

Physical Resource Management

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The planning, development, and management of physical resources are functions of all park and recreation managers, whether they are in the public, nonprofit, or for-profit sectors. Physical resources include natural undeveloped lands and waters, and developed areas including urban parks, special complexes (such as sports and aquatics), and buildings of various functions (such as fitness centers, community centers, and interpretive centers).

Park users typically describe their park and recreation experience in terms of the natural experience, the facility experience, and the service experience. The natural experience includes the forests, waters, geological features, and so on, whereas the facility experience can include the quality of the built environment—trails, athletic fields, interpretive facilities—or support facilities, such as restrooms. The service experience refers to the interaction the visitor may have with the managing agency. This could be direct interaction, such as attendance at an interpretive program or successfully reserving a campsite. Or, it could be indirect interaction, such as knowing there is adequate law enforcement protection when leaving their car at a trailhead. And, of course, the service experience also refers to how well the visitor is treated by the agency staff.

Some visitors, of course, prefer the absence of development and facilities, and in some situations, such as remote areas, staff and service are simply not feasible. Nevertheless, most park and recreation areas provide basic facilities, with the number and quality varying greatly from park to park or type of area. Park surveys often indicate that users choose a specific park based on the level of development. For example, a park and recreation area with well-designed and maintained trails, fishing access, and full-service campgrounds may appeal to a substantial number of users, in contrast to a remote, primitive, minimally developed site. Similarly, a community park with a full-service community center, swimming pool, and athletic facilities will likely receive significantly more use than a comparable park with minimum development. For the park and recreation manager, achieving an appropriate balance of develop-

ment becomes an important objective and challenge. In seeking such balance, the manager considers:

- needs of the area residents and park users;
- capability of the natural resources of the site (soil, vegetation, slopes, etc.);
- financial resources for initial development as well as future, ongoing maintenance;
- area safety and security; and
- degree of accessibility, pedestrian and vehicular traffic flow, and night lighting for evening accessibility.

Written policies and procedures direct the development of all park and recreation lands and facilities and an operational plan guides management within the program goals and the financial framework of the organization. These policies, procedures, and operational plans are reviewed annually and reflect a concern for optimal use and coordination with the total area and facility resources of the community.

This chapter approaches physical resource management in three sections:

1. undeveloped natural areas;
2. developed areas and facilities; and
3. maintenance operations.

The discussion of undeveloped natural areas focuses on ecosystem protection and visitor management. The section on developed areas and facilities takes a general approach, with discussion of legal requirements, facility safety and security, and play area safety. The maintenance section details the elements in a maintenance plan.

Undeveloped Natural Areas

Undeveloped natural areas are sites where the natural environment is of primary importance and there is a minimum of facility development—for example, wilderness trails, back-country campsites, undeveloped lake shores, and some historical and cultural sites.

This type of physical resource requires less in the way of maintenance, but more in terms of protection from overuse and visitor impacts. Generally, facility development within natural areas is dispersed among a large acreage of land to minimize visitor impact. This section discusses physical resources from the perspective of managing the visitor impact on natural resource sites.

Ecological Considerations

Environmentally sound, written standards and procedures guide the development and maintenance of an organization's natural resources. They pay particular attention to protecting and preserving sensitive land and water areas. A manager might be responsible for such natural areas as environmentally unique areas, wetlands, riverbanks, lakes, and woodlands. These areas are valuable for erosion control, nature study, wildlife habitat, water supply reservoirs, and water recharge areas. They may be used for a multitude of outdoor recreation pursuits, such as rock climbing, white-water rafting, and mountain biking.

The natural resource base provides the *raison d'être* for visitation to the area. Areas that are degraded or offer a lower level of perceived quality tend to discourage use. Moreover, the natural resource base is multifaceted in that it usually includes a variety of such subcomponents as vegetation, scenery, wildlife, air quality, and watershed. Critical management elements include species selection for trees and shrubs, integrated pest management, knowledge of plant succession communities, and woodland ecology. Thus, the natural resource base must be evaluated within an ecosystem management perspective.

Ecosystem management implies a holistic approach to the use and safeguarding of the natural resource base. It recognizes the need to protect or restore critical ecological components, functions, and structures to permanently sustain resources. Managing these resources to safeguard the productive capability of the environment requires restoration, maintenance, and enhancement of the resources. Recreational activities and their management should not impair the environment's basic life-support system. This means that providing clean water, minimal soil erosion, and a diverse and healthy community of plants and animals is good park and recreation management and good stewardship of the earth. Policies that support this management direction are part of any park and recreation organization's environmental resource plan.

There is a public and natural resource interface. The role of management is to provide a balance between satisfying public demands and safeguarding the natural resources. From a managerial perspective, natural area stewardship must consider:

- increase in the use and demand for diverse recreational endeavors, particularly near large urban centers;
- increase in the use and demand for new types of recreational activities (e.g., recreational gold panning) that create the need for more regulations and resource monitoring; organizations may need to deal with this demand by using techniques such as "site hardening" and alternative timing (e.g., alternate days for hikers and horseback riders); in this case, site hardening refers to techniques and methods such as placing wood chips on the surface of the soil, to protect the location from erosion, trampling, or other impacts from use; and
- increase in users, which may require creating "sacrifice zones." These are zones in which the natural resource may be severely, and probably permanently, damaged by heavy use as a sacrifice to preserve other areas in which use is restricted.

There is a need to monitor various characteristics of impact to a natural area site, including physical, biological, and social (see Exhibit 12.1). For example, soils are critical to the survival of vegetation and the absorption of rain and dew. If the soil is eroded, it exposes infertile subsoil or rock, reducing vegetation. Further, the eroded soils often end up in watercourses, damaging habitat for fish and other aquatic organisms. Techniques for guarding against damage to soils vary based on types of soils and trail use. For example, soils with high clay content tend to readily compact under heavy traffic. When compacted, they retain water and become greasy. Hence, a trail with heavy clay and a significant amount of traffic is likely to hold water and be slippery. While the slipperiness is a risk to visitors, compacted clay is unlikely to erode, unless the slopes are very steep, and it will hold nutrients well, thus supporting vigorous vegetation. Conversely, a trail made of sandy soils is likely to drain much better and be less slippery than clay. However, because the sand does not hold together well, vegetation is likely to be less firmly rooted, and wind and water on steep slopes can erode it more easily than clay. It is better to have soil with a mixture of sand and clay. Here the properties of each soil type can be used to support vegetation, provide reasonable drainage, retard erosion, and provide acceptable footing.

Management can select either direct or indirect approaches to ecological protection. Indirect approaches try to educate or persuade users or manipulate the site. Direct approaches involve more overt actions, such as law enforcement, closing specific sites, or limiting use. The approach selected should be driven by organization

Exhibit 12.1
Characteristics of Impact for Management Consideration

Physical	Biological	Social
Soil Compaction/Percolation	Amount of Ground Cover	Number/Types of Users
Amount of Ground Cover	Biodiversity	Number of Encounters
Number of Campsites	Vegetative Damage	Visitor Perceptions
Condition of Campsites	Wildlife Composition/Health	Undesirable Behaviors
Condition of Trails	Reproduction Success	Visitor Complaints
Amount of Erosion	Plant Vigor	Extent of Conflicts
Dead and Down Timber	Presence of Exotic Species	Desired and Expected Activities
Water/Air Quality	Levels of Resiliency and Resistance of Species	Communication Patterns of Visitors
Level of Toxicity Present		
Patterns of Degradation		

goals, the visiting public, and issues specific to the situation. There are additional important considerations:

- providing for a quality recreation experience while safeguarding the natural resource;
- providing opportunities for quality recreation implies managing through pre-established and agreed-upon objectives, while providing for natural resource diversity;
- seeking to provide visitors with a range of options, which, in turn, may provide both natural resource diversity and freedom of user choice; and
- monitoring physical, biological, and social impact is of paramount importance in promoting effective management strategies.

Principles of Management

There are several principles and tools for managing natural sites and developing outdoor recreation opportunities. They can be applied to developed urban and metropolitan parks, as well as undeveloped natural areas. These include:

- carrying capacity;
- Limits of Acceptable Change (LAC);
- multiple satisfactions;
- Recreation Opportunity Spectrum (ROS);
- substitutability;
- specialization; and
- professional judgment.

Carrying Capacity

Carrying capacity refers to the level and type of use at which selected social, physical, and biological com-

ponents begin to decline at unacceptable rates. The concept of carrying capacity, which originally focused on the population size of a certain wildlife species that could be supported over time in a specific habitat, has been extended to outdoor recreation. It looks at the number of recreationists that can be supported over time by a recreation habitat. The focus initially was on physical carrying capacity. This may include the number of parking places, campsites, picnic tables, and the like. The number of such facilities influences the number of recreationists who can be comfortably and safely served.

A second dimension is the psychological carrying capacity. This relates to whether visitors enjoy and are satisfied with their experiences. Does the visitor have the desired amount of social interaction and solitude? This is challenging, as the tastes of visitors differ; some desiring more social experiences and some desiring more solitude. Is there a magic number for the “right” number of users? If such a number exists, how does an organization get and keep the amount of use at that level?

While much effort has gone into determining correct or appropriate numbers of visitors to provide a certain type of experience, there is no universal formula or number for all situations. A continuum of use limitations has a wide range of options:

- users may be limited by designing the trail to be physically challenging;
- users may be dispersed by additional information that will give them new sites to visit;
- users may be deflected from a heavily used site, e.g., rerouting a trail away from the site or making it accessible only by a side trail instead of from the main one;
- user numbers may be restricted by using a permit system; just the presence of a permit system

will limit use, even if there are an unlimited number of permits;

- user numbers may be further restricted by having a limited number of permits; fairness can be enhanced by using a lottery form of drawing, giving everyone an equal chance of acquiring a permit;
- greater user restriction occurs by adding a fee for a use permit; the fee limits use and helps pay for the additional expense of limiting use; negatively, however, the fee may discriminate against those with less disposable income;
- use can be totally eliminated and the area posted as off limits; this is often done near a site critical to rare, threatened, or endangered species, such as nests of bald eagles.

Reducing the number of visitors to provide a higher level of solitude means more management effort is dedicated to fewer visitors. In a system driven by fee revenue, this may have negative revenue consequences, as decreased revenue from decreased use will result in staff and program reductions. Charging differential (higher) fees to support less use/more solitude is not a universally accepted practice in the public or the non-profit sectors. However, it is common in the private, commercial recreation sector.

