

Maintained Landscapes in the National Park Service

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SPANNING NEARLY SEVEN MILLION ACRES, maintained landscapes (MLs) are one of the largest and most complex asset categories under National Park Service (NPS) stewardship. MLs represent a diversity of constructed and actively managed park assets, including campgrounds, picnic areas, urban parks, ornamental gardens, historic orchards, and battlefields. They include recreational, cultural, and operational landscapes vital to fulfilling the mission of the service and are present across the national park system in places such as the National Mall and Memorial Parks in Washington, D.C. (Figure 1); Jefferson National Expansion Memorial in St. Louis, Missouri; and Yosemite National Park in Sierra Nevada, California.

Figure 1. Aerial view of the urban landscapes of the National Mall and Memorial Parks, Washington, D.C. NPS photo.



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MLs are distinguishable from natural areas in that they are often designed, planned, and constructed; they require regular recurring maintenance and an investment of labor and materials. They typically include engineered and built features, such as walls, fences, masonry walkways, irrigation systems, and maintained plantings.

NPS established MLs as an asset category in the Facility Management Software System (FMSS), its enterprise work management system for real property, to support landscape preservation and operational needs for one of the most prevalent asset categories in national parks.

Managing MLs presents many complex challenges. As compared with other constructed assets, landscapes are inextricably connected to the environment; their condition is dynamic and highly susceptible to frequent impacts and change. Threats from invasive species and pests, climate change, human use and development, and other forms of encroachment directly influence ML condition and management needs. Without regular recurring and cyclic maintenance, deficiencies in condition can quickly develop and lead to serious deterioration or loss of important landscapes, such as deferring mowing of a historic agricultural field that soon reverts to woodland. When these deficiencies occur, they require significant funding and staffing to correct. In addition, many NPS MLs are historically significant cultural resources and must be carefully protected and preserved as part of the US national legacy and the NPS mission. Such preservation requires effective collaboration between facility management and cultural landscape specialists to ensure that these important resources are managed thoughtfully and appropriately.

To improve the effectiveness of its ML maintenance and management, NPS has introduced measures to more accurately record data in the FMSS, and the NPS Park Facility Management Division (PFMD) has implemented several employee development initiatives to strengthen field staff expertise. Parks now have greater access to resources and information that support sustainable practices, build employee competencies, and promote more effective and efficient landscape management.

Data management

Significant improvement to servicewide ML management requires a unified and consistent effort to accurately record quality and comprehensive asset inventory data in the FMSS. To ensure that this effort is inclusive and informed, the PFMD is engaged in a collaborative effort with the Park Cultural Landscapes Program (PCLP) to record data for 390 nationally significant cultural landscapes. For the MLs located within these cultural landscapes, participating parks have been asked to complete a cultural landscape inventory (CLI), as shown in Table 1. This inventory identifies a landscape's level of cultural significance. Landscapes may be deemed culturally significant if they are associated with important people or events or traditional cultures or if they contain designed (e.g., historic landscape) or vernacular (e.g., a village or farm) elements. The CLI facilitates documentation of the elements of a landscape that are important to preserve and includes a list of stabilization measures necessary to prevent further deterioration.

In addition to the CLI, parks also have the option of completing a cultural landscape report (CLR), depending on the management need. The CLR is the principal document used to manage cultural landscapes in the short term and also outlines the vision for a landscape's

long-term management. For example, the CLR may articulate whether a landscape should be restored to resemble a historic period or rehabilitated according to contemporary standards. Table 2 provides some additional information on what standards are used to develop a CLR.

In addition to the use of CLIs and CLR, the recent release of servicewide guidance on the management of ML assets is helping park staff understand how to manage this complex asset category appropriately. For example, the business practices developed for ML management specify the criteria for defining ML boundaries relative to those of other asset categories. This delineation is necessary because cultural landscapes may also overlap with roads, parking areas, and trails, all of which are categorized as other asset categories in the FMSS. It is important to distinguish between different asset categories in the FMSS to determine each asset category’s diverse management and reporting needs. Examples of criteria used to define ML boundaries include operational need and the density of landscape features, as well as the presence of existing landscape demarcations, such as roads.

