Landscape Culture

a newsletter for cultural landscape stewards

Cultural Landscapes Program Summer 2018

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Vegetation and Building Maintenance in Cultural Landscapes

Should vegetation be maintained in close proximity to buildings? "It depends" is the most appropriate answer. The relationship between vegetation and structures is unique to each cultural landscape. Here are some general principles for vegetation attached to, or in the direct vicinity, of buildings and structures.

Principle 1: Vegetation can be a contributing resource within a historic site or district.

While buildings and structures tend to command our initial attention, vegetation can have a larger impact on conveying the historic character of cultural landscapes and telling its story. The NPS Management Policies state: "Where necessary to preserve and protect the desired condition of specific cultural resources and landscapes, plants and plant communities generally will be managed to reflect the character of the landscape that prevailed during the historic period" (2006, 16). Consult the Cultural Landscape Inventory, Cultural Landscape Report, or your park's Cultural Landscape Advisor to find out more about the historical significance and appropriate character of your site's vegetation.

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This Dutchman's pipe vine has been in place next to the Day Company General Store building since around 1912 (SLBE).

Historic vines, ivy, trees, and shrubs grow on and adjacent to the Tao House at EUON.

Principle 2: Consider the many contributions of vegetation to the site before removing.

In most cultural landscapes, vegetation contributes to the significance and integrity of the historic place. It contributes other values too, such as environmental, ecological, economic, cultural and social benefits. The environmental benefits include protection from UV damage and driving rains, cooling in the summer and insulation in the winter. These yield economic benefits from energy savings and less damage caused by extreme temperature variations. The ecological benefits of vegetation extend well beyond natural areas, to include developed areas in parks and urban environments. Vegetation improves air quality, protects soil, creates habitat, sequesters carbon, reduces stormwater runoff, prevents erosion, and protects against flooding. In terms of cultural and social benefits, vegetation evokes history and a sense of place, creates shade for visitors, visually integrates buildings with their environments, and can be aesthetically pleasing. Removing vegetation eliminates these benefits and may result in unintended consequences. If historic vegetation is removed or severely damaged during building maintenance projects, generally parks should plan to replace the vegetation.

Principle 3: Make evidence-based decisions when planning vegetation work adjacent to buildings and structures.

According to the Royal Horticultural Society, "Most trees growing near buildings cause no damage." Universal clearing zones for vegetation are not recommended. For maintenance access to buildings, an 18" space between the building and vegetation is a workable amount of foliage-free space. However, this means woody vegetation must be rooted farther out than 18", and plant bed size must support this. Woody vegetation is generally healthier when it's not jammed up against the facade of a structure, so more space is a win-win. However, the type of vegetation, growth rate, and growing conditions are key variables. Generally, woody plants should be planted no closer than 5' from a facade, if conditions permit. Historic vegetation must be evaluated on a case by case basis.

To optimize roof life span, tree limbs should not touch or low-overhang a roof. However, a long-lived, strong-wooded, major tree can have upper limbs high above a roof without causing the roof to deteriorate more quickly because it allows air to pass underneath its branches. Tree limbs should be reduced in length to the minimum amount necessary to permit air and light passage around structures. To protect the health of the tree, remove no more than 25% of live canopy in one year.

Principle 4: Address potential damage to buildings and structures early with preventative maintenance.

Many of the problems related to the interface of vegetation with structures are the result of deferred maintenance. When vegetation is allowed to grow unchecked, it can penetrate foundations and exterior sheathing, cause mold, or crack building materials. When the problems are serious, vegetation is removed to conduct repairs, resulting in loss of the many values of vegetation.

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Volunteer lilac growing at the base of a stone foundation on North Manitou Island, SLBE.

Managing vegetation impacts to buildings through Preventative Maintenance

Problem	Preventative Care
Blocked drains	Maintain underground drains in good condition. Most roots will be unable to penetrate drains without cracks or leaks.
Soil subsidence	Subsidence is generally only a problem in clay soils. Subsidence caused by trees will occur during a dry period. If trees are a documented source of subsidence, consider increasing irrigation. If the trees are replaced, select drought tolerant trees which will create less of a problem.
Damaged paving and foundations	Root prune vegetation that is causing substantial lifting.
Rodent access	Many types of rodents are able to enter buildings regardless of adjacent vegetation. Remove rodent nests and install traps. Maintain building surfaces and block all potential entrances such as vents and eaves. Prune trees so they are not directly touching buildings.
Damaged roofs and gutters	Remove dead, dying, and damaged tree limbs from above buildings. Monitor tree health and potential defects. Extend the lifespan of historic trees and reduce the risk of falling limbs through maintenance. Historic trees that have become hazardous can be removed, but should be replaced in-kind or with a compatible alternative. Prune vines away from gutters and window trim annually. Remove vegetative debris from roofs annually to avoid rot.
Vine-damaged siding	Maintain building plaster or siding. For self-clinging vines (aerial roots and creepers), apply silane-based anti-graffiti paint to walls to reduce depth of attachment. For vines that attach with tendrils or through twining, install a visually compatible trellis system for support and to separate vines from buildings. Prune or sheer vines (depending on the species) to allow for light penetration.
Concealed historic structures	Particularly in tropical areas, vegetation can completely cover buildings and structures. Remove all non-contributing vegetation on an annual basis and maintain historic vegetation.
Growth in damaged mortar joints	Most vegetation cannot establish in maintained mortar joints. Repoint mortar joints as needed with compatible mortar and methods.