Limits of Acceptable Change

An important concept in the monitoring and development of a carrying capacity component is the Limits of Acceptable Change (LAC) process. LAC was initially developed for management of congressionally designated wilderness areas, but could be applied to undeveloped natural areas.

Traditional carrying capacity models focus on maximum use; LAC focuses on identifying desired conditions and managing the area to meet those conditions. The concern is not with the number of users, but the impacts or changes that result from those users. The premise is that any level of use, even minimal use, results in some degree of impact or change. LAC is a way to determine *how much of this change is acceptable*. Unlike wildlife, humans can be very unpredictable and diverse in their treatment of the environment and numbers alone are not good predictors. For example, five campers who practice Leave No Trace techniques will have far less impact (or change) on the environment than five careless campers who litter and deface trees. LAC is a particularly useful technique:

- where judgments about carrying capacity are a function of human perceptions as well as scientific evidence;
- where human use patterns are a prime cause of the impacts, and use numbers and patterns can be somewhat controlled; and

- where the public and various stakeholders have both interest and expertise in selecting and defining desired social and resource conditions.

The LAC is a nine-step process:

- Step 1. Identify area issues and concerns.
- Step 2. Define and describe opportunity classes.
- Step 3. Select indicators of resource and social conditions.
- Step 4. Inventory existing resource and social conditions.
- Step 5. Specify standards for resources and social indicators.
- Step 6. Identify alternative opportunity class allocations.
- Step 7. Identify management actions for each alternative.
- Step 8. Evaluate and select an alternative.
- Step 9. Implement management actions and monitor conditions.

Perhaps the greatest value in the entire process is the public involvement in the decision-making process. Within this context, managers may want to modify the LAC process to fit their specific needs and situations while retaining the opportunity to receive systematic public input.

Another critical part of the process is in Step 9, where changes in management are made based on monitoring observations and evaluation. In other words, are the strategies the managers are using to achieve the goals of limiting change within acceptable limits? If not, monitoring advises or alerts management so that it can change strategies to meet the objective or alter the objective so that it is obtainable.

LAC is a complicated process but can yield long-term management benefits. The reader is referred to *The Limits of Acceptable Change (LAC) System for Wilderness Planning* (Stankey, Cole, Lucan, Perterson, & Frissell, 1985) found at <http://www.fs.fed.us/r8/boone/documents/lac/lacsummary.pdf> for more information. The reader also may want to consider a similar concept known as Visitor Experience and Resource Protection (VERP) (see <http://planning.nps.gov/document/verphandbook.pdf>). It is an adaptation of LAC developed by the National Park Service that addresses a wider variety of settings.

Multiple Satisfactions

Multiple satisfactions suggest that a given natural resource area has the potential to accommodate a variety of recreation expectations and produce high-quality experiences. Different users will seek different combi-

nations of activities, experiences, and natural resource attributes. The Recreational Opportunity Spectrum (ROS) is one of the most used of the recreational management tools for multiple satisfactions.

Recreation Opportunity Spectrum (ROS)

ROS combines the conditions that give value to a place. The value is measured by evaluating the site conditions, types and levels of uses, and the management framework—for example, facilities, regulations, enforcement—and how these factors interact to create a recreation opportunity. ROS is similar to municipal zoning, which can range from rural to residential to industrial. Most ROS spectrums create four to six classes of opportunities, ranging from primitive to modern/developed. Managers need to understand how ROS is used in order to classify opportunities and form plans for creating the most appropriate type of recreational opportunity for their resources.

The intrinsic value of an area is directly related to its environmental conditions. Moreover, management actions can change the composition of who visits the site through social succession (e.g., amelioration, adaptation, displacement, enhancement, and attraction).

The ROS is one of the tools the U.S. Forest Service uses to manage the 191-million acre national forest system. ROS views recreation as a goal orientation, in which recreationists realize satisfactory experiences through engaging in preferred activities in a desired setting. It recognizes that different recreationists have different goals, and that diverse settings are necessary to achieve these goals. It also recognizes that physical, biological, social, and managerial factors influence the setting for recreation and other uses of the land. By providing a spectrum of opportunity, the needs of a wide range of recreationists may be met somewhere, while at no one location are the needs of all persons met.

For the Forest Service model, the spectrum ranges from primitive areas (designated wilderness where there is no development, and solitude and the need for self-reliance are featured) to urban (where the works of humanity are common, social experiences abound, and programming and regulation are highly visible). This concept of a spectrum of opportunity that meets a variety of needs is applicable to many park and recreation organizations. It is important to clearly articulate which needs are to be met and in what type of setting they will be met. Some legitimate recreation needs cannot be met appropriately by a given park and recreation organization (e.g., large concerts in wilderness areas).

Substitutability

Related to social succession or how people adjust their behavior to a given change in the recreational environment—for example, going only on the weekdays

because the weekends are too crowded—is the concept of substitutability. Essentially, substitutability refers to the potential of selecting alternative recreational endeavors (location, time, and activities) because they offer greater availability while still satisfying expectations or desires. For example, will snorkeling take the place of scuba, or canoeing on a reservoir satisfy the same needs and desires as white-water boating?

Specialization

In the concept of recreation specialization, there is a continuum of use preferences and motivations focused on a particular recreation activity. Hence, recreationists pursuing any given activity are not a homogeneous group, but rather are composed of segments with differing and perhaps conflicting, motivations. For example, the beginning angler seeks to catch a fish, any fish. This angler may be seeking convenient fishing opportunities (close to home, easy vehicle access), and few restrictions on the tackle or method used to fish, and may have only a moderate interest in fishing, not extending to joining a fishing-related organization. On the other hand, a technique specialist, such as a dedicated fly angler, will seek areas where angling is restricted to fly fishing. His or her interest may focus on matching the current hatch of insects, reducing his or her technological advantage by catching the fish on the lightest tackle possible, and releasing the fish after it is caught and briefly admired. He or she is likely to be an active member in a fishing-related organization that advocates for clean water, catch and release fishing, and restrictions on methods of fishing other than fly fishing.

As a recreation manager, it is difficult to meet the needs of both groups at the same site. Further, while beginning or occasional anglers may outnumber technique specialist anglers, the technique specialists will be better represented in the political process through their membership in related special interest groups and high-level interest and involvement with their activity. Those with more exacting preferences, such as the technique specialist anglers, will also be more challenging to please and less compatible with others.

Another key tenet of meeting recreation needs is a desired condition or setting. This may be a setting already in existence or one that needs to be achieved. For example, the Forest Service, to achieve more primitive settings, closes some roads or limits their use to management purposes (i.e., wildfire control). Hence, the setting becomes more natural as the evidence of roads decreases.

From a management perspective, the concept of specialization is related to resource development and, as such, is closely linked to the recreation opportunity spectrum concept. This suggests that natural area managers must recognize the importance of provid-

ing diverse recreational opportunities and that those activities that are more specialized require more specific attributes (e.g., fast-moving rivers) and are more easily disturbed.

Professional Judgment

Professional judgment is defined as “a reasonable decision that has been given full and fair consideration to all the appropriate information, that is based upon principled and reasoned analysis and best available science and expertise, and complies with applicable laws” (Hass, 2002). Put another way, professional judgment is based on using a reasonable process that considers the best available data and knowledge of professionals in that discipline. The key to the success of this process is being able to document a well-defined thought process and collection of credible literature.

Any decision involving complex or multiple variables involves professional judgment to some extent. As seen in the carrying capacity discussion above, it is virtually impossible to arrive at a “magic number” when considering recreation management issues. Human beings are simply too variable in their behaviors to apply the yes/no model found of many scientific disciplines. Professional judgment takes into account a degree of uncertainty when making decisions, but addresses that uncertainty, by gathering available information and documenting how it was used. The idea is to eliminate methods such as “gut feeling” that can’t be backed up.

Consider this example. A trail in a wilderness area is open to both horses and hikers, and is located in an area with erosive soils and steep slopes. A recreation manager receives complaints from a hikers group that the trail is “nothing but mud,” and attributes the problem to the horses. The hikers call for a ban on horses, and of course the horse riding community strongly disagrees. Both make claims regarding the impact caused by horses. There is little definitive research about trail impacts in this type of ecosystem. What is a manager to do?

The manager looked at the terms used in the definition of professional judgment and took the following action (see Exhibit 12.2).

For more details on using professional judgment as a decision tool, the reader is referred to *Restoring Dignity to Sound Professional Judgment* (Hass, 2003).

Visitor Management

Managing the visitor in an undeveloped natural resource area involves understanding the factors that influence participation, including demographics, discretionary time and income, and opportunity. Age decreases participation in certain recreation activities,

such as those demanding a high level of physical activity. There tends to be a high correlation between level of education and level of engagement in recreation in natural resource sites. Ethnicity and residence also appear to influence participation, but the effect is not thoroughly understood. Both discretionary time and income appear to be directly related to degree of participation. That is, as either one increases, participation also appears to increase. Likewise, as actual availability and knowledge of available resources increases, there appears to be an increase in participation.

There are a number of additional operational factors that need to be considered in visitor management, such as motivations for participation, types and styles of participation, visitor perceptions, influences of technology (e.g., GPS, mountain bikes, etc.), and characteristics of the visitor (e.g., level of experience, skill base, etc.).

Visitor Needs and Site Characteristics

The organization must understand how visitor needs and expectations interface with site characteristics so it can make intelligent decisions about how much and what type of development is most appropriate for the location. Part of the decision must include the mechanics of site characteristics (such as topography, soil characteristics, and drainage problems) and issues related to patterns of use. Patterns of use reflect current visitor involvement with the site. While a heavy use pattern may reflect a high level of satisfaction and enjoyment on the part of the visitor, such use may also imply ease of access or a lack of other opportunities. The manager needs a clear picture as to whether people are using the site because of some attractive attributes—beautiful scenery, good cliffs for rock climbing, for instance—or because there are no other equivalent opportunities or facilities in the general vicinity.

Of equal importance is understanding the purpose(s) of the site. Many sites do not have a written or policy-driven purpose. This lack requires the manager to develop a set of overriding principles governing how the site is managed and what objectives/benefits/purposes there are for visitors to that location. There is a tendency to overdevelop a site with facilities and amenities; hence, there is a need to create a written management vision as to how an area can best fulfill its purpose and match the characteristics specific to the site. In the case of natural resource sites, this often means employing a “minimum impact” attitude to safeguard against negating the natural setting—often the very reason people are coming to the site in the first place. Sites should be maintained for a sense of “naturalness,” favoring those activities that are specifically dependent or related to the “naturalness” of the area—for example, a naturally flowing stream but with no human-made fishing ponds.

