

**A Guide To Cultural Landscape Reports:**  
Contents, Process, and Techniques

by  
Robert R. Page  
Cathy A. Gilbert  
Susan A. Dolan

U.S. Department of the Interior  
National Park Service  
Cultural Resource Stewardship and Partnerships  
Park Historic Structures and Cultural Landscapes Program  
Washington, DC  
1998

*Cover photo:*

*Site plan for Motor Service and Tea Room, Blue Ridge Parkway at Rocky Knob Park. Blue Ridge Parkway. (NPS, 1936)*

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



U.S. Department of the Interior  
National Park Service  
Cultural Resources

Park Historic Structures & Cultural Landscapes



# United States Department of the Interior

## NATIONAL PARK SERVICE

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August 17, 1999

To Whom It May Concern:

Enclosed is a copy of *A Guide to Cultural Landscapes Reports* for inclusion in your library. The document addresses the role of the Cultural Landscape Report in managing cultural landscapes in the national park system. Authored by Robert R. Page, Cathy A. Gilbert, and Susan A. Dolan, this new guide describes the contents, purpose, and use of the Cultural Landscape Report, and provides practical information and procedures for planning and conducting cultural landscape research, documentation, analysis, and treatment.

The guide has been prepared in three parts:

- *A Guide to Cultural Landscape Reports: Contents, Process and Techniques* provides a general history of landscape research in the National Park Service; describes the relationship of the Cultural Landscape Report to park planning, design and resource management; and describes the content and format of a comprehensive Cultural Landscape Report.
- *A Guide to Cultural Landscape Reports: Landscape Lines* provides a collection of technical documents containing detailed and up-to-date information on topics and techniques that apply directly to the development of Cultural Landscape Reports.
- *A Guide to Cultural Landscape Reports: Appendices* provides examples and general reference materials related to the information included in both the *Contents, Process and Techniques* and *Landscape Lines* parts of the guide.

This document represents the ongoing expansion of technical information for managing cultural landscapes in the national park system. The information in this guide also should be useful to other agencies, organizations, and individuals involved in similar work. If you have any questions regarding the guide, please contact me at 202-343-8147 or email [bob\\_page@nps.gov](mailto:bob_page@nps.gov).

Sincerely,

Robert R. Page  
Program Manager  
Park Cultural Landscape Program

## ACKNOWLEDGMENTS

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Throughout the production of the document, several individuals assisted by collecting and submitting illustrations for the guide, including Gina Bellavia, Eliot Foulds, Katy Lacy, Lauren Meier, and David Uschold, Olmsted Center for Landscape Preservation; Patricia Brouillette, Golden Gate National Recreation Area; Steve Burns; Joe Crystal; Jill Cowley; Maureen Joseph; Lucy Lawliss; Marla McEnaney and Sherda Williams, Midwest Support Office; Michael McMahon; Steve McMahon, The Trustees of Reservations; Darwina Neal; Peggy Nelson, Landscape Systems; Paul Shackel; and Tim Davis and Tom Behrens, HABS/HAER.

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# INTRODUCTION

## PURPOSE OF THE GUIDE

This guide addresses the role of the Cultural Landscape Report (CLR) in managing cultural landscapes in the national park system. This guide focuses on three primary objectives: 1) to clarify the purpose and use of a CLR, 2) to define the content, process, and format of a CLR, and 3) to provide technical information on the methodologies and techniques for cultural landscape research, documentation, analysis, evaluation, and treatment.

This guide to CLRs expands on the information provided in the National Park Service (NPS) *Cultural Resource Management Guideline*. In addition to defining a CLR and describing its content, this guide clarifies the purpose of a CLR, its relationship to other types of reports, and its use in cultural landscape research and management. This guide also gives professionals and park management and staff practical information and procedures for planning and conducting cultural landscape research for a CLR project. This guide has been prepared specifically for those who manage cultural landscapes in the national park system. However, the information in this guide should be useful to other agencies, organizations, and individuals involved in similar work.

