The **chief of interpretation** is responsible for coordinating and implementing a cohesive interpretive program on park bears.

All division chiefs and supervisors should provide opportunities for employees to attend training in bear biology and behavior, bear management policies and regulations, and proper behavior in relation to bears. Each division chief or project supervisor is responsible for providing bear information to people working under their direction, whether permanently, temporarily, or for brief projects. All park and concession employees are responsible for ensuring that their activities are consistent with the bear management plan and do not contribute to conflicts with bears.

HAZARDOUS TREES

Extensive portions of parks contain trees as natural or landscape components. Among the trees may be manmade developments with accompanying visitor activities. This poses the risk of damage to property and injury to visitors from tree failure. Even though any tree or portion of a tree may present some degree of risk or hazard to visitors, employees, and property simply by its proximity, in most cases only such trees (and other vascular plant forms such as large cacti) that are determined to possess a significant flaw or structural defect may be deemed hazardous. The purpose of this section is to outline a hazardous tree program (HTP) that provides the foundation for each park to implement its own hazardous tree management plan (HTMP), and also to provide a general scheme for such plans. The need for these plans arises from the responsibility of the NPS to reasonably protect visitors as invitees to parklands. Failure to do so could make the NPS liable. A deliberate effort by the NPS to manage for hazardous trees will reduce the risks and liability by avoiding vulnerability to claims of negligence or breach of duty.

DEFINITIONS

Hazard A potential risk from the physical presence of a woody plant. By contrast, **hazardous** should specifically refer to a plant with a significant flaw which, when coupled with a location in an identified public use area, makes that tree an actual risk. Thus a **hazardous tree** is one that, because of a recognizable mechanical flaw, poses a threat to people or property. Plants that contain toxins, irritants, or even addicting drugs should not be termed hazardous but **noxious**.

Negligence Failure to take responsible action to adequately protect visitors. Liability for damages from hazardous trees commonly revolves around the determination of whether the NPS was negligent in its programmatic approach to managing hazardous trees. There are four elements which together constitute negligence:

1. There must be a legal duty or obligation requiring the agency to conform to a standard of conduct to protect the visitor against unreasonable risks. The responsibility of the agency to the visitor may generally be defined as using “ordinary and reasonable care

to keep the premises reasonably safe for his visit and to warn him of any hidden danger" (Smith v. U.S., 1974).

2. There must be a failure (breach of duty) to meet the standard.

3. There must be an establishable connection between the action (or inaction) and the resulting injury or damage.

4. There must be a definable injury or damage level.

Invitee The traditional visitor or worker who, in effect, enters park lands by expressed or implied invitation. As the steward of park lands, the NPS is obliged to exercise reasonable care for the safety of invitees during their visit. Other users of the land who are not invited are not owed the same level of protection. Examples of the latter include people who enter a park or park area that is closed and poachers.

Target The object, structure, or person that potentially may be hit or impacted by a falling tree or tree part.

PROGRAM OBJECTIVES

The NPS must seek to implement an HTP that will reasonably protect visitors from unnecessary risks resulting from hazardous trees. The program should be directed toward the public welfare while simultaneously avoiding a posture of negligence. A hazardous tree reduction program provides a systematic method for mitigating tree hazards to avert damage to people or property. The problems should address the areas of visitor use, landscape management, interpretation and transportation corridors (such as parking lot, walkway, visitor center, campsite, picnic ground) which the public is openly invited or requested to use. The program is not applied to wild or natural areas away from trails or shelters.

The inherent decision-making challenge in addressing hazardous trees is to preserve and sustain healthy trees as components of the park's natural systems, while treating or removing trees with discernible defects which represent risks to the public or property. The attitude when inspecting a tree must be: Can this tree be reasonably retained as a vital component of the natural system? If not, should the tree be removed? The action to be taken should result from an evaluation of the tree as a functional and aesthetic component of the landscape, in addition to its potential hazard.