Exhibit 12.2

Testing Definitions of Professional Judgment

Term used in definition	Action taken
“full and fair consideration of the appropriate information”	<p>The manager looked at all aspects such as actual trail condition, weather, and use:</p> <ul style="list-style-type: none"> • the manager surveyed the trail and discovered 4 percent of the total linear distance was muddy (standing water or wet and soft soil); • the manager reviewed patrol log records for the past three years and noted relatively little change in the number of horses or hikers observed; • the manager reviewed rainfall data for the last five months and discovered rainfall was 10 inches above normal; • the manager reviewed annual trail monitoring records for this trail and found no significant deficiencies over the last three years.
“principled and reasoned analysis”	<p>The manager was careful not to put a “spin” on his analysis, and gathered facts directly related to the issue at hand:</p> <ul style="list-style-type: none"> • he surveyed the trail three days after a moderate rain and noted that in his documentation; he did not survey the trail immediately following a heavy rain, nor did he wait for things to dry up; • he reviewed patrol logs for three years to ensure there were no seasonal variations; • he did not pick a dry or wet month to document the rainfall data.
“best available science and expertise”	<p>The manager did a literature search to see what information was available:</p> <ul style="list-style-type: none"> • the manager was not able to find research related to hiker and horse trail impacts in this type of soil type and ecosystem; he did, however, cite studies conducted in similar areas and noted the differences; • the manager cited literature on proper trail maintenance and design technique, and noted that most of the trail followed those techniques.
“complies with applicable laws”	<p>The manager documented the following:</p> <ul style="list-style-type: none"> • the trail was constructed after completion of an environmental analysis required by the National Environmental Policy Act; • the trail survey revealed three instances where lack of maintenance or poor design violated agency trail standards.
“a reasonable decision”	<p>The manager documented all findings and decided to continue to allow horses to use the trail. The decision was based on the following rationale:</p> <ul style="list-style-type: none"> • the trail was wetter than normal due to above average rainfall, thus the muddiness was likely caused by the wet conditions rather than from horse use; • annual trail monitoring surveys did not indicate any problems in previous years, which had experienced average rainfall; • only a small portion of the trail was actually muddy, and it would be unreasonable to expect the trail to be in perfect condition; • trail literature shows that trails can sustain horse use if designed and maintained properly; the majority of this trail was designed and maintained properly.

Consider a trail as one example. What types of uses are contemplated? What soils are in the trail corridor? How many watercourses are crossed? One needs to understand the physical nature of the site in relation to the recreation activity. For example, a trail for hiking

will be designed differently than one for mountain biking. A hiking trail may have many sharp turns, stairs, and blind corners. The sharp turns and blind corners may follow land contours and provide a sense of solitude, as one cannot see for great distances. Conversely,

a trail focused on mountain biking will have more gradual turns, be more likely to use a side-hill design than devices such as stairs to ascend and descend slopes, and will eliminate blind corners to promote safety. The gradual turns will reduce hard braking, which will reduce erosion. The side-hill design will eliminate the need to dismount at facilities such as stairs and will follow the contour of the land at slopes feasible for riders to safely ascend and descend. If a trail is contemplated for both uses, it needs to be more like a mountain bike trail than a hiking trail in order to promote user safety. Blind corners can be as dangerous to a hiker as to a mountain biker when both are using the trail.

Visitor management involves deciding what level and what type of site management will be practiced. That is, how obtrusive or visible will be the regulation of the visitor and consequent recreation behavior? What will be the distribution of visitor use and how will this distribution be implemented?

Visitor Safety

Organizations must try to protect visitors from injury. While visitor safety has traditionally been considered a concern with structures (i.e., fences, play opportunities, barriers, signage, etc.) safety concerns involve a spectrum of issues and situations. These issues may be viewed in three general categories.

Setting. Visitor safety takes into account the interactions between the visitor and the physical settings: i.e., a tree limb falling on a visitor's automobile or tent. Various natural environment components, such as water height and depth, vegetation, wildlife, and weather/health-related concerns pose specific safety hazards or threats to the visitor. However, recreation managers have developed ways to mitigate or control the threat to the visitor. (See Exhibit 12.3.)

Activity. Certain recreation activities typically done on natural area sites involve not only a specific set of physical attributes (i.e., whitewater, raft, or kayak launching facilities), but also have different types of inherent risks associated with them. For example, white-water boating involves dealing with fast-moving water and all the dangers and skills needed to successfully deal with that environment. Other adventure recreation activities in the natural environment include mountain climbing, hunting, horseback riding, caving, and skiing. Some of these activities have rating systems that can provide an indication of the level of skill needed to successfully engage in the activity at a given location.

Other visitors. Other visitors may present a safety hazard. Given the growing demand and visitation at

natural areas and recreation sites, this type of safety concern is becoming more prevalent.

Essential to visitor safety is making the visitor aware of dangers and potential hazards. Whatever the specific situation, most recreation management organizations dealing with natural areas should consider the following questions when dealing with visitor safety:

- what are the management objectives of the site or location?
- will restricting specific activities, such as rock climbing, interfere with the management goals and purpose of the area?
- will placing a fence or barrier have a similar effect?
- how can the manager design and plan for this area to fulfill its potential and management goals?
- what type of visitors will be attracted to this area and what will their skill and experience levels be?

Visitor Security

Visitor security or protection and vandalism prevention often fall within the purview of law enforcement. Protecting the resource from vandalism and malicious or unintentional destructive acts from an individual or group often necessitates less intrusive law enforcement measures, including innovative site design, increasing visitor awareness of the consequences of their behavior, and promoting self-regulation. (See Chapter 22 for a detailed explanation of law enforcement measures.)

Interpretation as a Management Tool

Interpretation is a visitor management tool that is gaining in popularity. Managers of outdoor recreation use interpretation to maintain the balance between two opposing forces: providing recreation experiences and protecting natural resources. Unmanaged recreation is a major issue facing public recreation lands, in the specific forms of user conflict, crowding, and environmental impact.

Interpretation is one of the indirect management practices that act on visitors' decision-making and lead to preferred behavior. Managers of public land agencies discovered the benefits of heritage interpretation as a form of indirect visitor management somewhat by accident. The National Park Service began a social science initiative in the 1970s. Visitor demographic information was sought as a means of meeting new federal mandates and to compete for recreation resource money. During the next couple of decades, direct management of visitors through law enforcement, physical barriers, signage, and other forms of deterrence was attempted

Exhibit 12.3
Components, Threats and Mitigation Related to Visitor Safety

Component	Typical Occurrence (Threat)	Provisions
Water	Cold Temperatures Rapid Heat Loss Overpowering Force Drowning Cold Water Hypothermia Currents/Hidden Obstacles	Education of Visitor Skills Development Warning Signs/Information Elimination of Hazards (e.g., sweepers, wires across streams, etc.)
Height/Depth	Falls During Rock Climbing, Mountaineering, Caving, Rappelling, etc. Weather-Related, e.g., Avalanche Scuba Diving/Snorkeling-Related Lost or Disoriented	Visitor Awareness Restricted to Appropriate Skills Levels Adequate Equipment Requiring Specific Certifications Search and Rescue Groups
Vegetation	Poisonous Plants Hazardous Trees	Removal Visitor Warnings Structural Modification (e.g., pruning)
Wildlife	Animal Attacks/Bites/Claws Visitor Injuries Due to Wildlife Viewing (e.g., slipping on wet rocks) Poisonous Animals	Removal of Offending Animals Placement of Designed Wildlife Viewing Stations Education of Visitors
Health-Related Concerns/Weather	Poor Water Quality Cold/Heat/Sun Injuries Lack of Water/Food Poor Sanitation Distance from Medical Aid Distance from Outdoor Environment (e.g., Lyme's disease) Avalanche/Rockfall	Regular Monitoring and Maintenance of Water Systems Warning Signs, Barriers, Fences Visitor Education/Awareness Safety Patrols, e.g., National Ski Patrol Visitor Training and Appropriate Level of Skill

with only limited effectiveness and at a relatively high cost. Meanwhile, the swell of interest and money in recreation participation in the 1970s and 1980s helped the number of interpretive programs and guides to grow at many federal and state sites. The USDA Forest Service, the U.S. Army Corps of Engineers, the Bureau of Land Reclamation, and state park systems began utilizing interpretive messages to accomplish recreation management at parks, campgrounds, picnic areas, trailheads, and marinas around the country. Generally, interpretive programming became viewed less as mere entertainment for visitors and more as an experimental method to convey conservation and environmental messages to visitors. The captive audience at a campfire talk appeared to be an ideal opportunity for parks to practice indirect management of the visitor. As interpreters in the 1980s were scrambling to justify the economic benefits of their exhibits and programs, they began to make the case for the added value of improved visitor attitude and potential behavior change at a fraction of the cost.

Managers borrowed yet another idea to assist in recreation management, this time from the private sector and businesses. Interpretation as a form of indirect management was found to be an ideal vehicle for achieving social marketing, a means of persuading the public to accept certain social idea (Bright, 2000). Interpretive messages could be designed by individual resource agencies and recreational organizations to influence behavior, be cost-effective, focus on the visitor (customer), and could be segmented for diverse audiences (markets). Furthermore, formative evaluation of interpretive programs could be undertaken to assist in the design of new programs and exhibits. Heritage interpreters and environmental educators have viewed social marketing as a means of moving visitors along a progression of steps, levels, or stages of increasing awareness and experience of natural and cultural resources leading to stewardship—a self-motivated interest in taking care of such resources (Merriman & Brochu, 2005).

At many large federal recreation areas, management and interpretive divisions share interest and technology in their mutual efforts to bring protection of resources in line with educating and informing visitors as they enjoy their recreation experiences. The overall interpretive plan at recreation sites includes non-personal media and personal programs and tours. Initially, warning signs were reworked by creation maintenance shops into pseudo-educational and environmentally friendly guides to appropriate visitor behavior. As parks, historic sites, aquaria, zoos, and museums improved their sophistication, brochures, trail maps, and the interpretive wayside exhibits panels began to weave agency missions and management goals into the often wordy and picturesque narratives about a host of natural, cultural, and historical topics. Informal roving rangers and formal guided interpretive programs were crafted to integrate information, inspiration, provocation, and social marketing of conservation topics into their artistic presentations.

