

Below are some O&M items that may not be obvious, but are certainly helpful to include in your plan:

- List of people who have keys to locked gates and bollards
- List of access points that are locked and how they are locked
- Plans for quickly dealing with unexpected events such as storm damage
- Daytime and nighttime contact information for trail managers
- Dates for local hunting seasons, particularly if hunting properties are near the trail corridor
- List of regular trail events and contact information for event organizers
- Trail event requirements, regulations, costs, and similar information as a standard handout to event organizers
- Contact information for any local or state agency that may need to be reached with questions or violation information, including:
    - Local police, fire, and other first responders, both emergency and non-emergency contacts
    - Animal Control or shelters (loose or lost pets)
    - VA Dept. of Game and Inland Fisheries (poaching, unlicensed fishing)
    - Virginia Marine Resources Commission (unlawful use of waterways, unlawful boaters)
    - U.S. Coast Guard (injured kayakers/ canoeists on blueways, unlawful boating)
    - Local Veterinarians (injured stock or other animals)

Resources:

Rails-to-Trails Conservancy "Rail-Trail Maintenance & Operation: Ensuring the Future of Your Trail—A Survey of 100 Rail-Trails"
• http://www.railstotrails.org/resources/documents/resource_docs/maintenance_operations_report.pdf

Policing the Trail or Path

Policing is a general term for actively watching over trail users and trail activities. Policing can be accomplished by your local governmental police force, volunteer safety patrols, and by other trail users.

The Rails-to-Trails Conservancy recommends that local law enforcement agencies who are asked to surveil trails and paths do so on bikes rather than in cars or ATVs. Bike-mounted police have more maneuverability, have lower associated costs, do less damage to the trail, and tend to have better public relations. Another option may be horse-mounted police. If you or your local law enforcement agency is interested in learning more about bike-mounted policing, contact the International Police Mountain Bike Association (IPMBA). IPMBA offers many useful training courses and publications.

Volunteers safety patrol on a trail. Courtesy of IMBA.

Volunteer safety patrols consist of volunteers who walk, bike, or ride trails and paths and watch for trail violations or users who are in need of assistance. This practice is fairly common on mountain bike trails, but can be adapted to any type of trail or path.

IMBA's *Managing Mountain Biking: IMBA's Guide to Providing Great Riding* offers "10 Traits of Highly Successful Patrols" that provide good information for anyone interested in starting or enhancing a trail or path safety patrol. The following tips are adapted from IMBA's text. Safety patrols should:

- Be professional and organized
- Communicate within the patrol through meetings, websites, and newsletters
- Consider using volunteers who are part of the trail community
- Offer frequent training in public engagement, first-aid, and risk management
- Dress to be visible and recognizable on the trail
- Engage in community activities
- Partner with local emergency services
- Manage volunteers effectively
- Engage the media in a positive manner
- Fundraise to support patrol activities and purchases
- Make training and patrols interesting and fun

Resources:

Friends of the W&OD Trail Patrol
- http://www.wodfriends.org/trail_patrol.html

International Police Mountain Bike Association
- http://www.ipmba.org/

National Mountain Bike Patrol
- http://www.imba.com/nmbp

Rails-to-Trails Conservancy Management and Maintenance: Police and Safety
- http://www.railstotrails.org/ourwork/trailbuilding/toolbox/informationSummaries/police_safety.html

Risk Management Considerations

Chapter 7 of the International Mountain Biking Association's (IMBA) Managing Mountain Biking: IMBA's Guide to Providing Great Riding provides an excellent overview of safety and risk management concepts and guidance that are applicable to all types of trails and paths. Much of the information provided here is abstracted from that document.

IMBA defines risk as the voluntary taking of chance, whereas a hazard is a hidden, unexpected danger. The goal of risk management is not to remove all risk—and thus the challenging or interesting portions of trail and paths—but to identify and address unreasonable hazards that might cause harm to trail users.

The majority of websites and texts that address risk management on trails agree that the best overall risk management practices are to properly design trails, properly construct them, and properly maintain them. When it comes to trails, the old cliché of "prevention is the best medicine" holds true. Risk management techniques both protect trail users from injury and offer a measure of protection from lawsuits for trail managers.

The following risk management practices were taken from multiple resources and are condensed here for easy reference. For more information, consult any of the materials listed in the Resources section.

Below are a number of risk management practices intended to help you start discussing and understanding risk management policies and then applying them to your trail or path. These practices include techniques for designing your project, implementing plans and policies, and dealing with risk management considerations that arise after the trail or path has opened to users.

Design for Risk Management

Many risk management concerns can be mitigated and addressed before the trail or path is constructed simply by understanding what risks currently exist in the environment and identifying and understanding the intended users. Skilled trail professionals and design consultants will be able to anticipate risks and adjust the trail or path design accordingly.

Design Your Trail According to Generally-Accepted Standards

Hazards and liability can be limited by adopting generally-accepted design standards during the trail design phase. Documents such as the 2010 Draft AASHTO *Guide for the Planning, Design, and Operation of Bicycle Facilities* and Americans with Disabilities Act (ADA) guidelines are accepted and used by most design professionals and review agencies.