There may be situations where particular weather or site conditions can make a group or section of trees in a public activity area hazardous. A system of notification or warnings may be warranted in such cases. Where or when a hazardous condition exists it may be necessary to close an area until the hazardous situation ends or is corrected.

AUTHORITIES

Impetus for the hazardous tree program derives from aspects of liability. The Federal Tort Claims Act-1 46 (28 USC 2671-80 and 1346 (b)) provides the basis for the Service to be held liable for failure or negligence with respect to visitor protection. Most interpretations of tort law make the landowner responsible for taking reasonable care to avert harm to visitors. Reasonable care may take the form of action and/or warnings. The government as a landowner is required to have superior knowledge of dangers which would not he obvious to the invitee if such dangers are discoverable in the exercise of due care. For example, in Middaugh v. U.S. (1968), where a camper was killed when a decayed tree fell on his campsite in Yellowstone, it was determined that NPS had a duty to inspect the campsite for obvious safety hazards. Since the camper was in a designated area he had the right to expect to be reasonably safe.

The clear agency policy espousing a duty to protect visitors means many courts may choose to use it as the criterion for determining degree of responsible action rather than turning to local or common law or even precedents. Further emphasis on federal responsibility rises as sharper distinctions are made between discretionary management decisions for which there is little liability and administrative function, which, if improperly performed, may result in liability. Other liability variables such as assumed risk by the visitor and leaving wild areas unaltered by management actions are also decreasingly available retreats from agency responsibility. In many cases, the more an agency does to protect the visiting public or enhance their experience, the more vulnerable the agency may become to tort claims. Hence, the more areas are developed and become places where the visiting public is invited, the more likely is the occurrence of hazardous tree problems.

PROGRAM GUIDANCE

The hazardous tree program is implemented through a hazardous tree management plan (HTMP). The HTMP should be utilized as an action plan and a component of the park's resource management plan. Each park containing large vascular plants (usually trees) should be covered by this plan. The following guidance may be used in developing a park plan. Each plan must be tailored to a park's particular requirements according to vegetation type(s), type of visitor use areas, frequency of visitation, and other factors.

I. Park Responsibilities

A. Inspection

Periodically, any trees which stand within falling distance of public use areas and which might pose a hazard to the public or significant property should be systematically inspected for flaws. The form and frequency of routine inspection or surveillance will depend on the type of visitor use areas (which will be defined later). The constraints of manpower available to a park may not permit periodic inspection of all pertinent areas. Nevertheless, a documented effort toward

achieving the goal will undoubtedly be helpful in avoiding negligence in the event of an accident in an area which has not been inspected. Frequency of inspection as called for in the HTMP becomes a local issue keyed to the nature of the park and visitor use. The plan should indicate with accompanying rationales the periodicity of inspections for various visitor use areas. For many areas a frequency of once a year would be the norm. In addition, particular events such as wind storms or fires (for example, the Yellowstone fires of 1988) may call for special inspections.

B. Public Notification and Warning

Where extensive risk may exist from falling trees, but the trees themselves are not classified as hazardous, a means for public notification and warning of potential hazards is required. This situation is analogous to a falling rock zone in that although there are no detectable flaws in the trees, any one of them could be blown on to a passing vehicle during a wind event. The concern may result from the steep slope, slow moving traffic pattern, exposure to unpredictable wind patterns, shallow soils, or other factors. Such areas might even be closed in advance if predictions of sufficiently hazardous weather conditions exist. The warning is given in terms of a dangerous area, not hazardous trees. Another example is the risk to campers from falling trees or limbs during an ice or snow storm. This situation normally can be addressed in the permit process where the camper or visitor is notified that he may be asked to vacate the campsite or park in the event of adverse weather conditions.