The National Association for Interpretation (NAI), the professional association for interpretation in the United States, defines interpretation as “a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource” (<http://www.interpnet.com>). The organization has established standards and presently offers a training program for certifying interpreters in several categories, based on the interpreter’s role in the site, from concessionaire (host), to guide, planner, and manager. The NAI-certified interpreter curriculum articulates the use, value, and benefit of interpretation for accomplishing social marketing; the persuading of visitors to appreciate and understand, and eventually care for the natural and cultural resources protected at sites. Interpretation’s transition from being solely used as a means of connecting the visitor to the people and landscape of protected areas to its present state of being viewed as a multi-purpose tool for management took several decades and is yet evolving.

Public land agencies have four strategies for the direct management of creation: increase supply, reduce impact of use, improve the durability of the resources, and limit use (Manning, 1999). The need to provide high-quality recreation experiences demands a varied approach through the use of trained interpreters wielding a communication process that helps visitors during their unconfined recreation experiences behave in ways that are consistent with the management objectives of reducing erosion, improving water quality, maintaining habitat, and increasing visitation. Interpretation is a management tool that incorporates many aspects of visitor use behavior: moral development; communication theory; recreation use patterns focused on behavior,

persuasion; knowledge; visitor attitudes; and depreciative behavior. The success of interpretation to aid in recreation resource management, like any tool, depends on the skill and precision with which it is used.

Lake and River Management

The presence of a lake or river, either in a natural or developed setting, presents a whole new set of circumstances to the park manager. Water is a great attractor—just look at the price of waterfront real estate—and people love to use it for recreation. But it can also be a major headache when it comes to safety, operations and maintenance, and resource protection. The variations are extensive. Water can move up, down, sideways, or not all: up and down if you are dealing with a river or reservoir, down if you are dealing with waterfalls and rapids, sideways if you are dealing with river current, tides, or wind, and not moving at all if it is a placid lake. Add to that the fact that it sometimes freezes and other times dries up, and the park manager is indeed chasing a moving target. Still other challenges abound: balancing the sometimes opposing needs of diverse users such as fishermen and jet skiers, protecting shorelines from erosion, and encouraging people not to drown, just to name a few.

The reader is cautioned that water activities, particularly rescue, can be extremely dangerous and require proper training and equipment. Design requirements, expertise, and certifications far beyond the information presented here are necessary for prudent management of water-based recreation. This text presents only some of the more common issues that a manager must handle. Many solutions are available, and depend upon local conditions that result from terrain, type of use, climate, etc. Rather than try and provide a solution for each possibility, a list of resources is presented at the end of this section to assist managers.

What are some management considerations regarding lakes and rivers?

Rivers

Safety. Moving water is extremely dangerous and commonly misjudged by the public. Education, good design, and proper maintenance can mitigate these risks, and a trained and equipped rescue staff can minimize negative results for those that do not heed those risks. Here are some common hazards:

- *misleading appearance*: people may not recognize that the water is moving or fail to comprehend its force;
- *strainer*: when a victim is pinned by the current against a tree branch or other object;
- *the drowning machine*: a sort of sideways whirlpool (known as a hydraulic) that occurs

below dams or other structures and traps the victim;

- *parked barges*: river currents can draw boats under a barge tied up to a bank, particularly if the barge has a raked (slanted) bow;
- *moving barges or other large commercial vessels*: these monsters can take over a mile to stop and have numerous blind spots; their large size can also unexpectedly steal the wind of sailboats and windsurfers leaving them with no way to maneuver.
- *flotsam*: rivers are notorious for floating debris and submerged hazards inches below the water line and out of sight of boaters; the same holds true for swimmers who may dive head first and become paralyzed from striking an object;
- *hypothermia*: water temperature can be a killer when someone finds themselves submerged in cooler temperatures; even relatively warm water can quickly cool a person; in fact, the physical properties of water will cool 25 times faster than cold air; the result can be impaired movement and thought processes, and eventually death;
- *general boating*: boating skills are critical for safe operation on the water; basic knowledge such as rules of the road, use of a personal flotation device, and boat handling are just a few of the many skills necessary, which vary by the type of craft being used; unfortunately many states still do not require boating education or certification, although some states now require younger operators to obtain training; numerous innovative programs are in place and include free life jacket loaner programs, online boating courses, and insurance discounts for boaters who pass a safe boating class.

Operations and maintenance. The following list highlights the major issues for operations and maintenance of river-based recreation areas.

Flooding. The primary maintenance issue for rivers is their natural tendency to flood. Any structure in the flood prone area needs to be designed to be submersible. This becomes problematic for amenities such as electrical hookups or boat ramps that become unusable because they are underwater. However, design solutions are possible. For example, to accommodate many different water levels, a floating boat dock along with a long, sloped launch ramp can meet that need. Some facilities, such as pit toilets, *must* be located above the flood prone area to prevent escape of sewage into the water body. This can be problematic if there is no high ground in the area and it may require bringing in fill to elevate the pit toilet location. Lastly, floodwaters are

messy, coating everything they touch with a thick film of mud. A cleanup plan is critical.

Drought. The opposite of flooding can also occur. Boat docks, boat ramps, and fishing piers may be high and dry as a river loses its volume. Again, proper design can account for fluctuating water levels.

Bankerosion. While bank erosion is a natural part of a river environment, it is little consolation if your parking lot is within inches of falling into the river. There are design alternatives such as rip rap bank protection that can mitigate this problem.

Riverside facilities. Another challenge is the maintenance of riverside facilities such as fishing piers, boat docks, and boat ramps. The constant moisture greatly shortens the life of the building materials, currents carrying debris can damage the structures, and the submerged end of boat ramps can be washed out creating a hole that can swallow boat trailers. Yet again, proper design can be helpful in managing these issues.

Shoreline management: See Lakes section, below.

Lakes

Safety. Some common lake hazards include:

- *hidden drop offs*: an uneven bottom may cause an unaware visitor to step from knee-deep water to over their head in just one step; a common example of this is when a reservoir has high water and floods an area normally above water, and a wading visitor steps off of an embankment that would otherwise be obvious;
- *submerged objects just below the waterline or shallow water*: for boaters, this is a concern at reservoirs and shallow natural lakes; for swimmers, the hazard is becoming paralyzed from diving head first and striking an object or the lake bottom;
- *rip tides and surf at large lakes such as the Great Lakes*: this is often not obvious to the unwary visitor, and many are surprised to discover that this hazard exists on inland lakes;
- *severe weather*: this is most dangerous when a boater is a long way from shore;
- *ice*: winter brings ice skaters, snowmobiles, and sometimes even vehicles to the lake; many different consistencies and thicknesses of ice exist, and not all are safe;
- *commercial traffic if on a large lake*: see river safety;
- *hypothermia and boating*: see river safety.

Operations and maintenance. Many of the operations and maintenance issues related to rivers also apply to lakes, particularly if they have a frequently fluctuating water level such as reservoirs. Some additional topics commonly found at lakes are addressed below.

Swimming beach management. Standards for beach design and management can be found in agency guidelines or state or local statutes. Standards generally include slope requirements, no drop offs, no submerged objects, depth markers, an emergency action plan, capacity, and water quality monitoring. Some agencies use lifeguards and others do not. If not, the decision with rationale should be documented and mitigating measures put in place (signage, telephones, life rings, etc.).

Aquatic weed growth and other organisms. Unwanted weed growth is a common problem. The problem is compounded by the introduction of non-native invasive species that can choke swimming beaches and boat ramps and upset the natural balance of the lake. Other organisms such as the zebra mussel and the Asian carp have emerged as recent problems. Treatment is possible, and companies that specialize in eradication are the manager's best source of help.

Shoreline management. Many lakes are populated with homes along the shoreline, with varying levels of restrictions depending upon the local situation. Often a public entity is responsible for the lake itself and may include jurisdiction up to the high water mark and beyond. Some common issues involve dock permits, public access, property line setbacks, septic system requirements, horsepower limits on boat motors, dredging, and shoreline modifications, such as seawalls. Another issue is that of regulating commercial use such as a marina. If the marina exists on public lands, there likely are more stringent restrictions. Common considerations include size, types of structures and docks, fuel dispensing, sewage disposal, fee structure, alcohol and food sales, storage, and electrical wiring around water.

Dams. Human constructed lakes and even some natural lakes use dams as a means to maintain a specified water level. Dams require frequent maintenance such as mowing and brush removal, and require engineering inspections for safety, particularly after a high water event.

Lakeside public facilities. Maintenance issues are the same as for riverside with the exception of lack of current.

Resource Protection for Lakes and Rivers

The obvious issue here is that water runs downhill. Therefore, anything a manager does on land can affect nearby water bodies. Some impacts that might occur include the following.

Sedimentation. Nearby ground-disturbing activities such as construction can loosen soil and send it into the water body. On reservoirs in particular, sedimentation from upstream activities can fill a lake with silt. In fact, most reservoirs have a predicted life span based on sedimentation rates.

Chemical pollution. Pesticides or other chemicals designed for land use should not be allowed to flow into water bodies.

Sewage effluent. Although obvious, nearby pit toilets or other sewage equipment should not be allowed to leak or be located in an area that would allow them to be flooded during high water events. Another consideration is faulty septic systems leaching into a nearby water body.

Recreation activities. Land-based recreation uses, such as horse trails or ATV areas, can inject sedimentation or waste into a water source. On the water, houseboats with on-board toilets will need strict regulation to prevent indiscriminant dumping of effluent.

Monitoring: Many agencies regularly monitor their lakes for water quality and fish populations.

Design

An excellent source of information for design of water-based facilities is the U.S. Army Corps of Engineers, which manages thousands of such facilities nationwide. A visit to a nearby corps facility can give a manager some ideas and an opportunity to meet with local staff for insight on best management practices. (To find a Corps site, see the Resources section, below.)

Developed Areas and Facilities

Developed recreation areas are characterized by facilities accommodating high-density use. They require a high degree of maintenance and continuous site supervision and management. Developed recreation sites may be categorized as follows:

- *buildings:* buildings that serve the public, including: community centers, fitness centers, and nature centers/interpretive facilities; buildings that serve park and recreation employees, including: administrative buildings, maintenance facilities, utility structures, employee residences, or employee dormitories;
- *special facilities:* golf courses, marinas, zoological exhibits, botanical gardens, historical properties, and so on, represent special facilities that often require an admission or user fee;
- *day-use areas:* aquatic facilities, picnic areas, athletic facilities, and playgrounds are examples of typical recreation day-use areas and may represent the majority of park and recreation developed sites;
- *overnight areas:* these include campgrounds, lodges, and group camps; and
- *support facilities:* food service, rest rooms, rental structures for canoes, bicycles, etc., represent

support facilities used by the public to enhance convenience and enjoyment of the area.

