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## Chapter 23. Trail Maintenance Principles

The intent of trail maintenance is to keep a trail in a sustainable and safe condition that:

- ensures visitor safety;
- protects natural and cultural resources;
- preserves the public investment in the trail; and
- provides for public use and visitor convenience.

Maintenance generally includes:

- removal of encroaching vegetation, fallen trees, limbs, and rocks;
- shaping the trail tread to maintain the intended drainage design; and
- repair of damaged or failed structures or those structures that have reached the end of their useful life.

### 23.1. Types of Trail Maintenance

Maintenance activities can be broken into two types: ongoing and deferred.

#### 23.1.1. Ongoing Maintenance

In the California state park system, ongoing maintenance is identified as activities that need to occur on a cycle of less than every five years to maintain the designed function of a trail. For the purposes of budgeting and scheduling, ongoing maintenance tasks are divided into two categories: those that occur on a daily to annual basis and those that occur every two to five years. In addition, ongoing maintenance includes repair work caused by an incident (“incident related”) that can be anticipated based on previously recorded inventory information, such as the quantity of downed trees and landslide occurrences, as well as prorated repairs required to replace trail structures that have reached their usable lifespan. Ongoing maintenance schedules and budgets are based on the types of trail features and structures and the materials used to construct them, the rate of mechanical wear experienced by the trail, and environmental conditions associated with the trail.

##### 23.1.1.1. Daily, Annual, Two-Year, and Five-Year Cyclical Maintenance

These activities may include watercourse drainage maintenance such as cleaning of culverts, waterbars, or grade reversals; removal of organic debris; maintenance of the air gap around bridges, boardwalks, and puncheons; repair of broken or worn out trail structures, such as railing, decking, or steps; logging out downed trees; brushing; and annual trail inspections. Additional cyclical activities include “trio” maintenance, aggregate surfacing repairs, and applying sealants to trail tread hardeners or wooden structures.

It is important to note that the maintenance interval for different activities varies between locations. For example, trail brushing may be required once or twice a

year in one location but only once every five years in another due to differences in vegetation types and growth rates.

#### 23.1.1.2. Incident Related Repairs

Incident related repairs (one-time repairs) may be difficult to predict, but the need can be anticipated by considering inventory and maintenance records from previous years. Incident related repairs are addressed when they occur. A large tree that falls across the trail during a storm can be a one-time repair. Railing or decking damaged by a fallen tree limb, a debris slide blocking a trail, and vandalism are other examples of incident related repairs. A good maintenance program is prepared to take on these one-time activities and respond in a timely manner.

#### 23.1.1.3. Prorated Maintenance

Within the ongoing maintenance program is the replacement of trail structures that have reached their safe and usable lifespan, known as “proration.” Funding for the replacement of trail structures is allocated based on the total quantity of structures, their expected lifespans, and their replacement costs. By dividing the total replacement costs by the life expectancies, an annual replacement cost for those structures is identified. The lifespans of bridges, puncheons, steps, rails, retaining walls, and other trail structures depend largely on the local environment, quality of construction, materials, and level of use. Within the Department, the anticipated lifespan of trail structures must be established and standardized. Trail structure lifespans are monitored when performing annual inspections and if the lifespan of a structure needs to be modified due to local conditions, this modification is documented and changed in the trail maintenance budgeting program established in MAXIMO. See Chapter 2, *Trail System Development and Management*, for further information on prorating trail structures. Replacing or substantially repairing a structure prior to it reaching its usable lifespan is key to ensuring the safety of users, protecting natural and cultural resources, preserving the investment in the trail, and maximizing the level of service to users of the trail.

#### 23.1.2. Deferred Maintenance

“Deferred maintenance” refers to trail reconstruction and rehabilitation projects that are required when a trail system’s maintenance needs exceed the trail program’s capabilities. Such conditions usually occur due to poor initial trail design and layout, inadequate funding, poor management, lack of assigned staff, or natural disasters such as fires, floods, storms, and earthquakes. Inevitably even the best managed trail programs will have work enter “deferred” status. These projects are generally large and involve the replacement of multiple trail structures or the reconstruction of the trail. In large trail systems, it is not uncommon to have several bridges, puncheons, boardwalks, and retaining walls that need replacement at the same time. These projects may also involve the replacement of trail structures if the original design or function of the structure is altered, such as replacing a milled

stringer bridge with an all weather steel bridge. Significant trail reroutes, trail removal and rehabilitation, and road-to-trail conversions may also be necessary. It is vital to track deferred maintenance needs and to have a mechanism to identify and prioritize them when funding becomes available.