C. Tree Care

Any tree denoted as hazardous should be promptly cared for, using the best arboricultural techniques, to eliminate the hazardous status of the tree. If it cannot be made safe, or if the effort to make it safe would be too costly in terms of manpower or dollars, then the tree may be removed. A very important point is that once a tree has been categorized as being hazardous, any damage that occurs thereafter from that tree will almost surely result in liability. It is, therefore, critical that inspection programs be closely linked with capability for remedial action; otherwise the park will expose itself to financial risk.

D. Remedial Action

Depending on the location of the tree and its integrity, the park may consider leaving the main trunk of the tree for wildlife habitat in areas where wildlife is considered an important element and where ample den or food trees do not exist. This means that a dead tree need not necessarily remain a hazardous tree and that it is possible to convert a hazardous tree into a positive environmental element. Part of the decision-making process must include the extra manpower (time commitment) in topping a tree as opposed to dropping it. Where a structural target exists, removal of the target is another option if the value of the tree exceeds that of the target.

E. Personnel

Each park should have at least one person designated for hazardous tree inspections. This responsibility should be explicit in the individual's performance standards. Other park personnel should also be on the lookout for hazardous trees in performing their own duties.

F. Exceptions

The hazardous tree management plan should not address situations where there is risk of a vehicle driving into a healthy tree along a roadway; this should be addressed in another part of the safety program.

II. Types of Inspections

The following types of inspections should be conducted by a team of at least two persons with the form of inspection selected according to the nature (management zone) of the site. Trees requiring follow-up action should be marked and documented.

Individual trees. Each tree in the specified area will receive a 360-degree visual inspection for flaws. This means close visual inspection, including tests with various tools as warranted.

Walk through. Walk through the area visually scanning for potential flaws. This includes inspection of individual trees suspected of being hazardous, as above.

Drive-by or windshield survey. This type of survey involves deliberate visual scans at slow vehicle speed followed by inspections of all trees noted or suspected of possessing hazardous characteristics. Despite the practicality of this form of inspection, particularly where long stretches of roadway are involved, the obvious limitations of the effectiveness of this method may not allow it to be very persuasive in a court of law. Only a thorough documentation of findings, if it can establish a professional level of work, will lend any credence to this method.

Use of binoculars, knives, wood chisels, hammers, coring devices, and other tools should be encouraged to enhance the quality of the inspection process. Park areas that are closed for a season(s) would best be inspected just prior to reopening. Areas should remain closed or be closed until hazardous tree conditions are eliminated.

III. Documentation

Whatever type of inspection is chosen, it is imperative that written documentation of the inspection be kept. A “hazardous tree log” should include the persons making the inspection, date(s) of inspection, the area covered, management zone, noted or suspected hazardous trees (include

location, size, and species of tree), ratings, notes on inspections of individually checked trees including description of the flaws, recommendations, and documentation of follow-up actions. The record of inspected trees from year to year can be useful to document whether a tree is declining, stable, or regaining vigor. Photographs may also be used to supplement the record.

A hazardous tree record form used by the State of Washington Department of Natural Resources (see Exhibit 1) is provided as a guide for use by the parks in deriving a form to meet their needs. (Also see &ample of a Hazard Rating System, below).

IV. Inspection Types Keyed to Use Areas or Management Zones

It is suggested that the following management zone types be inspected according to the given procedures; however, the park should use its best judgment, particularly if there is good cause for more thorough inspections.

A. Wilderness or Undeveloped Areas

Ordinarily no inspections are called for in these areas. Visitors are expected to know that they are responsible for their safety in such areas. Public education and/or warning procedures should be considered. However, where wilderness or backcountry campsites are designated and assigned by the NPS, the area should be inspected and hazards removed at such sites.

B. Trails or Informal Activity Areas (Walk Through)

Long horse trails or hiking trails might involve some form of inspection. Inspections of such trail systems often will not be a high park priority because of the extremely low risk to visitors and because of the extensive manpower requirement.