Because of the very diverse nature of developed areas and facilities, only generalized management considerations concerning legal requirements, facility safety and security, and play area safety and maintenance are discussed in this chapter. Vehicle management and maintenance, facility and equipment depreciation and replacement are briefly presented. However, maintenance is a critical aspect for all managers, and thus a major section is devoted to it. (See Resources, below, for materials on specialized facilities.)

Legal Requirements

There are many local, state, and federal regulations that affect the operation of a park and recreation organization. As public concerns about the environment, public safety, employment conditions, and human resources have increased, the number, type, and scope of laws, policies, rules, and regulations with which the recreation and park organization must comply has expanded at a corresponding rate. For example, mandates regarding the application of pesticides, respiratory protection, smoking in public buildings, confined space, drug testing for drivers of commercial vehicles, sexual harassment, and accessibility have significantly increased both costs and operational complexity for virtually every park and recreation maintenance program.

The sheer magnitude of laws and regulations has made it essential that someone in the organization be charged with the responsibility of reviewing and becoming familiar with all applicable regulations and their effect on the organization. In many organizations, the human resource or safety personnel assume that responsibility (see Chapters 16, 21, and 22). Because many regulations are maintenance-related, the maintenance operation should take an active role in developing compliance policies and procedures, and in minimizing their effect.

A record-keeping system ensures that employees who need specialized training in areas such as pesticide application, confined space, or respiratory protection actually receive the training, and that it is recorded in their personnel file and in special compliance files for each applicable regulation.

Managers also keep participants and employees informed about significant safety and health issues that may affect them. Both the employer and the employees have a responsibility to ensure that programs, areas, and facilities are as safe as possible for visitors and staff, including minimizing health risks. In addition, employees are obligated to work safely, to wear appropriate protective equipment when required, and to quickly report accidents and hazardous conditions. Employers

are obligated to maintain a safe working environment, provide proper tools and equipment, train employees, and maintain records about occupational injuries and illnesses.

Of the several types of regulations with which the organization must comply, several deserve additional discussion, including:

- building codes;
- environmental protection;
- health department regulations;
- safety and loss control procedures; and
- accessibility.

Building Codes

Ensuring compliance with building codes is generally the jurisdiction of the local governmental entity (county, city, village, township, etc.). Building codes, which generally encompass building processes and layout, as well as mechanical, electrical, and plumbing systems, have their greatest effect during construction, but may also affect certain levels of building maintenance. The typical building code may mandate such things as the types of materials used in construction, the number of parking spaces needed, the installation of fire sprinkling systems, the use of burglar and/or fire alarms, the number and types of entry doors and hardware, and the number and type of toilets. Many local governments require approval of preliminary construction drawings and/or plans and specifications, and mandate inspections and approvals by fire and building authorities before an occupancy permit is issued. Some building code requirements also affect maintenance operations, for example, a requirement that the inspectors test valve on the building sprinkling system be activated at least once each year. Also, certain areas of the country have building codes related to earthquakes, floods, and hurricanes. Local zoning and development codes also regulate development, including building setback requirements, landscape standards, and density/use parameters.

Playground safety standards are set forth by the Consumer Products Safety Commission (CPSC) and the American Society for Testing and Materials (ASTM). See section on Play Area Safety and Maintenance, below.

Environmental Protection

A multitude of laws govern environmental protection and apply to public agencies in varying degrees. Just a few with which the agencies may need to comply are the National Environmental Policy Act, the Endangered Species Act, the Archeological Resource Protection Act, the Clean Water Act, and the Clean Air Act, in addition to state and local laws. This is a very complicated aspect of park and recreation management, and requires a thorough understanding of the local situation and legal

requirements. It is not possible to address this topic in detail in this publication.

Health Department Regulations

Local governments are also primarily responsible for health code enforcement. For example, in Illinois, county health departments are responsible for developing and ensuring compliance with food-service regulations, and regularly inspect kitchens, concession stands, and other food-service facilities.

Special facilities, such as swimming pools, spas, amusement parks, and zoos, may be subject to specific county and state health and safety regulations. For example, for public swimming pools within Illinois, the county health department ensures that public pools comply with regulations regarding water quality, proper function of the mechanical systems, deck and locker room procedures, and similar processes. However, responsibility for ensuring that newly built or renovated swimming pools comply with appropriate use, function, layout, and safety standards remains with the state of Illinois.

Safety and Loss Control Procedures

One of the most important, comprehensive, and complex categories of regulations that affect park and recreation organizations relates to safety and loss control. Maintenance operations often account for two-thirds of the total park and recreation occupational injuries. Management of this category is highly dependent on the local situation: do the staff operate boats, ATVs, or ride horses? Do they engage in high risk activities, such as firefighting or chainsaw operation? A comprehensive safety plan is an excellent and important management tool to address these local needs.

The vast majority of safety and loss control mandates are part of the Occupational Safety and Health Act (OSHA) of 1970. With implementation of the OSHA policies and procedures, park and recreation maintenance managers have discovered what the private sector realized decades ago—that working safely is good business; it not only prevents accidents and injuries, but also saves time. Although employees in public park and recreation agencies are exempted from the act, most federal agencies, including the National Park Service, are required by executive order to develop effective and comprehensive occupational safety and health programs. In addition, many states have adopted programs that replicate the OSHA requirements. As of 1998, 25 states had approved OSHA plans that require the development of comprehensive occupational safety and health programs applicable to all employees of the state and its political subdivisions.

In general, OSHA specifies certain duties for both employers and employees. The employer is gen-

erally responsible for providing a place of employment free from recognized hazards that are known or likely to cause death or serious physical harm. Employees have the duty to comply with standards and regulations. OSHA also identifies a number of rights held by employees with respect to standards, access to information, and enforcement. Though both employer and employee have duties under the act, penalties for noncompliance are issued only against the employer.

OSHA standards and programs protect workers from occupational injury and illness. Specific record-keeping requirements and a comprehensive safety inspection process are also mandated under the OSHA program. Managers should also keep in mind the need for safety requirements for volunteers and other partners, such as contractors or concessionaires. Most agencies apply the same safety requirements whether the individual is an employee or partner.

Examples of OSHA standards and programs that specifically affect park and recreation maintenance managers include:

- *confined space protection program*: this program details policies and procedures intended to assist organizations in maintaining a safe working environment for those employees whose job requires working in or around confined spaces, such as underneath vehicles; it includes definitions, hazard control, compliance options, permit procedures, training requirements, personnel responsibilities, rescue guidelines, and testing/monitoring information; a common example of confined space entry might be an employee entering a sewage lift station to perform maintenance;
- *lockout/tagout policies and procedures*: these detailed policies and procedures to ensure compliance with the Control of Hazardous Energy Sources Standard; it is designed to protect employees who perform maintenance work where the unexpected startup of equipment could cause injury. It includes staff responsibilities, lockout/tagout procedures, and training and monitoring guidelines; a common example of lockout/tagout might be placing a padlock on an electrical box to lock the main power supply in the “off” position, thus preventing someone from inadvertently turning the power back on while another employee is working on an electrical outlet;
- *respiratory protection program*: this program defines respirators use to prevent employees from breathing hazardous substances and materials such as using a blower to remove fine

silt from a sidewalk; it includes employer and employee responsibilities; air quality controls; respirator selection, fitting, and use guidelines; respirator care and maintenance; cartridge information; and employee training requirements; a common example of respiratory protection program might be the required use of a particular type of respirator while applying a pesticide.

There are other, non-OSHA, safety and loss control programs with which park and recreation maintenance operations must comply. Chief among these programs is the U.S. Department of Transportation regulation that governs the use of controlled substances and alcohol by drivers of commercial motor vehicles. This program applies to all operators of public vehicles that hold a Commercial Drivers License (CDL). It also mandates drug and alcohol testing under the following conditions or times:

- before the first time a driver performs safety-sensitive functions;
- following certain accidents;
- on a random basis; and
- for reasonable suspicion.

The regulations also govern testing methodology and integrity, and procedures for responding to positive test results.

Accessibility

The Architectural Barriers Act of 1968 required that any building or facility using federal funds must be accessible to and by people with physical handicaps. Subsequently, this act was augmented by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (ADA). Most state and local laws complement the federal ADA, requiring all public facilities to be accessible to all people. The Americans with Disabilities Act (ADA), applicable to both public and private entities, has had a significant effect on park and recreation organizations. Basically, the ADA is a civil rights law that guarantees equal opportunities for persons with disabilities in employment, state, and local government services, transportation, public accommodations, and telecommunications. The Americans with Disabilities Act of 1990 for new or remodeled facilities and recreation areas includes the following areas:

- barrier-free entries and exits;
- ease of access to seating areas, including wheelchairs;
- barrier-free access to service areas, including toilets, concessions, telephone, first-aid areas, etc.;

- exits near vehicle parking and traffic patterns;
- designated parking spots for users with physical disabilities;
- accessible drinking fountains, fire alarms, fire extinguishers, and thermostats;
- accessible program areas, such as water entrances, trails, and picnic areas.

Under the ADA, state and local governments that construct new buildings and facilities, or make alterations to existing buildings and facilities, must make them accessible. Title II requires a public entity to ensure that persons with disabilities are not excluded from services, programs, and activities because existing buildings and facilities are inaccessible. Where accessibility guidelines have not been finalized, it is the responsibility of the park and recreation organization to ensure that programmatic accessibility is maintained.

The Architectural and Transportation Barriers Compliance Board (Access Board) was formed to develop design guidelines and standards for accessible buildings and recreation facilities such as recreation centers, outdoor pools, and meeting halls. Guidelines are available for some recreation facilities, such as swimming pools, golf courses, fishing piers, etc. As of this writing, the Access Board is developing guidelines that will apply to trails, beaches, picnic areas, and camping areas. Information on the latest developments may be obtained from the Access Board (See Resources section below.)

Facility Safety and Security

In recent years, security has become an important management function in most park and recreation organizations. It is essential that participants, visitors, spectators, and employees feel safe and secure when using or working in park and recreation areas or facilities. On many user attitude and opinion surveys, the lack of a sense of security is one of the most frequently listed reasons for why people do not use parks and recreation facilities. This section discusses building security, preventive security measures, preparing for the unexpected, and vandalism. (For further discussion of law enforcement and security, see Chapter 22.)

Providing a safe environment requires constant attentive management of the facility, equipment, patrons, and staff. The responsibility for development of security measures for the premises of an organization rightly belongs to both management and staff; however, maintenance must install and keep security equipment in good condition, as well as do systematic inspections.