This guide does not provide step-by-step instructions for developing a CLR. The CLR itself is a flexible document that can be used for a wide range of cultural landscapes and different management objectives. A CLR might address an entire landscape, a portion of a landscape, or an individual feature. To best serve management objectives for a project, professional judgment is integral to interpreting and applying the information in this guide to a particular CLR.

## HOW THIS GUIDE IS ORGANIZED

This guide contains three standalone documents:

- *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*
- *A Guide to Cultural Landscape Reports: Landscape Lines*
- *A Guide to Cultural Landscape Reports: Appendices*

### Contents, Process, and Techniques

This perfect-bound document provides a general history of landscape research in the NPS, describes the relationship of a CLR to park planning, design, and resource management, and describes the content and format of a comprehensive CLR. This information provides guidance for preparing a CLR and contains material that will remain fairly constant over time.

### Landscape Lines

This new collection of technical documents provided by the NPS contains information about preparing a CLR. The Landscape Lines documents are intended to provide "lines of communication" for specialized information that represent the state of the art in cultural landscape research, documentation, analysis, evaluation, and treatment. As such, the information is transitory and meant to be updated and expanded. Each of the Landscape Lines documents included in this guide was prepared with input from individuals with expertise in the specialized subjects. Together, the documents represent the initial development of the collection. Additional Landscape Lines documents will be developed as topics are defined and expertise is available.

Each Landscape Lines document is produced as an individual piece that can be distributed and copied. The collection is presented in a three-ring binder to provide a central location for the information,

permit the addition of new or updated Landscape Lines pieces, and allow for the inclusion of related reference material selected by the user.

The technical information in Landscape Lines is presented in three formats:

- general information highlighting the application of existing technology to cultural landscape research (for example, pollen analysis)
- comprehensive information on subjects for which limited reference material currently exists, especially as the subjects are applied to cultural landscape research (for example, treatment of biotic resources)
- procedural guidelines for subjects related to preparing a CLR (for example, graphic conventions)

## Appendices

This document provides examples and general reference materials related to the information included in both the *Contents, Process, and Techniques* and *Landscape Lines* parts of the guide. The appendices are presented in a three-ring binder to provide a central location for the material and allow for subsequent additions and updates.

## How to Obtain these Documents

*Contents, Process, and Techniques* and *Landscape Lines* are available for purchase as a set from the Superintendent of Documents, Government Printing Office, Washington, DC, 20402-9325, Stock Number 0245-005-01187-1. Materials contained in the *Appendices* are available from various sources. For information on how to obtain these materials, contact the Park Historic Structures and Cultural Landscapes Program, National Center for Cultural Resources Stewardship and Partnerships, 1849 C Street NW, Room NC360, Washington, DC, 20240.

# Understanding Cultural Landscape Research

## OVERVIEW OF CULTURAL LANDSCAPE REPORTS—PURPOSE AND USE

**T**he Cultural Landscape Report (CLR) serves two important functions: it is the principle treatment document for cultural landscapes and the primary tool for long-term management of those landscapes. A CLR guides management and treatment decisions about a landscape's physical attributes, biotic systems, and use when that use contributes to historical significance. (See Figure 1.)



*Figure 1. The CLR for the Moses H. Cone Memorial Park outlined a management strategy for each significant landscape component, such as the carriage roads, orchards, pastures and meadows, and lakes and ponds. The historic orchards and Bass Lake can be seen in the middle ground of this view from the manor house, Blue Ridge Parkway, (NPS, 1940)*

A CLR must establish preservation goals for a cultural landscape. The goals must be grounded in research, inventory, documentation, and analysis and evaluation of a landscape's characteristics and associated features. The content of a CLR provides the basis for making sound decisions about management, treatment, and use. Information about the historical development, significance, and existing character of a cultural landscape is also valuable for enhancing interpretation and maintenance.

A CLR clearly identifies the landscape characteristics and associated features, values, and associations that make a landscape historically significant (according to the National Register criteria). A CLR may include information spanning numerous disciplines in order to evaluate a landscape's historical, architectural, archeological, ethnographic, horticultural, landscape architectural, and engineering features, along with ecological processes and

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## STANDARDS FOR THE USE OF A CULTURAL LANDSCAPE REPORT

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The following standards guide the appropriate use of CLRs in cultural resource management.