C. Developed Zones

Campgrounds, picnic areas, visitor centers, parking lots, interpretive areas, and similar areas should be given individual inspection, possibly in combination with walk throughs. All trees within falling distance of designated use space should be individually checked. In buffer, transition areas, or perimeter zones, inspections may be accomplished by walk-through procedures.

D. Transportation Corridors

Deliberate visual inspections of transportation corridors should include all trees that could affect the roadway. Areas that may be screened or otherwise difficult to view from the road should be given a walk-through inspection. Drive-by inspections may not catch all flaws in the trees along roadways. However, it is generally recognized that it may not be realistically possible to walk by all trees along miles of roadways, and under these conditions a documented drive-by inspection

should be considered satisfactory. Usually the quality of documentation of suspected hazardous trees will reflect the adequacy of the drive-by inspections. In some areas the park may even want to adopt a policy for establishing a "window" of clearance along the roadway to minimize the risk of the heavy portion of a tree falling onto the roadway. Such a window should reflect the size of the trees along the road in the park. Often a window thirty feet wide and twenty feet tall is sufficient. This clearance also promotes lines of sight but may be at the expense of natural areas. Areas along roadways where traffic may be predictably and repetitively slowed, such as near controlled intersections, should be handled by walk-through inspections.

E. Landscaped and/or Cultural Zones

Trees within areas of landscaped zones where visitors are specifically invited to go should be individually inspected. Trees close to parking lots and parking areas along roadways should be individually inspected. More informal areas where visitors may simply feel free to wander should receive walk-through inspections. In the specific case where a tree is designated as an Historic Tree or part of an historic scene, extraordinary effort will be directed toward comprehensive arboreal treatment to sustain the tree while protecting the public from flaws. Much more effort and care will be used on such trees than would be used in other situations owing to the value and significance of the particular resource.

F. Park Boundary Areas

Inspection of trees along park boundaries for threats and damage to adjoining properties or people may be performed in conjunction with other boundary activities. Even though it may be almost logistically impossible for large parks to systematically inspect their boundaries, the park should periodically make a deliberate effort to check for hazardous trees primarily near activity areas such as homes, yards, or roadways.

Parks should be knowledgeable of state and county rights-of-way as the basis for determining whether a park tree could fall on a nonpark roadway. Whenever the park is notified of a presumed hazardous tree by a citizen, a prompt inspection should be made and corrective action taken, as warranted and documented.

V. Types of Hazardous Tree Conditions

It is not the intent of this section to technically define or characterize all of the various sorts of hazardous tree conditions. Such information can be obtained through training, experience, and references. However, the following list includes many of the most common types of hazardous tree conditions:

- Decay
- Cavities
- Dead limbs (overhangs)
- Splits and shakes
- Weak crotches
- Heavy horizontal limbs
- Basal or crown rot; root decay
- Termite and carpenter ant infestations
- Wind and vehicle damage
- Construction damage
- Leaning trees, heaving
- Soil slippage areas
- Tree declines: insect pest and disease situations
- Heavily-used areas with compacted soil and injured roots

VI. Evaluation of Hazardous Trees

The following factors should be considered when trying to evaluate the risk of a potentially hazardous tree. The park should adopt a rating system of its choosing as part of the plan. A decision would normally be either to let the tree remain, monitor the tree, care for the tree, or remove it.

Probability of failure. Estimate the likelihood that under critical weather situations or through predictable decline that tree (branch) will fall during the year.

Probability of target impact. Analyze the potential that a falling tree or limbs will strike a given visitor use area. Estimate the likelihood (seasonal or otherwise) that a given area will be occupied. This estimate may also be made in terms of percentage of the time the area is occupied (e.g., campsite reservation lists).

Estimate of target. Estimate the value of the target when property is involved, or the numbers of visitors that might be injured or killed.