Building Security

Each building should have a security plan, which includes inspection checklists for opening, closing, operating, and monitoring procedures. Of course, the type of facility and use received will greatly influence specific security functions and responsibilities. See Exhibit 12.3 for items typically included on facility checklists. Additional items should be included on the checklists for other safety and security functions, such as:

- automatic sprinklers;
- fire alarms;
- fire and security doors;
- downspouts and drains;
- electrical cabinets and panels;
- fire extinguishers
- flammable liquids and chemicals;
- heating and air conditioning systems;
- housekeeping problems; and
- personal protective equipment.

Different checklists are used for weekly, monthly, and quarterly evaluations, according to the building security plan.

Preventive Security Measures

The security plan for areas and facilities necessarily involves more than developing checklists and inspection programs. Other preventive security measures include:

- lock and key security;
- fencing;
- fire protection;
- signs and symbols; and
- illumination.

Lock and key security is maintained primarily by developing a key control system. Keys are distributed only to those personnel who need them. Except for specifically responsible management personnel, no single individual is given keys to all locks. While there may be master keys for a number of locks within one facility or structure, no one key should open all of the locks. There are locking systems on the market that include different security levels that can exclude access at the discretion of the manager. The installation of numbered keypads that use codes is another way to limit access.

Within a building, security can be maintained by installing locking gates or doors to prevent an intruder from having access to interior rooms, even if an outer entryway has been penetrated. A series of reinforced steel gates at strategic locations within a facility may do much to frustrate the trespasser or to deter vandalism. Maintenance personnel can assist in reducing security problems by checking locks to assure that equipment, tools, and rooms are secured.

Fencing is most often designed to assure the safety of park and facility users, screen off visual eyesores, direct pedestrian traffic, and prevent accidents by discouraging access to hazardous areas. Fencing may be of synthetic or natural materials. Where strength, durability, and prohibition of access are essential, chain-link or other metallic fencing should be used. When aesthetics are a consideration, natural materials, such as plants, wood, or water may be used. For security purposes, barriers and fences should be monitored to detect or prevent breaching in vulnerable areas.

Fire protection is another preventive security measure. Park and recreation facilities first conform to applicable state and local fire codes. Beyond that, however, the building security plan may include fire protection measures, such as:

- firefighting equipment to put out various kinds of fires;
- fire-retarding doors and emergency exits;
- sprinkler systems;
- alarms; and
- anticipated escape routes.

Maintenance personnel will almost certainly be involved in any kind of fire problem, and must know how to check and use equipment. Moreover, maintenance personnel are often trained to inspect fire protection elements.

Signs and symbols can communicate safety and security considerations. While signs may be authorized and designed by other units, the maintenance manager generally must make sure that signs and bulletin boards are maintained, repaired, replaced, or cleaned. Posted warnings can reduce the number of incidents that would occur if no sign were present. If people are warned about hazards, it is likely (but not inevitable) that they will avoid the danger. If signs are prominently posted where the greatest numbers of people are going to be informed, or if information about specific hazards is posted, then the liability to the organization is reduced.

Illumination can also be an effective preventive security measure. Inside stairwells, steps leading from a building to a walkway, and sport and game facilities intended for night use, all may be made safer for users through efficient lighting. The maintenance operation is usually responsible for maintenance, repairs, and replacements of such systems. Strategic lighting may also help prevent crime and vandalism in park areas. Lighting building exteriors, parking lots, and pathways may discourage vandals and other criminal elements. Night lighting for all kinds of recreation activities prevents accidents that might occur because participants cannot see balls, bats, clubs, or other equipment normally associated with sports and games. The effective maintenance of recreation lighting can prevent

minor problems and major injuries to participants and spectators.

Preparing for the Unexpected

Devastating acts, such as the terrorist attacks on the World Trade Center and the Pentagon, have left many people concerned about the possibility of future incidents and their potential impact. Despite uncertainty about what may happen, there are several steps that public organizations can take to prepare for the unexpected.

1. Identify potential threats. Consult with local law enforcement to discuss potential threats in your community. Make any needed security improvements to protect your facilities and staff. Discuss specific local response plans so you will know what to expect.

2. Create an emergency operations plan. This plan includes a policy statement that reflects the organization's goals and objectives regarding emergency preparedness. It also contains emergency telephone numbers and guidelines for reacting to various emergencies, including weather (tornadoes, lightning, thunderstorms), fire, hazardous material incidents, floods, earthquakes, utility emergencies (gas line breaks, power failures), and civil or national disorders. It is also useful to include information about communicating with the news media during times of crisis. Once developed, it is essential that employees receive appropriate training regarding the plan. (See Compendium 12-1 for an Emergency Operations Plan.)

3. Develop evacuation plans for buildings and facilities. Establish meeting places for each public building or facility. Where appropriate, schedule evacuation drills, particularly in facilities where children's programs are common.

4. Establish mail-handling precautions and protocols to identify suspicious letters or packages. In Illinois, the Park District Risk Management Agency, a risk management cooperative with more than 125 municipal partners, has developed detailed procedures for mail handling (LRN Alert 01-37, www.PDRMA.org). The United States Postal Inspection Service has also developed guidelines regarding mailroom security (see Compendium 12-2).

Vandalism

Vandalism is the willful or malicious destruction or defacement of property. Within a park and recreation context, vandalism is the damage or defacement of facilities, buildings, picnic tables, benches, signs, drinking fountains, restrooms, vegetation, or other park and

recreational amenities. Repairing the vandal's handiwork is certainly one of the most frustrating aspects of the maintenance manager's job. Before the maintenance manager can develop an effective strategy for preventing vandalism, it is important to consider and understand the different motives that underlie the problem. There are six motivational categories for vandalism: acquisitive, tactical, vindictive, playful, malicious, and erosive (Sharpe, Odegaard, and Sharpe, 1994, p. 329).

Acquisitive vandalism involves destroying property while illegally obtaining money or other desired objects. Examples include looting soft drink and candy machines, fee collection boxes, telephone coin boxes, and traffic signs.

Tactical vandalism is also premeditated but is done to attract attention or gain publicity for a special cause. Such attention-getting vandalism may stem from psychological problems, often manifested by excreting in sinks or on restroom floors, or by setting incendiary fires. Publicity-oriented vandalism, as contrasted with attention-getting vandalism, most often takes the form of names or slogans written on park buildings.

Vindictive vandalism is motivated by a desire for revenge on an individual, organization, or simply "the system." Here, vandalism seems to be an outlet or release for someone smarting under actual or imagined unfair treatment. Being fired from a job, receiving a traffic ticket, or being evicted from a park, sport field, or building are frequently cited reasons for vindictive vandalism. Examples of vindictive vandalism include spilling paint or slashing car tires.

Playful vandalism is the outgrowth of a group play situation and accounts for a relatively large percentage of vandalism in recreation. The destructive act is not planned, but grows out of "interstimulation," where members of a group excite one another into increasing acts of destruction. Group members feel a sense of security in numbers and may regard their vandalism as mischievous fun. Peer pressure causes many individuals to participate in acts of vandalism that they might not otherwise commit. Examples of playful vandalism include spray painting a door, breaking windows in a building, or shooting out light fixtures.

Malicious vandalism is performed by those who seem to derive enjoyment and satisfaction from destruction. Pure excitement appears to motivate malicious vandals. Examples of malicious damage to recreation facilities include smashing restroom facilities, setting fire to maintenance equipment, or blowing up a playground. Researchers cite boredom, despair, exasperation, resentment, failure, and frustration as feelings that might precede malicious vandalism—most directed at life in general, rather than against a particular organization or person. Intoxication often plays a part in this behavior.

Erosive vandalism, by itself, may not be damaging. However, when repeated by large numbers of people, such acts can cause substantial damage. Erosive vandalism may be caused by ignorance, but it may also result from neglect or from disregard for recreation values. Examples of erosive vandalism include shortcutting trails, collecting park objects for souvenirs, or writing on rocks or walls.

Many solutions to the problem of vandalism and suggestions for reducing vandalism have been proposed. Some that have been advocated include:

- better-designed park facilities;
- more signs and lighting;
- improved maintenance;
- removal of temptation;
- user fees;
- increased surveillance;
- expanded law-enforcement efforts; and
- increased public education and involvement.

Each of these proposed solutions and suggestions has some validity; however, there is no single solution to the vandalism problem. Maintenance managers must consider each alternative carefully, within the context of the specific situation. One premise that maintenance managers should keep in mind is that *attempting to reduce vandalism is difficult and discouraging, but failing to do so is much worse*.

Better-designed park facilities. Better-designed facilities are often proposed as a solution to vandalism. When facilities are replaced, the strongest available materials should be used. The higher initial cost that this entails is probably justified in the long run. Constructing buildings that are strong enough to withstand vandalism and that are also attractive is very difficult, and probably not the maintenance manager's responsibility. Nevertheless, maintenance managers need to give input into the design of recreation buildings and facilities, and be acquainted with current vandalism prevention technology. For example, building design and location should make it impossible to gain access to the roof by climbing fences, walls, trees, or the outside of the building itself.

Building walls are often defaced with graffiti applied with paint, lipstick, crayons, pencils, and pens. Walls should use textured materials rather than smooth surfaces. Suggested exterior materials include brick, concrete block, and stone. Inside, a smooth, nonporous surface, such as tile, is preferred because it is easy to clean and requires no painting. Glazed brick is difficult to write on, easy to wash, and is an ideal interior surface. Special coatings that protect against spray paint can be applied to walls, but they are relatively expensive and may have to be reapplied frequently. Regardless of the

material used to paint walls, graffiti must be removed as soon as possible; otherwise it encourages others to add to the graffiti.

Restrooms are also subject to frequent vandalism. Suggestions for safeguarding these facilities include hiding all piping from view, using metal mirrors and electric hand dryers, installing stainless steel fixtures that protrude as little as possible, using push-button faucets, covering windows with heavy metal screens, and other similar techniques. Unfortunately, such installations can be aesthetically unappealing and often resemble those found in prisons.

More signs and lighting. Signs in park and recreation settings are necessary to welcome and inform visitors, but also become handy targets for vandals. Signs with negative messages such as "Keep off the grass" are vandalized more often than signs with positive messages such as "Please use paved paths." Briefly explaining the reason for a regulation may deter some types of vandalism. For example, painting the message "Basin drains to stream" on drainage covers may reduce the amount of chemicals, motor oil, and other substances dumped into the basin. The material used to make the sign also affects vandalism. Routed wooden signs are attractive but are expensive and difficult to replace. Granite or stone signs are long lasting and vandal-resistant, but susceptible to painting and very expensive to replace. Silk-screened plastic, wood, and metal signs are relatively inexpensive and can be effective if their surface is scratch resistant. Installing signs in concrete and placing them in open, well-lighted locations will also help deter vandalism.