Design Your Trail With CPTED Principles In Mind

CPTED stands for Crime Prevention Through Environmental Design and is defined as the "multi-disciplinary approach to deterring criminal behavior through environmental design." The four main CPTED principles are:

• *Natural Surveillance*: Keep the environment maintained so people can be easily seen by other users, staff, and anyone who may pass by the trail or path. Design landscaping to avoid blind spots and hiding places. Ensure adequate light levels are maintained.

• *Natural Access Control*: Control natural access by some means such as a fence or a landscaped area. The access method should signal "walk here" and "do not walk" there. Therefore, a person in a walking area should not look out of place.

• *Territoriality*: Use territoriality reinforcement to distinguish public and private spaces. This can be done by a number of means, including signage, landscaping, and mowing. The idea is to show that someone owns and cares about this space. A space that looks unused can quickly be commandeered for illegal or undesirable activities.

• *Maintenance*: Only build what you can maintain. Without maintenance, a public area invites criminal behavior such as graffiti and other vandalism.

Create a Risk Management Team and Program

IMBA recommends creating a risk management team to develop, implement, and document a risk management program. Designate someone to lead the team and coordinate activities. The program should include a philosophy statement that demonstrates your team's commitment to risk management; trail design and construction policies that agree with your philosophy; and trail inspection and maintenance policies.

Develop Effective Sign and Warning Systems

Effective signage and warning systems clearly identify appropriate trail users for each trail, levels of difficulty, and potential risks. Signs can be used to indicate trail difficulty, rules and regulations, and encourage responsible behavior. Difficulty ratings are another type of warning system that use rankings or classifications to indicate how strenuous or complicated a particular trail might be. Trail users can then decide for themselves whether to embark upon or avoid a trail or section of trail.

Other systems might include milemarkers or signage that indicates where trail users are located in relation to trailheads or access points. GPS coordinates can be attached to signs that enable emergency responders to use satellite technology to locate a caller.

Warning signs indicating difficulty and changes to trail design. Courtesy of IMBA/Rich Edwards.

Develop An Emergency Response Plan

Emergency response plans clearly indicate how emergency situations—such as injured stock, lost hikers, or stranded bicyclists—will be dealt with. While not every emergency can be imagined and there will be unforeseen instances, having a plan that covers typical emergencies and even rare but known situations will go a long way to providing care for trail users and limiting liability.

Emergency response plans should include the following:

• Emergency contact information for local police, hospitals, fire, and rescue agencies.

• Emergency contact information for specialized services such as search-and-rescue groups, equine evacuation organizations, tow trucks, and helicopter services.

• 24-hour contact information for trail managers or responsible trail organizations.

• Identification of all potential trail or path access points, the limitations of each access point (vehicle size, difficult terrain, etc.), and who is responsible

for keys to any locks at each access point.

• Inclement weather plans for closing sections of trail that might be hazardous during events such as floods or ice storms. These plans should also include methods of evacuating users who are currently using trails during an emergency.

Develop A Maintenance Plan and Policy

Maintenance plans and policies are one of the primary ways to limit hazards and lawsuits, as well as ensure your trail stays attractive and usable. Periodic inspections, documentation of hazards and remedies, and maintenance activities should all be part of a well-rounded plan. Refer to discussions about maintenance later in this chapter and Appendix 5-B for sample maintenance schedules.

Maintenance plans should include the following:

• Contact information for trail managers, organizations, and/or volunteers responsible for maintaining the trail or path.

• Written inspection and maintenance policies that include tasks, timeframes, and responsible parties.

• Inspection forms that document date, time, person/group, condition of trail, hazards, and other pertinent information.

• Trail maintenance schedule that identifies timeframes for regularly-scheduled maintenance activities such as pruning, trash pick-up, and pothole filling.

• List of constructed features, such as bridges, culverts, and fences that require regular inspection and maintenance.

Review Your Plans and Policies

Even after you've created and implemented your emergency and maintenance plans and other policies, you must periodically review their effectiveness. At least once a year, and after any significant emergency or maintenance event, review your written and verbal policies with your staff or volunteer groups. Ask yourselves whether your current plans and policies were sufficient to address situations, where the plans and policies were lacking, and what can be done to update them. Document these review sessions and include them as written narratives in your plans.

Resources:

Flink, Charles; Kristine Olka, and Robert M. Searns. *Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails*. 2nd ed. Washington, D.C.: Rails-to-Trails Conservancy, 2001.

Morris, Hugh. "Rail-Trails and Liability: A Primer on Trail-Related Liability Issues & Risk Management Techniques." Washington, D.C.: Rails-to-Trails Conservancy, 2000.

National Trails Training Partnership Safe Trails Forum "Better Park Design Can Prevent Crime"
• http://www.americantrails.org/resources/safety/designcrime.html

Rails-to-Trails Conservancy Toolbox: Management and Maintenance
• http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/liability.html

Webber, Pete, ed. *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*. Boulder, Colorado: International Mountain Bicycling Association, 2007.