A Estimate of Total Risk

Where meaningful, derive a total risk involving the combination of the three factors above in terms of dollars or chance of personal injury or loss of life. Even though the above factors can to some extent be quantified, more so in some cases than others, most emphasis should be placed on using verbal justifications based on these categories. A numerical risk should certainly be obtained whenever meaningful. Every tree represents some degree of hazard during a given period of time; the objective of park personnel is to take appropriate action as justified in terms of noted hazardous trees.

B. Example of a Hazard Rating System

To assist parks with the development of a hazard rating system as part of the HTMP, the following widely accepted system is outlined as a model. A defective tree is given a rating according to:

(1) the risk of imminent failure of the tree, (2) the likelihood that failure of all or part of the tree will affect a person or property with significant value (historic or monetary value). Normally, rating factor (1), above, is keyed to a range of 1 to 4, with 4 being the greatest risk of failure. Such a tree would be categorized as not only being an imminent risk but having a lean that exacerbates the risk even more. A rating of zero would mean no flaw was detected, and hence there is no known risk. Rating category (2) has been valued on a scale of 1 to 3, with the 3 rating placing the target in the direct path of the tree and likely incurring extensive damage in the event of failure. A rating of zero would mean the tree is in a wild area away from any facilities or designated camping areas and therefore is not construed to impose any risk to a target such as a person or structure.

The sum of these ratings, which may be as high as 7, defines the level of hazardousness for the tree. Using this rating system, the following recommended corrective action chart has been derived.

Rating	Hazardous Condition	Recommended Action
0	No discernible flaw and no construed risk	No immediate action needed
1-2	Minor	Identify and continue to monitor annually
2-3	Low	Monitor at least annually but do not remove
3-5	Moderate	Treat the defect or protect the target
5-7	High	Top or remove the tree or defective limb(s) or move the target

Clearly such a system remains judgmental (hence the overlap of numbers 1-2, 2-3, etc.) and may only work as well as the competence of the inspectors. Other rating systems might work better for a given park. Also refer to Exhibit 1, which uses a similar rating scheme described under item 15 in the Exhibit.

In landscape or restoration areas, an important way to avoid hazardous tree conditions is to ensure that new and replacement plantings utilize trees that will perform well on the site. The site itself may need modification to improve the opportunity for successful tree growth.

ROLES AND RESPONSIBILITIES

I. Park

It is the responsibility of each superintendent, as appropriate, to develop and implement a hazardous tree management plan as an action plan. The superintendent must designate at least one staff person (or him- or herself) with the responsibility to perform or delegate (may even be contracted) the necessary inspections. The superintendent is also responsible for training staff for hazardous tree management. He/she also must assure the adequacy of fulfillment of the plan and address the needs for changes or updating. Normally, the superintendent or his/her designee, with advice from the regional solicitor, will represent the park's interests, if necessary, in court. It is likely that most inspections will be performed by staff in the resource management or maintenance units of the park. Personnel must be thoroughly trained so as to be adequately prepared to perform the necessary inspections. Every person in this chain of responsibility should have one or more elements in his/her performance standards fully describing the duties and expectations of the position.

II. Region

Regional Directors should ensure that each park 1s covered by an adequate hazardous tree management plan as warranted.

III. Washington Office

The **Associate Director, Operations**, is responsible for providing NPS policy on hazardous tree management and implementation of the hazardous tree program.

NOXIOUS PLANTS

In most cases the risk to the visitor from irritating and toxic plants will come from plants in their natural environment. Unlike a hazardous tree that contains a flaw that can to some degree be remedied by treatment, there is no flaw to be corrected with the irritating or noxious plants. Therefore the primary NPS responsibility lies in (1) documenting the presence of any potentially irritating and toxic plants, (2) warning the public through literature and signing of noxious plants, and (3) removal or horticultural management in developed or landscape areas if warranted. In any case, the park should assemble information covering any noxious plants and have a system whereby any affected persons could be treated in the park, at a local hospital, or by a doctor. Perhaps the most prevalent situation from irritating plants comes from members of the genus Rhus, including