- A CLR is prepared in order to minimize loss of significant landscape characteristics and associated features, and materials when existing information about the physical history and condition of the cultural landscape is inadequate to address anticipated management objectives, when impending development alternatives could have adverse effects, or to record actual treatment.
- A CLR is prepared by qualified professionals based on appropriate methodologies and techniques for cultural landscape research, documentation, and evaluation. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix A: Professional Qualification Standards.")
- Archeological records, base maps, and techniques, such as soil analysis, are used to collect data on historic and prehistoric features and conditions.
- Landscape, architectural, and archeological 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.
- National Register documentation is prepared or amended to address cultural landscape resources identified in a CLR.
- All field notes, primary documents, original maps, drawings, photographs, and plant materials gathered or associated with the research for CLRs or special landscape projects are organized and preserved as archival material or museum objects in consultation with the park or curator.

(Excerpted from *Cultural Resource Management Guideline*, Release No. 5.)

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natural systems. Based on this information and site management goals, such as access, contemporary use, and interpretation, a CLR outlines appropriate treatment for a landscape consistent with its significance, condition, and planned use. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix A: Professional Qualifications Standards.")

Treatment decisions for cultural landscapes are generally determined through the park planning process via a General Management Plan (GMP) or a Site Development Plan (SDP). The physical implementation of the treatment for a particular landscape is guided by the CLR. When treatment of a landscape has not been defined through the planning process, a CLR may augment or be combined with an SDP to determine the preferred treatment alternative and physical design.

The scope and level of investigation for a CLR varies depending on management objectives. A CLR is a flexible document, the scope of which is determined by the needs of park management, type of landscape, budget, and staffing requirements. (See Figure 2.) Management decisions should be based on a comprehensive understanding of an entire landscape

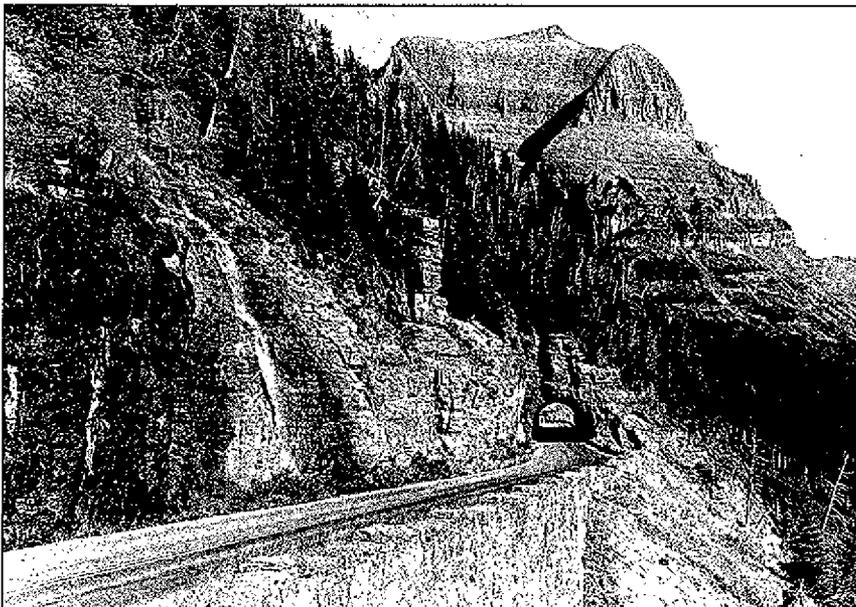


Figure 2. Historic roads, such as Going-to-the-Sun Highway, are one type of landscape that may be addressed in a CLR. Glacier National Park. (NPS, 1995)