Using Technology to Enhance Risk Management

Due to the prevalent use of Geographic Information Systems (GIS), maps are no longer static and quickly out-of-date. GIS allows users to pinpoint exact geographic locations on a computer-based map and attach information to those locations. In addition, the attached information can easily be updated and shared digitally. The data is input directly through the software or uploaded from a Global Positioning System (GPS) device. GPS devices are particularly handy because they can be carried on a trail and, through the use of satellites, record exact coordinates of any location. For example, a hiker with a GPS can stop at a trail washout, use the GPS device to record the washout locations, and then upload that data to a GIS map on their computer.

GIS is practical for trails and paths because data can be placed on an interactive map and used by anyone

TOOLBOX TIP:

GIS technology can help with emergency response by georeferencing trail locations to digital and printed maps. A map grid system combined with a unique letter/number code communicates location within 1/10 of a square mile to authorities. The code is posted on permanent signage at specific places along the trail to enable trail users to convey their location over the phone. More information about this technology is available at:

- http://www.atfiles.org/files/pdf/cedar911signs.pdf
- http://atfiles.org/files/pdf/PublicSafety911Holol.pdf

with access to that map. GIS maps may be shared with local law enforcement and emergency service agencies to make them aware of trail emergency access points, which can then hasten their response to calls for help.

It should also be noted that most smartphones are equipped with GPS. While not as powerful as a dedicated GPS system, in a pinch, smartphones can be used to pinpoint a general location in case of emergencies or even during trail inspections.

Resources:

Appalachian Trail Conservancy Mapping and GIS
- http://www.appalachiantrail.org/site/c.mqLTIYOwGlF/b.4805605/k.8389/Mapping_and_GIS.htm

Delaware Ohio Recreational Trails GIS Collaboration
- http://go.owu.edu/~jbkrygie/krygier_html/deltrails/deltrails_top.html

GIS/GPS Trail Condition Inventories: A Virtual Toolbox for Trail Managers
- http://proceedings.esri.com/library/userconf/proc04/docs/pap1590.pdf

Virginia Dept. of Conservation & Recreation Virginia Trails GIS Inventory
- http://gismaps.virginia.gov/vatrails/

Enforcement of Rules and Regulations

Rules and regulations are useful to deter unlawful and undesirable activity on your trail or path. While the majority of visitors who read rules and regulations will abide by them, enforcement may be necessary to promote the safety and enjoyment of all users.

If your trail is patrolled by professional law enforcement officers, they bear the burden of issuing citations for legal violations such as littering, after-hours use, and unauthorized vehicles.

While volunteer patrols cannot enforce laws, they can aid law enforcement officers by noting and calling in criminal activity. Each new patrol member should be trained to understand the extent of their enforcement capabilities and how to contact the proper authorities.

Where fees are charged or passes issued, enforcement may mean issuing warnings and citations to trail users who disregard rules. Penalties may range from a first-time warning to loss of all use privileges.

Permanent Trail Closures

You may find that you need to permanently close a section of trail because it has become over-used, it is no longer interesting to frequent users, it poses hazards to users, or it has begun to adversely impact sensitive environmental or cultural resources.

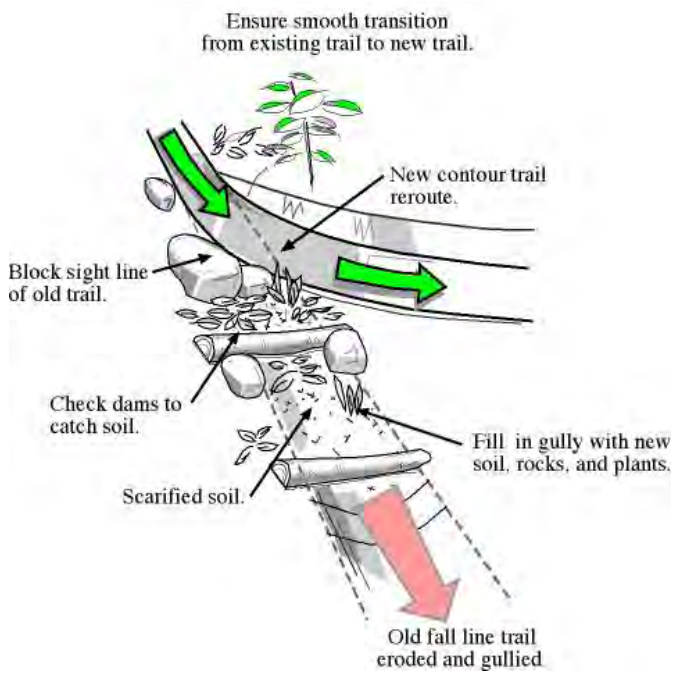
In these instances, you must clearly communicate to staff, trail users, and any other relevant people that the trail is closing well in advance of the closure date. Use newsletters, e-mail, websites, and meetings to forewarn visitors that this specific section of trail will no longer be open and explain the rationale. Post signs at access points in advance of the closure and leave them up. Ideally, signs will remain in place until no evidence of the trail remains so visitors are not tempted to detour from the official route. Other techniques include planting vegetation at access points, installing gates, and camouflaging access points with stumps, logs, and brush.

