

The following text was adapted from: “Mourning Glory: Preserving Historic Cemeteries,” published in 2011 and part of *Terra Firma: Putting Historic Landscape Preservation on Solid Ground* a publication series developed by the Massachusetts Department of Conservation and Recreation.

## CEMETERY ISSUES

### Natural Disasters

We have little, if any, control over natural disasters such as hurricanes and earthquakes, and these unplanned events can cause significant damage to historic cemeteries. Strong winds can cause tree limbs to drop onto monuments, markers, fences, gates and other structures. Heavy rains can cause flooding and washouts, especially at hillside cemeteries, eroding graves, displacing markers, and altering roads and paths. For these reasons, preservation planning for historic cemeteries should include disaster preparedness and recovery.

Older trees are particularly vulnerable. Without adequate maintenance, these plants become tall and top heavy, easily toppled by wind. Regular pruning and replacement can avoid catastrophic damage to historic plantings, the restoration of which may not be eligible for emergency funding.



*Tree damaged by during Hurricane Laura. Catholic Cemetery, Natchitoches Louisiana.*

## Unmarked Burials

As cemeteries and burying grounds age, temporary or fragile grave markers may change or disappear. In some cases, such as hospital cemeteries and potters' fields, burials were never marked or were marked by wooden or other temporary markers. The extent of burials may not be readily apparent as perimeter fences, walls or defining vegetation degrade over time; and, as adjacent development increasingly creeps toward cemetery boundaries, unmarked burials may be threatened. Conducting a land-use history of a parcel, including site-specific cartographic and documentary research, may assist in locating these burials. Once identified, Ground Penetrating Radar (GPR) and other geophysical techniques have been very successful in locating grave shafts and determining the limits of historic burial sites. Further archaeological investigation may be needed if areas are targeted for cemetery expansion or other development.

## Environmental Change

Cemeteries are subjected to environmental pressures that threaten the integrity of the historic landscapes. Acid rain or dew (pH <7) carries relatively high concentrations of acid-forming chemicals, usually released from coal burning, chemical manufacturing, and smelting. Although federal regulations on emissions have decreased pollutants in the atmosphere in the past decade, acid rain continues to plague stone and metal work in historic cemeteries. At low levels acid rain can bleach stones, and at higher concentrations it can eat away at engravings creating a effect, eventually destabilizing the stone. Marble, limestone and soft metals such as bronze are most at risk.

Vegetation in cemeteries is also affected by acid rain and climate change. Highly acidic soils can restrict nutrient uptake, weakening trees and other plants. Exposure to acid precipitation can also cause defoliation, making plants vulnerable to disease and other threats. Older vegetation may struggle to adapt to changes in temperature and rainfall which have been observed over the past 50 years.

## BEST PRACTICES

The following are some of the best practices for cemetery landscape preservation.

### Pathways and Drives

Paths and Drives are an integral part of cemeteries. The original grass or gravel surfaces were sometimes later paved with harder, impervious materials. Today it is often impractical to return to the earlier, softer, erosion-prone paving materials because of reduced staffing and budgets. It is important to maintain pavement profiles such that these routes do not collect or deter surface storm water which can lead to erosion.

Older cemeteries often do not have the generous turning radii at intersections that our contemporary vehicles require. Planned rerouting of traffic and/or provision of unobtrusive protective devices like bollards, wheel stops, or wood guardrails may be required.





*Narrow road American Cemetery, Natchitoches, Louisiana. The road, originally designed for horse and buggy, is not wide enough to easily accommodate automobiles.*

### Erosion and Compaction

Erosion is unsightly and presents a direct threat to the cemetery because it rapidly hastens degradation of monument foundations, paths, walls and landforms. Controlling erosion by maintaining vegetative cover and properly managing overland storm water flow is essential. In areas without storm drainage systems, it is imperative to prevent concentration of overland flow to avoid potential erosion. This entails providing smooth gradients that will spread the surface water evenly over the landscape.

Compaction, or the consolidation of earth, retards vegetative growth by reducing the soil's water holding capacity and air spaces. This, in turn, leads to erosion. Compaction is typically caused by overuse, either vehicular or pedestrian. To relieve these effects, managers should try to redirect vehicular and pedestrian movement to minimize compaction. Then, periodic aeration in the late summer or early fall with a core aerator may often be desirable. Aeration should be limited to a depth of 6 inches to protect against potential damage to buried resources, and aeration equipment should remain at least 12 inches away from grave markers.



## Vegetation

Trees, shrubs and hedges often contribute significantly to the character of the cemetery landscape. Over time, woody plants mature and decline due to age and disease. Dead branches in specimen trees can pose threats to visitors, monuments and structures. Proper maintenance, including pruning, integrated pest management, and periodic replacement ensures that character-defining vegetation remains a part of the cemetery. The periodic pruning of trees in historic burial places is essential to plant health and can allow light and air to reach the ground, instead of creating shaded, wet microclimates that might kill turf or foster biological growth on stones. Potentially hazardous dead wood should be removed every year, with safety pruning occurring every five years. Early removal of volunteer growth and invasive plants can prevent roots from damaging built features or crowding out historic plantings.



*Dead wood should be pruned yearly to avoid potentially falling and damaging grave markers. Catholic Cemetery, Natchitoches, Louisiana*

Plant replacements should be based on historic research, where possible, and be appropriate in terms of location, species, mature size and maintenance requirements. The use of invasive, non-native and/or exotic plants should be avoided. Managers should be aware of the potential for unmarked burials when undertaking tree removals or planting projects, and an archaeological assessment may be needed.