Lighting has been found to be an effective deterrent to vandalism and theft in park and recreation settings. High intensity discharge (HID) lighting systems installed on poles or strategically placed around buildings provides a source of light that can cover a wide area and improve security for both visitors and property. Burning lights all night may also help deter vandalism, although light fixtures are a favorite target for vandals. Screens or high-impact plastic can protect light fixtures. One of the benefits of proper and adequate lighting is that it makes parks and facilities more attractive to responsible users. As a general rule, the more responsible users present in an area or facility, the fewer vandals.

Improved maintenance. Many managers believe that good maintenance practices discourage vandalism. It is known that users are vocal when areas or facilities are poorly maintained or unclean. It is also true that users are attracted to clean and well-maintained areas and facilities. Clean and well-maintained facilities do get vandalized; nonetheless, vandalism seems to be reduced

by keeping an area clean and immediately repairing or replacing vandalized objects. It often seems that carvings in a picnic table or graffiti on a sign inspire imitation. Once the first graffiti is present, others often follow.

Removal of temptation. Employees can remove temptations by locking doors, putting away tools, and controlling keys. Vending machines can be placed inside buildings or in open areas visible to the public so that visitor traffic can help discourage theft. Some success has been obtained by labeling vending machines with such signs as: "This machine emptied of all cash each evening." Valuable artifacts should not be displayed where theft is possible. Replicas should be used and identified to discourage potential thieves.

User fees. There are no reliable data to support the opinion that fees reduce vandalism or that they increase it. Some managers have reported less vandalism in areas where user fees are collected, but others believe that fees increase vandalism by making users feel that they have a right to do as they wish. It is difficult to attribute reductions in vandalism solely to user fees. The fact that fee collection usually means that park personnel are present, at least occasionally, may partially account for that reduction. On the other hand, there are those who believe that even minimal user fees discourage those interested only in vandalizing.

Increased surveillance. Surveillance is probably the best means of deterring vandals that the typical park and recreation manager has available. While staff cannot be everywhere at once, isolated and vandal-prone areas should be visited frequently, with increased patrols during known problem periods. A varied travel pattern and the occasional use of unmarked vehicles may also help to deter potential vandals. The astute manager will maintain an effective relationship with local law enforcement. Caretakers, night security guards, and citizen patrols are good supplements to the regular park staff in reducing vandalism. Park employees should be trained in surveillance techniques whenever possible.

Special equipment is sometimes useful in areas where vandalism is high. Radio contact between employees and security personnel is particularly helpful. Closed circuit TV may also be useful around buildings, storage yards, and parking lots.

Expanded law enforcement efforts. Enforcement of existing laws is certainly one key to reducing vandalism. It is important that employees know the laws pertaining to vandalism and that they operate within them. For law enforcement to be effective as a deterrent, it must end in punishment so that potential vandals know they will

face consequences if caught. The chances of capturing vandals are enhanced if surveillance measures are used, but unfortunately, capture does not always guarantee a conviction. In prosecuting vandals, two things must be demonstrated:

1. that the damaged property had value; and
2. that the act was willfully committed with the intent to harm or destroy.

In minor acts of vandalism, these elements often do not exist. Another important point is the visibility of the conviction. Potential vandals must be made aware of the consequences if law enforcement is to succeed in deterring further problems. (See Chapter 22 for further discussion of law enforcement.)

Increased public education and involvement. Educating the public is a more long-term method that involves trying to reach the public with messages that might reduce vandalism. The intent is to instill a positive attitude toward park and recreation areas and facilities. Examples of public education techniques that have had some success include interpretive programs, slide shows, park tours, and educational signs. Many public agencies have communication specialists or public information coordinators who can be very helpful in getting the word out about the causes, effects, costs, and prevention efforts associated with vandalism.

There are many different types of public involvement programs that may help deter vandalism. Programs that employ teens for park improvement projects are worthwhile because they encourage a sense of pride and identification with organization goals. Youngsters are less likely to vandalize something that they have helped create. Many organizations work directly with school children both in the classroom and on site. As an example, the Elmhurst Park District in Illinois has developed a prairie awareness slide show that is shown annually to every third-grade classroom in the community's public schools. As a result, many young recruits have become involved in the district's Elmhurst-Great Western Prairie renovation project. The district hopes that children involved in prairie renovation will be less likely to damage or vandalize the site.

Although park or facility visitors are often reluctant to help stop vandalism or other deviant behavior that they witness, it is still worthwhile to show people how to handle certain situations and encourage them to report suspicious activity. Telling visitors in advance about vandalism problems and rule violations and asking them to report such behavior to rangers or facility supervisors may help to do this.

One of the most effective ways in which public involvement can deter vandalism is for the organization staff to do whatever is necessary to make the area

or facility attractive to responsible users and visitors. This may involve expanding housekeeping and other maintenance functions, improving interior and exterior aesthetics, expanding operating hours, or increasing available recreation opportunities. The more that responsible individuals and families are involved in the area or facility, the lower the number of vandals will be.

Some vandalism to park and recreation areas and facilities is unavoidable and must be regarded as part of the cost of running a recreational facility. On the other hand, much deviant behavior is preventable, and deliberate vandalism can sometimes be curtailed. Park and recreation facility managers need to make an effort to curb this drain on their budget and time.

Play Area Safety and Maintenance

Play areas come in every conceivable size and shape, but one is sure to be found in just about every neighborhood, community, regional, or state park, as well as at many private for-profit facilities, such as campgrounds, resorts, and amusement areas. Schools and some non-profit associations with facilities, particularly day care programs, also have play areas or playgrounds. Play equipment is available in an amazing array of configurations, sizes, colors, types, functions, components, and materials. It is also placed on many types of surfacing materials. In addition, play area users vary by age, shape, size, skill level, capability, and level of expectation. It is no wonder that the design, development, and maintenance of play areas continually provides recreation professionals with many opportunities and challenges. It is precisely because of the magnitude of these opportunities and challenges that the development of a comprehensive play area safety and maintenance program is important.

Each year, approximately 200,000 children ages 14 and under receive emergency hospital care from injuries that occurred on playground equipment. Based on data supplied by the Consumer Products Safety Commission, there was an average of 208,260 injuries yearly during the 1990–95 period; however, it is estimated that about one-fourth of reportable playground injuries are not taken to an emergency room or doctor. The most common injuries were fractures, lacerations, and contusions or abrasions. Injuries on public playgrounds account for nearly 70 percent of all playground equipment injuries. The equipment most frequently involved are swings, monkey bars or climbers, and slides. Falls to surfaces are the leading contributing factor (more than 70 percent of known occurrences) to playground injuries. (Mack, Thompson, & Hudson, 1998).

In the past decade, there has been a significant, nationwide effort to improve the safety of play areas. This effort has culminated in three important developments: the revision of the Consumer Product Safety Commission's *Handbook for Public Playground Safety*; the completion of the American Society for Testing and Material's voluntary *Standard Consumer Safety Performance Specification for Playground Equipment for Public Use*; and the development of NRPA's National Playground Safety Institute Program. These, along with other public and private playground safety initiatives, have provided park and recreation organizations with the framework and much of the information needed to develop a comprehensive playground safety program. The Institute also provides a certified playground inspector course curriculum.

When considering play areas, safety and maintenance are, at a minimum, interdependent, if not completely synonymous. A safe play environment is only possible where a comprehensive maintenance and inspection program is in place. Similarly, most maintenance functions and procedures focus on identifying and correcting safety concerns on the playground. Some professionals believe that safety considerations and the learning opportunities that come from challenge and risk in a play area design and activities are sometimes in conflict. However, "risk" is not synonymous with unsafe, but rather can be viewed as part of the normal physical and psychological growing process for children. While the play environment should optimize human growth and development, safety should never be compromised. In this litigious society, safety and maintenance must be a primary concern.

Play Area Hazards

Before a comprehensive playground safety program can be developed, organization personnel must recognize common hazards associated with playgrounds. These hazards include:

- improper surfacing;
- head and neck entrapment;
- entanglement;
- sharp points, corners, and edges;
- crush, and shear points; and
- trip hazards.

Surfacing

According to government data collected in hospital emergency rooms throughout the country, falls, primarily to the surface directly below the equipment, account for approximately three-fourths of all injuries associated with playground equipment. As a result, play equipment should not be installed over asphalt,

concrete, turf, or any other hard surface. Facilities need to install and maintain an impact-attenuating material under all play equipment.

There is a variety of synthetic and natural surfacing materials that meet the CPSC's impact-attenuation guidelines, if installed and maintained properly. Loose-fill materials such as engineered wood mulch, double shredded bark mulch, uniform wood chips, fine and coarse sand, and fine and medium gravel, have been shown to be effective at specified depths, and under equipment that does not exceed specified heights. Surfacing in new play areas must also be accessible to persons using wheelchairs, walkers, and other mobility aids, and that, at the current time, the only loose-fill material that meets both safety and accessibility requirements is *engineered* wood-fiber mulch.

Entrapment

A component or group of components should not form openings that could trap a child's head. Head entrapment can occur if a child attempts to enter an opening either feet or headfirst. In general, any opening between 3.5 and 9 inches may present an entrapment hazard, depending upon the opening's configuration. This possibility applies to all completely bounded openings, except where the ground serves as the lower boundary. Angles where adjacent components connect may also present an entrapment hazard. Test probes and procedures have been developed that enable maintenance personnel to determine whether an opening is hazardous. These probes and procedures are described in the CPSC Handbook, which can be found on line at <http://www.cpsc.gov/cpscpub/pubs/325.pdf>.

Entanglement

Protrusions or projections on playground equipment should not be capable of entangling children's clothing (especially hood strings, etc.), because such entanglement can cause serious injury or death by strangulation. Particular attention should be given to avoiding protrusions or projections at the top of slides. Components such as S-hooks on swing assemblies are also extremely hazardous. Again, protrusion gauges and testing procedures that can be used to test nuts, bolts, S-hooks, pipe-ends, and other protrusions are described in the CPSC Handbook.

Sharp Points, Corners, and Edges

There should be no sharp points, corners, or edges on any playground equipment component that could cut or puncture children's skin. Wood parts should be smooth and free of splinters. All metal edges should be rolled and have capped ends. Frequent inspections are necessary to prevent injuries caused by the exposure

of sharp points, corners, or edges due to wear and tear on the equipment.