Temporary Trail Closures Due to Inclement Weather and Emergencies

There will be times when it is appropriate to temporarily close your trail or path due to emergency

situations such as inclement weather, flooding, or accidents. Your O&M Plan should include an inclement weather policy that details procedures for warning visitors of poor trail conditions, closures, and detours.

Trail closure and re-routing sign. Courtesy of IMBA/Rich Edwards.



Trail re-routing diagram. Courtesy of IMBA/Rich Edwards.

If you are aware of trouble spots on your trail that are prone to flooding, icing, deep snowfall or drifts, or other issues that result from severe weather events, consider posting an inclement weather policy on your website, on signs at your trailhead, in newsletters, and via e-mail list-servs. Include a statement saying what types of events might trigger closures and contact information for finding out if the trail or path is closed (a website, hotline phone number, or e-mail address). For popular trails and trails in well-developed areas, you may want to provide a news item to local media to help get the word out.

In your O&M Plan, designate emergency team staff or volunteers specifically for bad weather and emergency closures. These people will be called into action to man the hotline, website, or e-mail address; post closure signs at trailheads; and lock gates or block access points. They should also be tasked with watching weather reports and contacting other team members in advance of trail or path closures.

Seasonal trail closures are common where weather conditions are known to be consistently poor. If your trail or path is susceptible to seasonal issues such as snow and ice, high winds, and flooding, consider making it policy to close the trail or sections of trail at the same time each year.

Evacuation Procedures

When emergencies arise, trail users may need to be evacuated. Evacuations may be pre-emptive, as in the case of an impending thunderstorm, or may be in response to an injured trail user. The key factor to a successful evacuation is to have a plan ready in advance of the evacuation event. Proper planning will save lives and limit negligence claims. Work with local law enforcement and first-responder agencies to develop evacuation plans for all foreseeable evacuation scenarios.

Depending on the type and severity of the emergency and the length of your trail, emergency team members may walk, ride, or drive trails or paths to evacuate the trail. The decision to do this must be weighed against the potential harm to your staff or volunteers. Never send people out on the trail or path when conditions may be detrimental to their safety. If conditions are not safe but you believe people may still be on your trail, contact local law enforcement and first-responder services immediately.

Resources:

Horse Rescue and Evacuation on the Trail
• http://www.myhorse.com/horse-rescue-and-evacuation-trail.html

Special Events and Maintenance Responsibilities

Occasionally, trail user groups request to use trails or paths for special events such as group equestrian rides, bike rodeos, or foot races. While these events provide a unique use for your trail and engage the community with positive publicity, they may negatively impact the trail. Common event-related problems include damage to the trail surface and shoulders, impacts on adjacent vegetation, erosion of stream banks or river bottoms at water crossings, and accumulation of litter.

It is important to work with trail users before permission is granted in order to outline the rules and restrictions for the event and what preventative and post-event cleaning and maintenance is required. Be sure to discuss any penalties for irresponsible actions or lack of post-event maintenance. You might consider providing a price list that clearly outlines costs the user group will incur if they do not adequately care for the trail corridor. These are costs that your organization would sustain if the user group does not clean or maintain the trail. Event fees are another way to recoup costs in advance of the event, although charging fees to use the trail may incur a higher level of liability (Refer to Chapter 4, Liability and Insurance Issues).

Bicyclists waiting to begin their event ride. Courtesy of Roanoke Valley Greenways.

Once you grant permission for the event, visit all areas that will be impacted by the event before it takes place. Walk or ride the trail with the event leader and identify key locations to avoid, desired entrance and exit points, hazards that must be addressed prior to the event, adjacent lands that must not be accessed, sensitive environmental resources, and staging areas. Waiting until the day of the event leaves no time to make adjustments or convey important information and rules. Take notes and photographs of hazard areas, previously-damaged trail sections, and portions of the trail that may be impacted. These notes serve two purposes: they act as a record of pre-event conditions in case of post-event disputes over damages and maintenance responsibilities and they help guard against claims of negligence.

If your organization is considering allowing special events on your trail or path, consider the following items:

- Parking: where will large groups of users park? Will you need space for horse trailers, trucks, or other over-size vehicles?
- Temporary closures: will your trail be open to the public during the event hours? How will you notify the public that the trail will be closed and how will you enforce the closure? Temporary closures are recommended when user conflicts are expected during events that include large groups of equestrians or bicyclists or during footraces.
- Restrooms: do you plan on providing Port-a-Johns or other portable toilets during the event? Where will these be located? Who is responsible for the cost, delivery, placement, and removal of these facilities?
- Volunteers: will the event user group provide their own volunteers or will your organization provide staff or volunteers during the event? Who will be in charge of the volunteer groups?
- Payment: will you charge for use of your trail or path for special events? Will you charge a nominal fee or will you ask for a deposit and fee to cover any unexpected clean-up and maintenance efforts? Will your paid staff receive compensation for off-duty hours worked during the event?
- Law enforcement and emergency services: will police and fire/rescue services be required or necessary during the event? Who is responsible for contacting these agencies? Who is responsible for working with these agencies during the event? If costs are incurred during the event, who will pay the charges?