## Turf

Grass is the primary ground cover on most historic cemeteries. A relatively high frequency of mowing is often better to prevent grass from growing too thick, making it more difficult to remove and thus creating a potential for harm to grave markers. It is also best not to mow grass too short as that creates conditions amenable to weed infestation.

Overdressing turf in the fall with compost is a natural solution for maintaining health. If fertilizer is needed, use only natural organic fertilizers to prevent long term damage to grave markers, particularly those made of marble and sandstone. Natural organic fertilizers have a much lower salt index than synthetic organic or synthetic inorganic fertilizers. After application be sure to remove fertilizer residue from grave markers with a low-pressure hose or spray bottles. Maintaining a proper soil pH is important not only for plant growth but also to help protect grave markers.

To control weeds, diseases and insects, utilize alternatives to chemicals and establish a monitoring system for early detection in accordance with Integrated Pest Management (IPM) practices. Exercise caution when using herbicides and pesticides as many of them also have a high salt content that can damage stone markers and create unsightly “dead zones” in a historic landscape.



*“Dead zone” surrounding grave markers where herbicides were used to control grass growth.*



Mulching practices can be adapted to decrease the maintenance burden of leaf removal as well as promote composting. At Mount Auburn Cemetery mowers are equipped with mulching blades with exhaust chutes padded with fire hose to prevent marring stones. Mulching mowers collect leaf debris that has been cleared from sensitive stonework and drainage areas with blowers. Special blades on the mower cut and mulch in one pass, leaving mulch to decompose over winter, enriching soil with nitrogen.

## Masonry

Historic cemeteries can contain a variety of historic masonry features: monuments, sculptures, tombs, vaults, mausoleums, walls and buildings. Historic buildings are often still in active use for administration or maintenance purposes, and their care should follow the Secretary of the Interior's Guidelines for the Treatment of Historic Properties. Stone walls should be preserved intact, repaired quickly after damage, and kept clear of non-historic and invasive vegetation.

Tombs, vaults and mausoleums can be difficult to maintain, and the conservation of stone structures should be undertaken in consultation with professionals. Table tombs can be unstable, creating a safety concern, or they can collapse and become embedded in turf. Mausoleums and vaults should be monitored for signs of frost heaves and moisture such as displaced stones, sinkholes on earthen roofs, icicles forming at mortar joints, or water seepage through walls. Only a structural engineer, architect or architectural conservator experienced with historic masonry structures should assess these burial structures, with work carried out according to preservation standards by skilled masons and conservators.



*Grave markers and vault tombs in American Cemetery, Natchitoches, Louisiana*

Monuments, tombs and grave markers are the single feature that visually identifies a historic landscape as a cemetery. They can also be the most prominent character-defining features that, in turn, are the most challenging to maintain. Markers vary significantly in design, size, age, and stone type, and can exhibit a range of deterioration from staining, cracks and spalls to delamination and total collapse. A preservation plan should determine the significance of the markers within the context of the larger landscape, noting their design and attribution, including exceptional carvings, significant people, or commemorative statuary. Stone conservation projects should be undertaken in accordance with the preservation plan and in order of priority.

### Cleaning Gravestones and Monuments

Soiling and staining of cemetery gravestones, monuments, markers, and statuary can result from soil splashing, pollution, rusting bolts or other metal features, bird deposits, and berries or sap dropping onto the stone. Biological growth, such as algae, lichen, or moss, can cover the surface, cause the stone to decay, and make reading the stone difficult.

The decision to clean a marker should and are an important character-defining feature of the landscape. be carefully considered, as each cleaning can remove a minute amount of original stone. One reason to consider cleaning a headstone is to remove soiling and pollutants which can accelerate the deterioration of the stone. Other reasons might include cleaning locally significant stones, or stones located at the cemetery entrance to help gain public support for additional cemetery improvements. Cleaning stones covered in heavy biological growth will reveal text important to local historians and genealogists. One or more of these reasons may lead to a decision to clean the stone.

Prior to undertaking a project, determine if a stone is stable enough for cleaning. Consult a professional conservator if you have leaning or falling stones, or if surfaces are flaking or sugaring (loose, grainy surface), as cleaning these stones could result in bodily injury or irreparable damage to the stone.

Cleaning stones should be done with the gentlest means possible. It should never be the intent to make a grave marker look “new.” Even with the most careful technique, cleaning may accelerate deterioration or cause loss of original material. Only use soft brushes and gentle cleaners, such as water or a non-ionic cleaner (neutral pH of 7). Never use wire brushes, power washers, or harsh cleaners, such as bleach.





*Cleaning grave markers in Oak Grove Cemetery, Nacogdoches, Texas.*

## Protecting Iron Fences

Iron fences are an important contributing feature to the historic character and fabric of the landscape, yet their care is often overlooked during cemetery restoration because they rarely mark a burial and almost never contain an epitaph or burial information. Iron fencing may surround individual or family plots, mark the boundary of a cemetery, or flank formal entrances. In cemeteries where metalwork is a distinctive feature – in the form of fencing, grave markers, signs, gates, or statuary - the landscape preservation plan should layout recommendations for treatment.

Repairing fences with loose or fallen pieces should be a high priority, as separated features can easily be lost. Small repairs, such as tightening bolts or replacing missing bolts, can easily be performed by cemetery staff. Consult a professional conservator for more complicated repairs, such as repairing or reattaching bent or damaged ornamentation, and for repairs of breaks in decorative cast iron fencing.

Painting inhibits rust formation, one of the leading causes of iron fence deterioration. The best practice is to remove all loose rust by hand with a wire brush, apply a coat of rust converter (available at hardware stores), followed by a coat of primer and several coats of paint. All primer and paint should be designed for outdoor metal surfaces.





Iron fence surrounding family plot in American Cemetery, Natchitoches, Louisiana