The publication of ML management business practices offers facility managers a tool for understanding the ML assets managed in the FMSS. MLs may have important cultural, natural, and recreational components and for this reason must be inventoried and inspected to ensure that their overall character and function is retained over time. Recording these details enables park managers to identify specific work processes and more accurately determine the current replacement value of the landscape. Business practices also assist parks in organizing and classifying MLs at a variety of scales depending on the intensity of asset management activities, maintenance operations, historical/cultural boundaries, and funding required. With this guidance in place, parks are able to more accurately describe and document the main-

Table 1. Sample cultural landscape inventory checklist.

Sample cultural landscape inventory checklist	• Remove deadwood from historic trees and brace leaning trees
	• Revegetate exposed, eroded soils
	• Replace in-kind deteriorated fence panels
	• Level frost-heaved flagstones
	• Aerate a compacted lawn

Table 2. Standards for the use of a cultural landscape report. Source: Cultural Resource Management Guideline, Release no. 5.

Standards for the use of a cultural landscape report (CLR)	• A CLR is prepared to minimize the loss of significant landscape characteristics and associated features and materials when existing information about the physical history and condition of a cultural landscape is inadequate to address anticipated management objectives, when impending development alternatives could have adverse effects, or when recording actual treatment.
	• A CLR is prepared by qualified professionals based on appropriate methodologies and techniques for cultural landscape research, documentation, and evaluation.
	• Landscape, architectural, and archaeological investigations supporting a CLR employ nondestructive methods to the maximum extent possible; they are prescribed and justified in a project agreement that includes a research design and impact analysis.
	• All field notes, primary documents, original maps, drawings, photographs, and plant materials gathered or associated with the research for CLR or special landscape projects are organized and preserved as archival material or museum objects in consultation with the park or curator.

tenance needs of MLs in the FMSS, and they can compete more effectively for limited NPS facility project funding. By providing parks with appropriate guidance on ML management, NPS is helping to ensure that MLs are managed according to a standard methodology, which in turn will strengthen ML data consistency and aid reporting. Improving the completeness of the ML inventory in the FMSS will also enable the PFMD to better understand the scope of its portfolio and to more accurately allocate management resources to preserve critical assets.

Employee skills development

To build employee knowledge and skill in ML principles and practices and to enhance employees' ability to effectively maintain MLs, NPS is focused on developing and delivering education and training. An emphasis on including park grounds staff in ML data inventory and condition assessment is helping them to develop and improve their professional landscape management skills. This on-the-job experience, in combination with formal education and training programs in landscape management, tree care, and cultural landscape preservation, is increasing proficiency in successful landscape management, planning, and operations.

The Olmsted Center for Landscape Preservation, a program of the NPS Northeast Region, in collaboration with the Historic Preservation Training Center and NPS Learning and Development, offers professional landscape maintenance training programs for park staff. These programs provide participants with fundamental knowledge and practical skills in the concepts and techniques needed to care for landscapes (Figure 2).

Landscape maintenance skills development

The Landscape Maintenance Skills Development Program provides employees with learn-
Figure 2. Landscape Maintenance Skills Development Program participants learning about tree inventory and inspection. NPS photo.



ing opportunities in park grounds maintenance operations. The program includes the following components:

- **Classroom sessions** that introduce landscape maintenance concepts and principles. Sessions include sustainable practices, soil management, diagnostic procedures, integrated pest management, plant nutrition, and fertilization.
- **Field training projects** reinforce classroom sessions by engaging participants in hands-on grounds maintenance activities, including turfgrass management, irrigation maintenance and repair, pruning, weed and pest control, trails construction and maintenance, masonry repair, comprehensive inspections and condition assessments, equipment operation and safety, plant and garden bed maintenance, plant health care, and hardscape management.
- **Independent study assignments** supplement knowledge and skills gained in the classroom by having students work with mentors and NPS landscape management professionals to apply information to their own park's landscapes. Students learn to conduct condition assessments, develop cost plans and cost estimates to correct deficiencies, and prepare routine/cyclic grounds maintenance recommendations.