Preventative maintenance of structures and vegetation reduces the need for large scale interventions and best serves the NPS Mission.

- » Assemble teams to inspect buildings and adjacent vegetation for potential deficiencies such as the need for building exterior repairs and vegetation pruning, weeding, or mulching.
- » Consider vegetation maintenance needs as part of operational costs and capture the needs in FMSS.
- » Request project funding for deferred maintenance work on vegetation.
- » Hire a certified arborist to conduct condition assessments of large trees adjacent to buildings every three to five years.Replace vegetation that is damaged during building repair projects, preferably within the same year.

The interface of a building and vegetation must be reviewed on a case by case basis to understand what is appropriate in each situation, depending upon the type and level of significance, climate, growing conditions, fire hazard, type of vegetation, structural materials, maintenance capacity, and subject matter expertise. Historic vegetation is significant, and through appropriate care, we can extend its life while preserving adjacent historic structures.

Employee Spotlight

Name: David Goto
Job Title: Arborist

Years with NPS?

I've worked with the NPS for 6 years.

Favorite Maintenance Task?

The most rewarding work that I do on a regular basis is pruning. I really enjoy recreating the historic view sheds of Manzanar that represent both the town era and World War II incarceration period.

Favorite/Most Inspiring Project?

The most inspiring project that I have taken a part in at MANZ is replanting the Wilder Orchard. I enjoy watching the new pear trees grow as it fulfills my ultimate goal of completing our Orchard Management Plan.

What inspired your interest in your cultural landscapes?

For me, the most important part of the cultural landscape at MANZ is preserving and rehabilitating a site where my family and 10,000 other Japanese Americans were incarcerated during WW II. I get to share and protect a site that represents a part of my history and in doing so I hope that this cultural landscape can serve to prevent another travesty similar to the Japanese American internment.

Tree Care for Fire Resilience

As summers are increasingly hotter and drier, wildfires have become even more of a challenge. This year, states have seen record-breaking numbers and acreages of wildfires. Many of these events have affected our parks, staff and cultural landscapes, resulting in significant loss.

Trees Have Varying Degrees of Inherent Fire Resilience

In the realm of preservation horticulture, wildfires are especially threatening. Most importantly, trees vary by species in their resilience to fire. Non-native vegetation introduced from temperate ecosystems without natural regimes of wildfires are more susceptible than native species that have evolved with natural wildfire. Measures should be taken to protect vulnerable historic vegetation from fire damage.

Timing Tree Care for Optimal Health

An ounce of prevention is worth a pound of cure, and the same pertains to tree health. Regular tree assessments by a Certified Arborist identify areas of concern before they reach advanced stages. Condition

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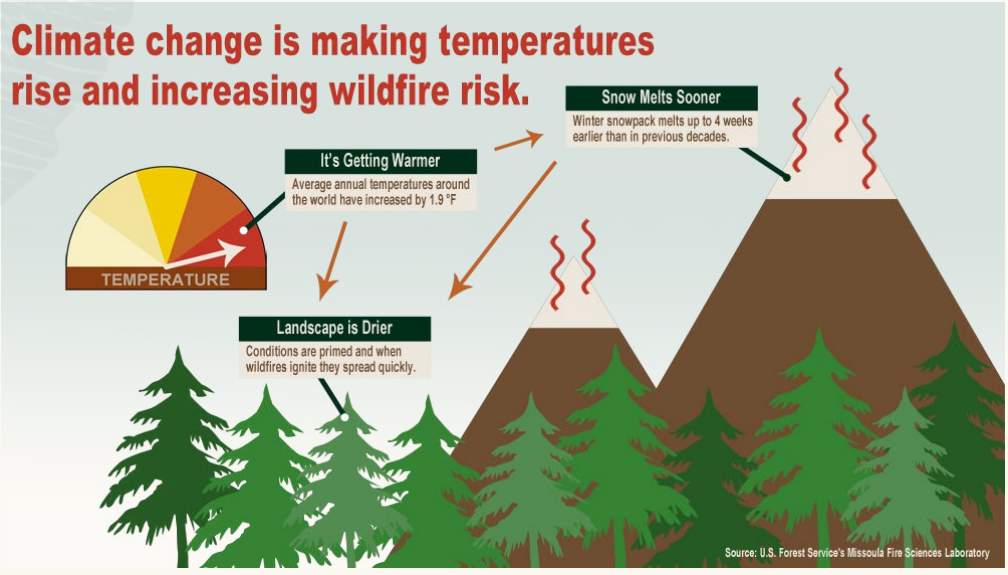