Crush and Shear Points

There should be no accessible crush, or shear points on playground equipment that could injure children or catch their clothing. Such points can be caused by components moving relative to each other (e.g., cargo nets made of chain links) or to a fixed component when the equipment moves through its anticipated use cycle (e.g., merry-go-round and undercarriage).

Trip Hazards

All anchoring devices for playground equipment, such as concrete footings or horizontal bars at the bottom of flexible climbers, should be installed below the playing surface to eliminate the hazard of tripping. In addition, attention should be given to environmental obstacles in the play area, including rocks, roots, and other protrusions from the ground that may cause children to trip.

Development of a Playground Safety Program

To create the safest play environment possible for children, and to provide the organization a defense against a legal challenge, park and recreation organizations can adopt a comprehensive playground safety program that includes such components as:

- development and adoption of a public playground safety policy;
- performance of a playground safety audit for each play area;
- development of a regularly scheduled safety inspection program;
- completion of a play area reference file for each site;
- development of a written staff training program; and
- implementation of a playground signage and user education program.

Safety Policy Statement

In any organization, safety and risk management programs can be effective only if supported by the governing board, top management, and those responsible for implementation. As a result, a written playground safety policy statement is the first step in a comprehensive program. A written policy statement effectively communicates the purposes of the playground safety program to both staff and public. A well-designed playground safety policy statement should:

- be simply written and include organization philosophies and objectives;

- establish the general goals and objectives of the playground safety program;
- indicate management support by providing the necessary resources;
- provide for coordination between sites and maintenance staff regarding needs, problems, and potential loss exposure; and
- facilitate the lines of communication between maintenance staff involved in playground risk management.

An organization's governing board, chief executive, and other top managers should formally approve the playground safety policy statement. This management commitment is vitally important to the long-term success of a playground safety program, since managers will ultimately be responsible for providing the resources necessary to implement and sustain it. The completed playground safety policy statement should be made available to all organization staff and be included in any training materials (see Exhibit 12.4).

Safety Audit

A playground safety audit is a comprehensive inspection process that helps identify a wide range of known playground hazards. It compares a playground to the organization's "standard of care" and determines areas of non-compliance with the CPSC guidelines and ASTM standards. It also assists an organization to determine where the most serious and potentially life-threatening hazards exist for specific types of equipment, as well as the park and playground environment as a whole. This is accomplished by assigning hazard index points to specific types of playground hazards based on their potential for serious injury or loss of life (see Exhibit 12.5). The playground safety audit can be used to:

- identify life-threatening or serious hazards that can be corrected by organization personnel (e.g., add surfacing, repair a fence, remove dangerous equipment);
- write to playground equipment manufacturers to see if retrofit upgrades are available to cor-

Exhibit 12.4 Sample Public Playground Safety Policy

In the continuing effort to provide quality, well maintained, clean, and safe parks and facilities for the public, (agency name) has developed the following procedures to protect and preserve its unsupervised public playground facilities and users. This program may only be accomplished through a commitment to a public playground safety program which assures that every attempt will be made to eliminate hazards while not eliminating the element of risk which is an essential part of any successful children's play environment.

To guarantee the continued success of this program, the following guidelines will be adhered to by all of (agency) departments and staff:

- All playgrounds will be subject to the playground safety program.
- All equipment shall be purchased from a playground equipment manufacturer with adequate product liability insurance.
- All equipment shall be installed according to manufacturers specifications.
- Anytown shall provide reasonable resources to ensure prudent and timely inspections and repair as determined to be necessary.
- All play equipment shall be inspected, repaired, and maintained by agency employees on a regular basis with necessary documentation.
- All playground equipment purchasers, installers, inspectors, and maintenance employees performing repairs shall be trained in accordance with the agency's playground safety training program.

Exhibit 12.5 Hazard Index Points Key

POINTS	RESULTING CONDITION
10 or more	permanent disability, loss of life or body part
5	serious injury or illness resulting in temporary disability
1	minor (non-disabling) injury

rect existing play equipment hazards to meet current safety standards;

- develop a playground replacement schedule; and
- demonstrate the organization’s plan of action to meet the current safety standards.

Inspection and Maintenance Program

A recent risk management analysis by a major play equipment manufacturer reported the causes of all known accidents involving its equipment over a five-year period. Results of the study indicated that 5 percent of the accidents were related to site planning, 10 percent to installation, 14 percent to design/product failure, 28 percent to maintenance, and 43 percent to misuse/lack of supervision.

Although these results are from only one research study, there is no doubt that improper maintenance practices and procedures are leading causes of playground accidents. A regularly scheduled play area maintenance and inspection program is probably the single most effective maintenance practice to ensure a safe play environment. Even if a safety audit is completed for every existing site, and all known hazards are removed or corrected, without a regular maintenance and inspection program to identify and repair ongoing problems, play area conditions will steadily decline.

Inspection frequencies depend on a wide range of factors—equipment quality, amount and type of use, user groups, and such environmental factors as precipitation, humidity, and proximity to saltwater. In addition, some play area components need to be inspected more frequently than others. For example,

a pea gravel safety surface may need to be raked back into place weekly, while a swing chain and S-hooks require checking twice a year, and slide footings only on an annual basis. Each organization must determine the frequency of inspection that is most appropriate for its particular set of circumstances. (See Exhibit 12.6, which was taken from California Parks and Recreation Society VIP program.)

A regular play area maintenance program usually functions best if the same individual or team is responsible for all inspections. Once trained in the proper methods and procedures for identifying play area hazards, a regular play area inspector brings a degree of consistency to the operation. Finally, it is up to the organization to develop a maintenance and repair checklist that best suits their particular types of equipment, circumstances, and conditions. (See Exhibit 12.7.)

Play Area Reference File

When dealing with play area safety and maintenance, one must *document everything* and maintain it forever. Children injured can bring suit until the statute of limitations has run out after they reach the age of majority. (See Chapter 21, Risk Management.) It is imperative that all documents relating to a play area be kept in a file by the personnel who are responsible for the inspection, installation, and repair of these facilities. The play area reference file should contain:

- a current copy of the playground safety program;
- copies of all relevant playground standards or guidelines;
- copies of staff training records:

Exhibit 12.6
Determining How Often to Evaluate a Playground

Use Factors		Materials				Environment				Scoring	
Vandalism	Use	Age of users	Base	Moving parts	Equip. Age	Post & Plat-form	Soil ph	Sun	Drainage	Total	Inspections
Low = 2	Low =2	2-5 = 2	Synthetic = 0	Moving = 6	1-2 = 0	Stainless Steel = 0	6-9 = 0	None = 0	Good = 0	>70	Daily to 2-3 x/mth
Med. = 5	Med. =5	5-12 = 4	Loose = 12	Static = 2	3-4 = 3	Alum. Galv. Steel = 2	10-11 = 4	Mod. = 4	Moist surface = 4	56-70	1/Wk - 1/Mth
High = 10	High = 10	All ages = 10	Both = 6		5-9 = 6	Plastic, wood or painted steel = 4	4-5 = 4	High = 8	Seasonal floods = 8	41-55	2/Mth to Bi-mthly
					10-14 = 9		<4 = 8		Standing water = 12	<41	1/mth to 1/season
					>14 = 12		>11 = 8				

Exhibit 12.7**Sample Play Area Safety Checklist****ELMHURST PARK DISTRICT
Play Area Inspection Checklist**

Play Area: Berens Park

Inspector: _____

Date: _____

ITEM	CHECKED	PROBLEM (IF ANY)	ACTION TAKEN
Cracks, bending, wear			
Open hooks, rings, links			
Worn swing hangers			
Missing or worn swing seats			
Broken supports, anchors			
Exposed concrete footings			
Sharp edges or points			
Exposed pipe ends			
Protruding bolt ends			
Loose, worn, rusted fasteners			
Splintered wood			
Lack of fabrication			
Worn or squeaky bearings			
Broken or missing rails, steps			
Worn or scattered surfacing			
Wrapped swing chain			
Chipped or peeling paint			
Broken glass			
Trip hazards, exposed roots			
Poor drainage (under swings)			

- dated training rosters including Social Security numbers,
- written training information,
- video training rosters, and
- employee test results;
- individual playground site histories by location, including:
 - site plans,
 - copy of bid specifications,
 - copy of purchase order or voucher for equipment,
 - manufacturer’s product liability insurance certificate,
 - manufacturer’s installation instructions,
 - manufacturer’s parts list,
 - correspondence from manufacturer,
 - initial playground safety audit, and
 - dated and signed playground safety inspection forms from completed inspections, including recommendations made and remedial action taken.

Staff Training Program

The inspection and maintenance program will be more successful if the inspection and repair personnel are properly trained. Training responsibilities typically are defined and incorporated into the appropriate job descriptions. The organization develops training guidelines that address training videos and written materials, hands-on field training, the testing of staff knowledge of

playground safety program elements, and supervisory audits of playground inspections.

Signage and User Education

In many instances, the failure to warn the users and the public about known hazardous conditions has led directly to lawsuits. The use of signs can provide some protection for the park and recreation organization. (See Exhibit 12.8.)

Accessibility

In accordance with the Americans With Disabilities Act (ADA), playgrounds constructed after 1991 must be accessible to persons with disabilities. In October 2000, the Access Board published specific accessibility guidelines for play areas. Although not yet permanent rules (and therefore not enforceable at this time) these guidelines address key accessibility concerns, including:

- definitions of ground level and elevated play components;
- criteria for determining the number of required accessible components;
- criteria and design specifications for providing ramps and transfer systems;
- technical requirements for play components; and
- accessible surfacing.

The reader is referred to the Access Board for the latest developments.

Exhibit 12.8
Sample Play Area Sign

PUBLIC PLAYGROUND SAFETY GUIDELINES

**Welcome. For your play enjoyment, please obey the following
or you may cause injury to yourself or
others around you.**

No pets allowed.

No bicycles, roller skates, or skateboard use within play area.

Inspect area before starting to play, and remove litter.

Children 7 and under should be accompanied by an adult.

CAUTION: Bare feet may cause injury.

CAUTION: Throwing sand or any other objects within the play area may
cause injury.

CAUTION: Playing on this equipment when wet may cause injury.

SWINGS

Hold on with both hands

Never swing or twist empty seats

Standing on swings can cause injury

Stand clear of moving swing to avoid

Stop swinging before getting off

contact and possible injury

SLIDES

Slide feet first only

No running or walking up the slide

CLIMBERS

No pushing, shoving, or running

Play safely and courteously

**If you notice broken equipment or anything that
requires immediate attention call 665-4710.**

We appreciate your cooperation.

THE WHEATON PARK DISTRICT

Source: Wheaton Park District.

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