The Landscape Maintenance Skills Development Program has been instrumental in building NPS employees' fundamental landscape management knowledge and technical skills. For example, a 2012 workshop on sustainable turfgrass management held at San Antonio Missions National Historical Park in collaboration with the NPS Natural Resources Stewardship and Science Directorate (NRSS) highlighted advances in sustainable practices developed by San Antonio Missions facilities staff. The workshop introduced participants from four NPS regions to lawn care practices that substantially reduce park carbon footprints by limiting the use of petroleum-based products while still achieving desired turf quality. Currently, limited resources can only support a minimal number of participants each year; however, as the use of distance learning increases, training opportunities will become available to a broader audience of NPS employees.

Arborist training

The NPS Arborist Training Program develops employee skills in sustainable tree care and builds NPS capacity to effectively manage important park resources. The program covers introductory topics, such as tree growth and development, chainsaw use, and tree climbing, through advanced arboriculture concepts and practices, including rigging, evaluating structural stability, conducting thorough condition assessments, managing historic trees, and mitigating hazards.

As a competency-based program, participants are assessed to demonstrate that they have acquired the necessary knowledge, skills, and abilities prior to completing the curriculum. Over the past decade, the program has trained nearly 100 NPS employees in professional tree care and management. Most participants have also obtained industry certification through the International Society of Arboriculture or individual state certification boards. Many of these participants now serve as instructors and mentors in the program, use their skills in managing park resources, and serve as active members of the NPS Arborist Incident Response Team, which assists parks in addressing emergency resource stabilization issues.

Branching Out: Youth exploring landscape management

Branching Out is a program that engages young people between the ages of 15 and 25 in learning about NPS landscape management and stewardship practices. Through educational workshops and hands-on field experiences, participants are exposed to park management opportunities that lead to higher education and career placement. Youth participants work alongside agency staff and professional experts, protecting park resources and acquiring knowledge and skills in landscape management. The goals of this program include the following:

- Offer youth experience in park facilities management and stewardship;
- Provide pathways for NPS employment and higher education;
- Introduce participants to NPS and its mission;
- Provide asset management support to parks and associated sites; and
- Forge connections between young people, landscapes and the NPS.

Branching Out has provided many youth with career pathways by connecting them with opportunities to become the next generation of NPS landscape stewards. For example, former program participants are now working as full-time park employees at Boston National Historical Park and Minute Man National Historical Park; others are pursuing college degrees in park management disciplines with postgraduate plans for NPS careers or with partner organizations.

Sustainable landscape management

Sustainable landscape management practices are an emerging area of ML stewardship. Traditional grounds maintenance operations generate enormous quantities of equipment emissions and use large amounts of petrochemical pesticides and fertilizers. These materials pose concerns for park visitors and potentially contaminate the environment, including soils and water sources. It is estimated that using a walk-behind mower for one hour generates as much pollution as driving an automobile for 45 miles (US Environmental Protection Agency 2014: 1), and the United States uses 1.2 billion gallons of gas each year to mow turf (US Department of Energy 2011: 4). Given that NPS maintains over 400 million square feet of turfgrass, or an area half the size of Manhattan, relatively minor operational adjustments have the potential to yield significant achievements in meeting sustainability goals.

Recognizing the potential for improvement and the need to develop a coherent strategy to address these issues, the PCLP formed a sustainability work group. This group meets monthly to share lessons learned and to discuss other developments in sustainable preservation practices. The program uses the United Nations definition of sustainability: that which “meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN General Assembly 1987: 1).

In addition to advancing environmental, social, and economic dimensions of sustainability, stewards of cultural landscapes must also maintain their historic integrity and historical character. The PCLP is currently developing a framework to more fully define what sustainability means in the context of cultural landscapes management. This framework will guide park staff in sustainably managing ML assets and will also include examples of successful ML projects. This guidance is being developed as a companion document to *The Secretary*

of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings. Sample ML projects will focus on the management of soil, water, and plants, as the soil of a ML should be a healthy ecosystem in its own right. These sample projects will also identify ways to build resilience for adaptation to a changing climate.

In addition to this forthcoming guidance from the PCLP sustainability work group, the Olmsted Center for Landscape Preservation is incorporating sustainable landscape maintenance practices into its training programs. For example, in August 2013 a workshop offered NPS employees field demonstrations and discussions on the following:

- Adapting new technologies for increasing operational efficiency and reducing emissions;
- Managing organic debris, bulk processing, and recycling to reduce landfill disposal; and
- Reducing turf maintenance requirements by adjusting mowing regimens, practices, and quality standards.