• Post-event clean-up and maintenance: who is responsible for clearing litter and trash from all areas impacted by the event, including the trail, trailheads, and parking? How will clean-up be accomplished and in what time-frame? Who is responsible for damage to trail features including signs, fences, gates, trail surfaces, water crossing, and trail shoulders? How will major repairs be fixed and paid for?

Resources:

National Trails Training Partnership Advocacy for Trails and Greenways: Planning Events to Showcase Trails
• http://www.americantrails.org/resources/advocacy/ADVeventPlanning.html

Maintaining Your Trail

Trail maintenance begins immediately following construction and is an on-going aspect of trail and path operations. Not only do maintenance activities keep your trail in good condition, they help ward off claims of negligence and illegimate and undesirable uses. This section discusses typical maintenance tasks, costs, and schedules that will protect your trail investment.

The need for maintenance is affected by the type of trail surfacing and the amount of use a trail or path receives. In addition, maintenance requirements vary by the trail's location. A path located in a flood-prone area, for example, may need more frequent maintenance than a path located at a higher elevation. In turn, a trail constructed in a warmer area might not be as susceptible to freeze-thaw damage. All of these considerations should have been brought to bear during the design phase of the project.

Below are some guiding principles for determining the best people and methods for maintenance activities, budgeting principles and estimates, and common maintenance tasks. It is always good practice to speak with other successful trail organizations in order to gain valuable insight from people who have gone through a few seasons of trail maintenance. Use the information below to form your general approach, but remember that the principles must be tailored to your individual project.

Who Should Perform Maintenance?

There are three basic ways that maintenance tasks are completed: by volunteers, local government staff, and private contractors. Often, a mix of all three groups is required in order to address maintenance concerns, particularly on larger trail systems. In some cases, trail users perform maintenance activities before and after events that impact the trail such as trail rides or foot races.

Volunteers on work day. Courtesy of Roanoke Valley Greenways.

Volunteers offer the quickest and easiest method of maintaining trails. They can be rallied in a short-time frame and can perform numerous types of tasks. Volunteers typically work for free or for the cost of materials, T-shirts, or lunch. Volunteers help with maintenance because they love the trail, they use it frequently, and they want to see the trail kept in good working order. Volunteers, however, require good leadership and organization. Without succinct plans and efficient management, volunteers can easily get off task. Some pitfalls of using volunteers include underperforming on tasks, performing tasks incorrectly, and doing work on sections of the trail that were not part of your work plan. Volunteers often do not have the skills needed for technical or complicated repair or rehabilitation work. Lastly, volunteers may not be covered by your trail organization's insurance policies. This is not to say volunteers should not be used for maintenance efforts, only that volunteers should be used wisely and in appropriate circumstances.

The U.S. Forest Service *Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds* offers three principles for working with volunteers that are

echoed in many other texts and websites: recruit, retain, and reward.

Recruit volunteers through: word-of-mouth; ads, fliers, and radio announcements; similar organizations; sign-up forms on community billboards or events; and posting on websites and forums. Trail events will often turn up people interested in helping out.

Retain volunteers by ensuring that people who show up to work are happy, understand their tasks and schedule, feel safe, and feel fulfilled. Before you ask anyone to help with maintenance tasks, make sure your organization has already prepared a plan for volunteer efforts. Before the first flier goes out, you should know what tasks need to be done, what dates are available, have a good idea of how many people you'll need, and what type of skills will be useful or required. Nothing turns off volunteers more than donating their free time to an effort that is disorganized and inefficient. Training sessions prior to actual work days help to solidify volunteer commitments and comprehension of techniques and safety precautions. Volunteers who are given guidance and reinforcement during work sessions are more likely to feel comfortable and fulfilled and more likely to return for future efforts.

Rewarding volunteers is an easy but important task to show your appreciation and encourage people to continue volunteering. Rewards can be as simple as telling someone that they are doing excellent work or reminding them that they are providing a wonderful service. Rewards might also be tangible, such as T-shirts, bridle ornaments, bandannas, badges, or water bottles. Food is also a form of reward that both makes volunteers happy and allows them to work longer. Consider supplying breakfast or lunch where trail work will stretch for more than a couple of hours. Another creative reward is to host an event after trail maintenance is complete. Reward hard working volunteers by hosting a trail ride, walk, or hike; a picnic; or a party the afternoon after a work session or on a separate occasion.

The need for volunteer safety and risk management should not be overlooked. Before working with volunteers, speak with a lawyer, local government entity, or other trail agency about potential legal issues. Check to see if your insurance policy covers volunteers and if there are any tasks that are not covered. Review the Federal Volunteer Protection Act of 1997, which states that volunteers of non-profit organizations and government entities are not liable for harm caused by their acts in commission or omission provided the act was in good faith. Check to see if this act applies to your situation. Discuss safety and liability at volunteer meetings and training sessions prior to actual work days. Require that volunteers read, understand, sign, and return waivers before they begin work. Risk management precautions will go a long way toward protecting your volunteers, your trail, and your trail organization.