### **23.2. Incremental Improvements**

Although ongoing maintenance is performed to maintain the design and function of a trail, improvements in the design and construction of trail features and structures (“incremental improvements”) should be performed whenever possible. Changing the design of a trail feature or structure to one that is more appropriate, accessible, and sustainable will better meet the user’s needs, protect park resources, and reduce future maintenance costs.

For example, instead of continually cleaning water bars that plug after the first storm, outslope the trail tread to provide sheet drainage, reduce soil erosion, and reduce ongoing maintenance needs. Similarly, instead of replacing a puncheon that crosses saturated soil, install a turnpike above the saturated soil. The turnpike protects park resources, provides for accessibility, lasts decades longer than the puncheon, and requires less maintenance. Another measure would be to replace a wooden retaining wall with plastic wood or cellular confinement to increase the structure’s lifespan and reduce long term maintenance and replacement costs.

Care must be taken when performing these incremental improvements to ensure that the nature of the improvement does not create an unfunded, increased maintenance workload. Additionally, while these activities may fall within the definition of maintenance, the potential for a high level of disturbance may trigger the need for environmental review.

### **23.3. Ideal vs. Reality**

Ideally, trail maintenance activities focus on annual, cyclical, or incident related projects. Unfortunately, most trail maintenance programs manage substandard trail systems with unsustainable trails. The trails were inherited from ranching, logging, or mining operations, are user-created (“volunteer trails”), or are simply poorly designed. They require far more than maintenance to keep them open and safe, and to minimize impacts to park resources.

Many park operations also lack the funding necessary for proper trail maintenance and/or management has failed to make it a priority. Since managers do not see them on a daily basis, trails are often forgotten. While park visitors consistently rank trails as one of the most important park facilities, most managers place a higher priority on maintaining other facilities. Trails are underfunded and often relegated to low-cost volunteer and inmate work crews. Lack of funding and management prioritization has resulted in trail systems with a backlog of rehabilitation, reconstruction, or reroute and removal projects. Normally these types of projects are funded through a deferred

maintenance or capital outlay budget request. However, these funding programs are also underfunded and the limited number of projects that are approved cannot keep pace with the deterioration of the trail system.

Thus, ongoing maintenance funds are often used to perform deferred maintenance to keep trails open and safe, and limit resource damage. This redirection of ongoing maintenance funds further adds to the deterioration of the trail system. Without proper ongoing maintenance, the number of deferred maintenance and capital outlay trail projects will continue to grow.

#### **23.4. Identification and Prioritization**

With limited funding, the selection of maintenance projects must be determined using an objective evaluation process. (See Chapter 2, *Trail System Development and Management*.) Setting maintenance priorities facilitates allocation of limited resources and provides a focus for fund raising efforts. Through the use of the project selection matrix discussed in Chapter 2, *Trail System Development and Management*, the most critical ongoing maintenance projects will be selected.

A good maintenance program incorporates every aspect of trail management. A sound decision-making process will direct limited funding and labor to the areas of greatest need. Only by efficiently using maintenance funds can a balance between protecting resources and providing public access be achieved. Even with a well-funded program, any improvement to trail facilities requires sound management decisions and efficient use of available resources.

#### **23.5. Environmental Considerations**

Maintenance activities may or may not be identified as a project as defined by environmental compliance requirements, but should be reviewed by resource and environmental compliance staff for a determination and assurance of resource protection. The Department's Project Evaluation Form (PEF) should be used for this purpose. (See Chapter 3, *Planning and Environmental Compliance*.) It is recommended that initial project compliance documents (i.e., documents required for compliance with CEQA or NEPA, or for regulatory permitting) and planning documents (e.g. General Plan, Road and Trail Management Plan) identify ongoing maintenance as a requirement for the continued existence and use of the facility. Maintenance requirements are thereby built in to the initial project development and subsequently covered under the associated environmental review process. Compliance documents should be kept in the program record for reference during future maintenance activities. Within the Department, maintenance activities should be in compliance with the Department Operations Manual Chapters 0300, 0400, and 0600. Adherence to the planning, design, and construction standards in this handbook will greatly reduce trail maintenance needs by addressing sustainability and safety issues before the trail is constructed rather than dealing with ongoing sustainability issues and associated resource impacts incurred over the lifespan of the trail.