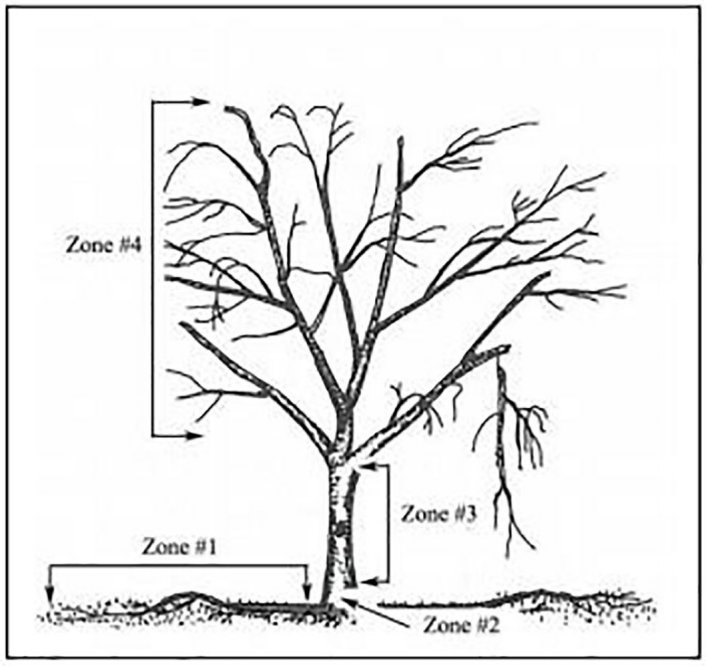
Diagram of the relationship between climate change and increasing wildfire occurrence (USFS).

assessments should be performed frequently, ideally in the early spring.

Many tree care practises that fall under regular maintenance are important to the overall health, and by extension, resilience of trees to fires. However, under immediate and imminent threat of fire, specific measures can be taken to prepare.

Tree Care by Anatomy

Fire protection of roots and trunks is imperative for historic trees. A tree can withstand burnt limbs but not a burnt trunk and roots. Soaking the trunk and root-zone with water is a protective measure, along with removing debris. Wrapping trunks with an aluminum-based fire shield will prevent trunk damage. Maintaining a clear zone around the perimeter of an orchard can serve as a firebreak and maybe treated with fire retardants. (Note, retardants should not be sprayed directly on historic trees.) Removing deadwood from the trunk and canopy of historic trees promotes health and removes vertical and horizontal fuels. The table below summarizes regular tree maintenance and fire preparation measures.



Anatomical zones of a tree.

Tree Care Practices for Fire Resilience

Areas of Concern	Regular Maintenance	Fire Preparation
Zone 4: Crown Overcrowded canopies, horizontal fuel continuity	» Remove inward-growing and crossing branches » Remove deadwood » Thin and reduction prune to achieve a well-balanced canopy	» Reduction prune to increase spacing between adjacent canopies » Thin prune trees with excessive water sprouts » Remove deadwood
Zone 3 & 2: Trunk/Flare Cavities, decay, and deadwood	» Remove deadwood » Stabilize leaning trees with props or braces » Bridge-graft cavities of fruit trees to repair trunk	» Irrigate to soak trunk » Remove deadwood and debris » Wrap with fire shield
Zone 1: Roots Soil erosion, dryness, and compaction	» Irrigate soil as needed » Aerate compacted soil » Replace missing topsoil » Amend soil per soil test results and spread nutritional mulch	» Irrigate to soak root-zone » Remove debris

Pests and Diseases: Dutch Elm Disease

> "For the purposes of the avenue, the American elm naturally suggests itself at once as the tree to be used; and it is to be hoped that the fine effect this produces, when planted in regular lines, may in a few years be realized in the Central Park."
>
> - Frederick Law Olmsted, in Landscape into Cityscape; Frederick Law Olmsted's Plans for a Greater New York City (p. 87)

Dutch Elm Disease: What is it?

The American elm was once considered to be an ideal street tree, prized for its form, longevity, and tolerance to the pollution and soil compaction of an urban environment. Then, Dutch elm disease was introduced into the United States in the 1930s. It has since spread across the country and Canada, resulting in the loss of most large American elm trees.