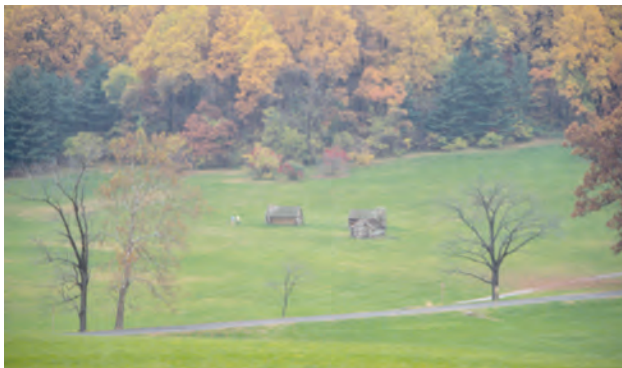
These programs will aid participating parks in meeting many of the goals identified in the NPS *Call to Action* under goal number 23, "Go Green," and the *Green Parks Plan* while also advancing park sustainable practices. "Go Green" seeks to foster sustainability in parks by reducing greenhouse gas emissions by 20%. The *Green Parks Plan* defines a collective vision and a long-term strategic plan for sustainable management of NPS operations.

Meeting maintenance goals despite a decreasing maintenance workforce is a primary challenge for the PFMD. Because the same standard cannot be achieved with fewer resources, maintenance objectives and practices must become more efficient. For MLs, this challenge may involve revising the frequency of routine and cyclic maintenance activities, such as mowing. Mowing less frequently can help meet agency sustainability goals by reducing emissions, and, although results may differ from the current appearance of the landscape, it provides an opportunity to more closely align facility operations with cultural landscape treatment objectives. For example, a historic battlefield would likely appear more authentic when managed as a meadow rather than as a closely clipped lawn.

In addition to collaborating with the PCLP and the Olmsted Center for Landscape Preservation, the PFMD is working more closely with the NRSS to identify strategies for sustainable management of MLs. A turf stewardship project piloted in the NPS Midwest Region will initiate development of standards for sustainable turfgrass management. To help communicate these standards to parks servicewide, two workshops have been held to date on sustainable turfgrass management.

Valley Forge National Historical Park (Figure 3) has made great strides in achieving sustainable turfgrass management. Over the past several years, the park has transitioned acres of turf that was regularly cut low to grassland meadow. The operational shift is improving the sustainability of facility operations and is helping the park meet its natural resource management objective of enhancing diverse wildlife habitats and native plant communities. Additionally, this innovative strategy requires less frequent mowing, furthers broader park resource management and interpretive programs, and reduces the input of resources and the park's carbon footprint.

Figure 3. Woodford Brigade Encampment Site with the Mount Joy Forest in the background and grassy meadows in the foreground, Valley Forge National Historical Park. NPS photo.



Future outlook

NPS efforts to develop effective landscape management strategies and deploy creative approaches to ML management are starting to have a noticeable effect, with facility managers carrying out strategies and serving as stewards on the ground. As a result, NPS is gaining a more complete understanding of its diverse ML portfolio. Park condition assessments are documenting landscape condition, CLIs and CLRs are providing blueprints for stabilizing and treating cultural landscapes, and innovative data management and training programs are improving park operations.

The relevancy of landscapes to park programs and use by the visiting public are the primary drivers for improvement. Landscapes support many park functions. Some are functional or aesthetic, such as areas around visitor centers. Many are important cultural landscapes that serve interpretive and education programs. Others, such as campgrounds and sports fields, are used for visitor recreation, and still others support scientific and horticultural research. The collaborative initiatives underway—improving sustainable practices, recording comprehensive FMSS data, and fostering connections between facilities operations, cultural landscape preservation, and natural resources management—underscore the relevancy of landscape stewardship to meeting the NPS mission.

But with nearly 7 million acres and counting, more must be done to effectively care for landscapes. NPS will need to continue to invest in the tools, approaches, and dedicated staff to ensure that its treasured landscapes do not deteriorate and are maintained in good condition.

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