Tips for Working with Volunteers:

• Find the right person for the right job. Talk with each volunteer to get an idea of where their interests lie and understand their general personality. Direct volunteers to tasks most suited to their interests and abilities.

Youth volunteers enjoying their time working on the trail. Courtesy of Roanoke Valley Greenways.

• Make sure the amount of work you have matches the amount of volunteers that you've requested. Having too little work for too many volunteers results in bored people who feel underutilized. Too much work results in people who are over-worked and stressed. In both cases, volunteers are not likely to return for another session.

• Consult your lawyer or legal representative and your insurance policy prior to inviting volunteers to perform maintenance activities.

• Hold organizational meetings and training

sessions prior to actual work days.

• Develop a work-day plan prior to inviting volunteers to understand how much work and what type of work needs to be done and how many volunteers you may require.

• Understand the limitations of volunteers when it comes to complex and technical tasks. Set aside difficult projects for skilled contractors or public works departments.

• Reward volunteers with food, prizes, give-aways, and/or special events.

• Plan work sessions well in advance or schedule recurring work days, such as the first Saturday of each month. This ensures that volunteers know when and where work will take place.

Local governments typically have parks and recreation maintenance or public works crews who perform work under the auspices of the town, city, or county in which the trail is located. Government crews are used when the municipality is tasked with maintaining the trail. This generally happens when the municipality was involved with funding and constructing the trail. In some cases, the municipality has a maintenance agreement with a non-profit trail organization (refer to memoranda of understanding earlier in this chapter). Municipal-run maintenance efforts need to be determined during the design phase. Many times, government maintenance crews have design preferences for items such as bollards, trail surfaces, and signs that conform to their existing schedules, abilities, and standards. Working with these crews during the design phase saves time and money because materials and tasks will be familiar and accepted.

Tips for Municipal-run Maintenance:

• Involve municipal maintenance staff and crews during the design phase and get feedback on preferred materials and designs

• Make sure maintenance responsibilities and agreements are in place prior to construction activities

• Begin discussions about maintenance funding and budgets during the early project stages to ensure that money is allocated in capital improvement funds or otherwise set aside for trail maintenance.

• Consider supplementing municipal maintenance efforts with volunteer tasks to reduce costs and increase community ownership over the trail and path.

Private contractors are generally a last-resort effort when major damage has been done to the trail or no one else is available to perform maintenance. Contractors can be useful, however, when emergency repairs are required or when non-profits or municipalities are too small to use their own workforces. Contractors may be contacted for one-time efforts or maintenance agreements may be set up for emergency or periodic tasks. Again, the use of private contractors should be discussed early in the trail planning stages and budgeted for accordingly.

Tips for Private Contractor Maintenance:

• Talk with as many different contractors as possible to find the right company and right price for the work. Discuss different levels of service, such as emergency-only services versus monthly or annual contracts.

• Discuss the contractor's willingness to work with volunteers for some projects.

• If you are a non-profit, speak with your local government entity first before contracting with a private company yourself. You may find that your municipality already has maintenance agreements in place that will provide you with lower-cost work.

Resources:

Birchard, William Jr. and Robert Proudman. *Appalachian Trail Design, Construction, and Maintenance*. Harpers Ferry, WV: Appalachian Trail Conference, 2000.

Chapter Four of *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*.

Hancock, Jan, Kim Jones Vander Hoek, Sunni Bradshaw, James D. Coffman, and Jeffrey Engelmann. "Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds." Missoula, MT: USDA Forest Service Technology and Development Program, 2007.

National Park Service Rivers, Trails, and Conservation Assistance Program "Volunteers"
• http://www.nps.gov/nero/rtcatoolbox/org_volunteers.htm

National Trails Training Partnership: Volunteers and Service Corps
• http://www.americantrails.org/resources/volunteer/index.html

Maintenance Plans

Maintenance activities fall into two categories: routine and remedial. Routine maintenance refers to day-to-day and regularly-scheduled tasks that are expected. Remedial maintenance refers to correcting significant problems, both expected and unanticipated. Both types of maintenance must be accounted for in budgets through standard appropriations and contingency funds.

In order to keep maintenance activities organized and efficient, you should develop a maintenance plan for your trail or path. A maintenance plan should be part of your overarching Operations and Maintenance Plan (see earlier in this chapter). A maintenance plan is a narrative report that outlines specific tasks, priorities, schedules, responsible parties, and budgets. It is the "go-to" source for maintenance information and should be provided to the leaders of your organization, anyone who leads volunteer efforts, and anyone responsible for maintaining your trail or path.