Dutch elm disease (DED) is caused by the fungus *Ophiostoma novo-ulmi*, which is spread by the native elm bark beetle and European elm bark beetle. The pathogen infects the vascular system of the tree, preventing water movement through the tree's tissues which causes its leaves to wilt, yellow, and ultimately turn brown. Branches and stems of infected elms typically develop dark streaks of discoloration.

Management

The quick and thorough removal of stressed, dying and dead elms is critical for reducing the spread of disease

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The now-rare beauty of a mature American elm tree, Ulmus americana.

Upcoming Training Opportunities

National Center for Preservation Technology and Training

Using Lime: A Technical Workshop on Using Lime & Mortars
Natchitoches, LA
April 29 - May 1, 2019

Vanishing Treasures

Asset Management for Historic Buildings
Grand Teton National Park
September 10-13

Executing a Historic Preservation Project in Wilderness
Bandelier National Monument
October 16-18

Guiding Principles for Field-based Historic Preservation
Grand Canyon National Park October 23-25

National Preservation Institute

Cultural and Natural Resources: An Integrated Management Strategy
National Capital Region, DC September 11-13
Sacramento, CA, September 25-26

Landscape Preservation: An Introduction
Portland, OR
October 16-17

Landscape Preservation: Advanced Tools for Managing Change
Portland, OR
October 18

to healthy trees. The disease can also live in the sap after the tree has died, so transporting elm wood to uninfected areas can allow its spread.

Although no elm trees are resistant to DED, several elm cultivars have been found to be more tolerant to the pathogen. Some were developed as hybrids from crosses of American, Asian, and European elms, while others were selected from mature American elm specimens that were found to tolerate the disease without damage.

Jefferson Elm: Species Diversity on the National Mall

One example is the "Jefferson" elm, a cultivar of the American elm (*Ulmus Americana*) that shows natural tolerance to DED. It was first discovered on the National Mall in the 1970s. Unknowingly, it had been purchased from a nursery and planted in 1935 during the implementation of the McMillan Plan, when 333 American elms were planted in four parallel rows along the north and south edges of the Mall. The Jefferson elm has a natural genetic mutation that enables its tolerance to the disease.

The NPS has substituted diseased American elm trees with various replacements, including Dutch elm disease-tolerant cultivars of the American elm (*Ulmus Americana*) including 'Jefferson,' 'Washington,' 'Princeton,' and 'Liberty'. Planting with this diversity of cultivars allows the cultural landscape of the Mall to retain its historic character while also protecting against the impact of the disease.

The Olmsted Elm

In 1883, Frederick Law Olmsted bought the property he called "Fairsted," which included an American elm that shaded the South Lawn. The tree had been planted around 1810 and remained an important feature of

Historic Olmsted Elm

the pastoral landscape for generations. More recently, infection by DED caused dieback of the canopy, contributing to the tree's decline. It was removed in March of 2011 and the disease-tolerant variety 'Jefferson' was planted in its place.

This specimen, which was propagated from the original Jefferson elm on the National Mall, was selected for its health, disease tolerance, and for its association with Olmsted. Olmsted's son, Frederick Law Olmsted Jr., had a role in planning the Mall as a member of the 1901 McMillan Commission.

Click on the image to the right to view a video about the planting of the "Jefferson" Elm on the Fairsted property.

Tool of the Moment: Turf Dethatcher

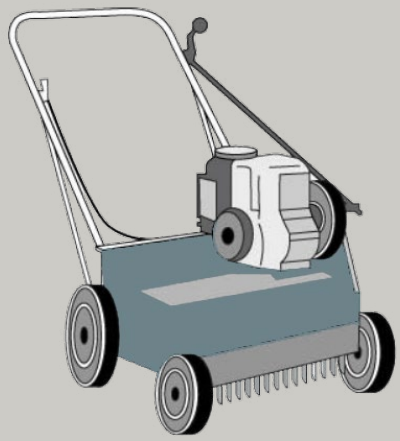
Dethatch turf before over-seeding in the late summer or early fall. Thatch is the layer of dead leaves and stems that builds up just below the live grass leaves. Dethatching improves water, air and nutrient infiltration, and opens up the soil surface to receive grass seeds. For small turf areas, use a thatching rake.

For larger turf areas, use a walk-behind dethatcher (a vertical mower, or a power rake), or a tractor-pulled dethatcher. These dethatchers cut through debris with rotating blades or stiff wire tines. Use steel blades with warm season grasses (e.g., Bermuda and Zoysia) and wire tines with cool season grasses (e.g., Tall Fescue, Kentucky Bluegrass and Perennial Rye).

Follow these steps:

1. Mow turf low before dethatching.
2. Make two passes with the dethatcher, one at a 90° angle to the first.
3. Rake up the debris and create compost.
4. When rains return, over-seed and top-dress with organic matter.

Thatching Rake



De-Thatcher