TOOLBOX TIP:

At a minimum, maintenance plans should include:

- Inventories of trail features, facilities, and amenities
- Goals and standards for the quality of maintenance
- Lists of maintenance tasks
- Maintenance priorities
- Parties responsible for maintenance activities
- Evaluation methods for the plan and tasks
- Maintenance budget

Maintenance Tasks

Creating a list of maintenance tasks, both routine and remedial, is the first step in developing your maintenance plan. When you develop this list, consult with other trail organizations, parks and recreation departments, and consultants who have experience with trail management and maintenance.

Using a sheet of paper, spreadsheet program such as Microsoft Excel, or another method, list all of the features and elements that make up your trail. It is helpful to do this while actually walking the trail or path. List the components of the actual trail construction (such as surface and shoulders), the amenities (benches, mounting blocks, drinking fountains, etc.), drainage features (culverts, swales, etc.), spaces (trailheads, parking lots, gathering areas, etc.), and constructed elements (bridges, walls, etc.). Include anything else that may need to be mown, pruned, painted, sealed, adjusted, repaired, replaced, cleaned, or otherwise maintained. When you are done, you'll have completed a preliminary inventory of items that require maintenance.

Work crews installing a drainage feature. Courtesy of IMBA/Rich Edwards.

Next, organize tasks for easy reference. The Virginia DCR document "Trail Development and Management Standard Operating Procedures Manual" divides maintenance into six categories: Trail Logs and Inspections; Vegetation; Tread; Drainage; Structures; and Signs. Any classification system will work as long as it makes sense to you, your volunteers, and others involved in maintenance activities.

Finally, take that list and assign an action to each item. Think about what actions must be done to each item

in order to keep it in good condition or to protect the health, safety, and welfare of the trail user. Actions might include: prune, paint, inspect, mow, clean, mulch, weed, plant, grade, and re-surface.

You now have a preliminary list of tasks and action items which serve as the beginning of your maintenance priorities and schedule.

TOOLBOX TIP:

Common maintenance tasks include:

- Pruning vegetation
- Repairing trail or path surfacing
- Repairing or replacing signs
- Repainting pavement markings
- Cleaning drainage features such as culverts and swales
- Re-grading eroded areas
- Re-seeding damaged trail shoulders
- Mowing
- Cleaning restrooms
- Blowing or sweeping leaves or snow
- Removing fallen trees
- Removing graffiti
- Replacing lights
- Removing litter
- Cleaning and repairing water hydrants
- Staining wood structures such as boardwalks
- Planting annual flowers and bulbs

Resources:

American Trails Maintenance and Management: Maintenance Checklist for Greenways and Urban Trails
• http://www.americantrails.org/resources/ManageMaintain/MaintCheck.html

"Feasibility Study for Various Rails to Trails Projects within the County of Cumberland"
• http://atfiles.org/files/pdf/CumberlandNJrailtrail.pdf

U.S. Department of Agriculture/Forest Service, "Trail Construction and Maintenance Notebook, 2004 Edition."
• http://www.fhwa.dot.gov/environment/fspubs/00232839/index.htm

Wernex, Joe. *Off-Highway Motorcycle & ATV Trails: Guidelines for Design, Construction, Maintenance, and User Satisfaction*. 2nd ed., Revised 1994.

Maintenance Priorities

Once your task list is developed, you can assign priorities to each task. Highest priority should be given to tasks that are critical to meeting risk management goals and protecting the trail user from hazards. High priority should also be given to tasks that support other important objectives such as protecting sensitive environmental and cultural resources or ensuring good relationships with adjacent landowners. Lowest priority should be assigned to cosmetic enhancements such as repainting fences, planting flowers, and pulling weeds. You can assign moderate priority to tasks that fall in between safety requirements and aesthetic improvements.

Use your best judgment to assign priorities with the realization that assignments can be changed at any time as you become more comfortable with the workings of your trail. In fact, priorities will certainly change as your trail ages. Part of a good, sustainable maintenance plan is periodically reviewing and revising priorities in order to stay apprised of current maintenance needs.

Maintenance Schedules

Maintenance schedules accomplish two goals: they outline how often maintenance tasks should be performed and assign responsibility for each task. Refer to Appendix 5-B for examples of a maintenance schedules.

Use the list or spreadsheet you've developed so far and create another column or row for frequency and a column or row for responsibility.

Use your experience, guidance from maintenance professionals, and the resources listed in this Toolbox to assign a frequency to each task that states how often each task must be done in order to maintain the feature in good condition. Common frequency categories include: daily, weekly, monthly, bi-

annually, annually, and as-needed. Use your best judgment knowing that you may always adjust the frequency.

Maintenance responsibilities were discussed earlier in this chapter. By the time you begin developing your task list and schedule, you should know who will be assisting you with maintenance. Whether you are reliant solely on volunteers or if you have multiple groups, crews, and contractors, you must match each task to an organization or entity. If you have a only a short length of trail, you may be able to assign individual names to each task. For larger trail systems, you'll want to include the name of each responsible organization along with the contact name of an individual.

Evaluation

One of the most important things you'll do once your task list is complete and you've begun to engage in maintenance activities is to evaluate the success of the plan. Periodically review how well the list of tasks actually concurs with the type of maintenance you are doing. Check how often you are engaging in each activity. Evaluate the results for each group of maintenance volunteers, personnel, or contractors. Make adjustments as needed and keep a log of those adjustments for future reference. Update your maintenance plan at least once a year and preferably more often. Refer to Appendix 5-A for sample trail logs and inspection forms.

Resources:

American Trails Trail Maintenance and Management: Maintenance Management Systems for Trails
• http://www.americantrails.org/resources/ManageMaintain/BuildMaintSys.html

"Feasibility Study for Various Rails to Trails Projects Within The County of Cumberland"
• http://atfiles.org/files/pdf/CumberlandNJrailtrail.pdf

Florida Trail Association's "Trail Manual for the Florida Trail System"
• http://www.floridatrail.org/doc/Download-document/47-Trail-Manual.html

Maintenance Budgets & Funding

Budgeting

The size and intricacy of maintenance and management budgets depend primarily on the length and complexity of the trail and who is responsible for management. A non-profit entity that operates ½ mile of trail will have a vastly smaller budget than a city that operates 3 trails totaling 25 miles. There are, however, commonalities for all trail organizations when it comes to budgeting.

Review your maintenance plan and associated task list and assign an estimated cost to each task. Costs should be divided into two categories: cost per incidence and annual cost. This allows you to see the cost breakdown for one occurrence compared to what your entire annual costs are for each task. For example, pruning trees and brush may cost $1000 per incidence yet you may have to prune 3 times a year. The first number will help you in the short-term, while the annual cost will help you budget for future needs and funding requests.

When assigning costs, it is important to include all the things that make up a cost. For instance, if you hire a contractor to re-surface your asphalt path, you are paying for materials, labor, overhead and profit. It is misleading to consider only the purchase price for an item. Even if your own volunteers are performing the work, you still may need to budget for fuel, tools, and transportation.

As part of your plan evaluation process, compare your budgeted costs to your actual costs to achieve a more accurate idea of true maintenance costs.

Below are some considerations for creating trail budgets:

• Develop a proposed budget for operations and maintenance before your trail is constructed

• Check with other trail organizations or governments to see how they handle budgeting and get some typical costs

• Remember to include items such as taxes, overhead, and labor costs when budgeting for purchases and contracted work

• Work with an accountant or a volunteer with accounting skills to set up a budget and

spreadsheets. Even a one-time accounting session can answer questions and set up a budget properly

- Include contingency funds in case of major trail damages, budget cuts, legal fees, or other unexpected expenses

TOOLBOX TIP:

Common components of a line-item maintenance cost:

- Shipping
- Taxes
- Labor
- Overhead & Profit
- Material Cost
- Equipment Purchase
- Fuel Charges
- Permits
- Contingencies

Funding Sources

Consider who is funding operations and maintenance of the trail. Most non-governmental entities who manage trails must continually fundraise to obtain yearly operating money. Many trails, however, are operated by local or state governments who set aside capital improvement or annual operating funds.

While government-operated trails tend to have more stable financial resources, they are prone to budget cuts and re-allocation of resources. In some cases, non-profit organizations can provide in-kind services or supplemental funds to ensure that their favorite trails are well-funded.

The key concept to remember is that properly funding operations and maintenance of your trail will likely require multiple sources. You must be prepared to continually identify new sources of revenue and reach out to new agencies and organizations in order to meet budget requirements.

Below are common sources of operations and maintenance funding:

- Municipality capital improvement funds
- Municipality general funds
- Volunteer in-kind services
- Fundraisers and donations
- Right-of-way leases for utilities
- Partnerships with local businesses
- Partnerships with stakeholders such as flood control agencies, public works departments, and homeowners' associations
- Philanthropic endowments managed by "friends-of" groups or other entities
- Private foundations and donors

Cost Estimates

Refer to Appendix 5-C for typical trail and path operation and maintenance costs. Operation and maintenance costs are difficult to quantify given the vast array of trail types, surfaces, locations, funding sources, usage statistics, and other characteristics that determine what type and how often trails and paths must be maintained.

The Rails-to-Trails Conservancy's "Rail-Trail Maintenance and Operations" report provides a rational for the difficulty in setting maintenance and operation costs:

First, the trail may be part of a larger budget for a single park or even an entire parks and recreation department. Specific costs for the trail aren't broken out. Second, small trail groups, though run by competent and extremely dedicated volunteers, tend to be seat-of-the-pants operations. Maintenance is done 'as needed,' funds are raised 'as needed,' and the people are volunteering because they love the trail, not because they love doing administrative tasks like budgeting. Reported maintenance and operation (M&O) costs will also vary based on a number of factors including the use of paid staff as well as the respondent's definition of what constitutes M&O costs.

One solution is to contact other experienced trail managers in your region to discuss operation and maintenance costs. While their trail or path characteristics will likely be different than yours, they will be able to give you relevant data about local contractors, regionally-specific materials costs, volunteer groups, and other information. Include both municipal parks and recreation departments, public works departments, and trail non-profits on your list of contacts.