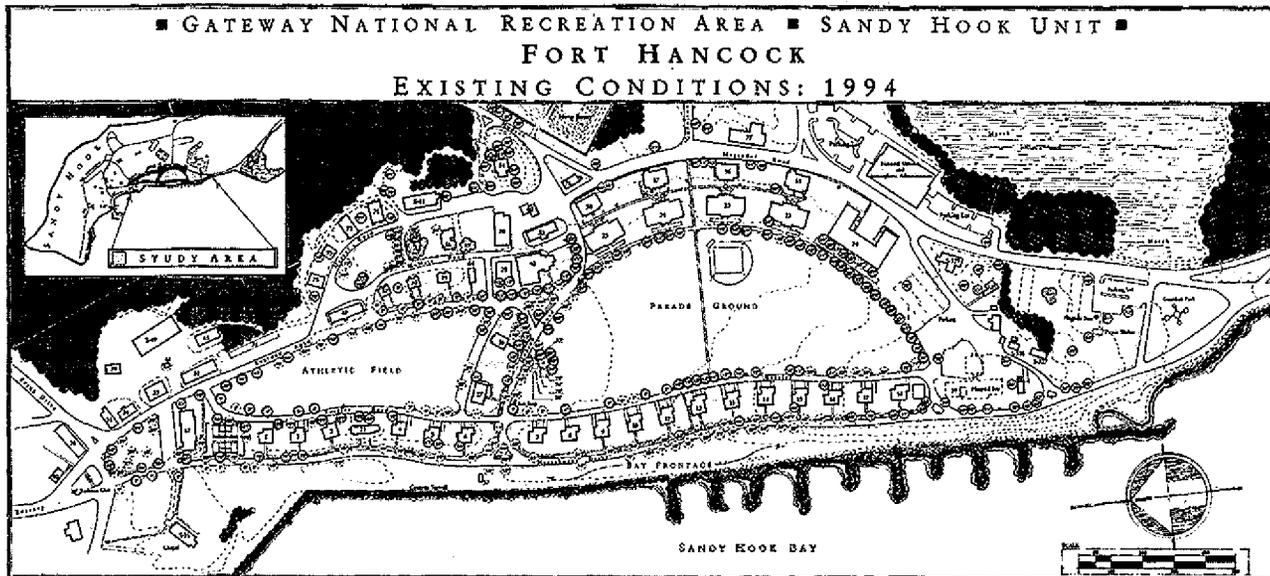


Figure 3. Existing conditions drawing of Fort Hancock, Sandy Hook Unit, Gateway National Recreation Area. (NPS, 1994)

so that actions affecting an individual feature can be understood in relation to other features within a property. Management objectives may, however, require a CLR to focus on a portion of a landscape or an individual feature within it, or to be prepared in phases. Therefore, it is imperative that a CLR's scope and objectives be clearly defined and articulated and any treatment decisions made in a CLR be limited to the scope and objectives. Before any treatment decisions are made, Part I of a CLR, titled "Site History, Existing Conditions, and Analysis and Evaluation," must be prepared.

A comprehensive CLR includes the following parts:

- Introduction
- Part 1: Site History, Existing Conditions, and Analysis and Evaluation
- Part 2: Treatment
- Part 3: Record of Treatment
- Appendices, Bibliography, and Index.

Each of these parts is described in detail in the section titled, "Preparing a Cultural Landscape Report," later in this guide.

## THE PARK CULTURAL LANDSCAPE PROGRAM

The national park system contains an impressive array of landscapes that reflect history, cultural richness, developmental patterns, and a changing relationship between people and the environment. These landscapes range from large rural tracts covering several thousand acres, to estates with formal gardens, to urban parks.

Over the past 15 years, cultural landscapes have become an integral component of historic preservation in the United States and abroad. In turn, the National Park Service (NPS) has come to recognize the significance of cultural landscapes to the national heritage, making the stewardship of these resources an important part of the NPS mission.

Since the 1930s, management of historical areas in the national park system has recognized the significance of the landscape characteristics and associated features in a park. However, in recent years the NPS has broadened its understanding of what constitutes a cultural landscape and has approached management of these resources with a greater degree of rigor. Until recently, however, there were no policies, guidelines, or standards for preserving and managing cultural landscapes.

At a broad program level, two developments clearly identify the preservation of cultural landscapes as a significant component of the NPS mission:

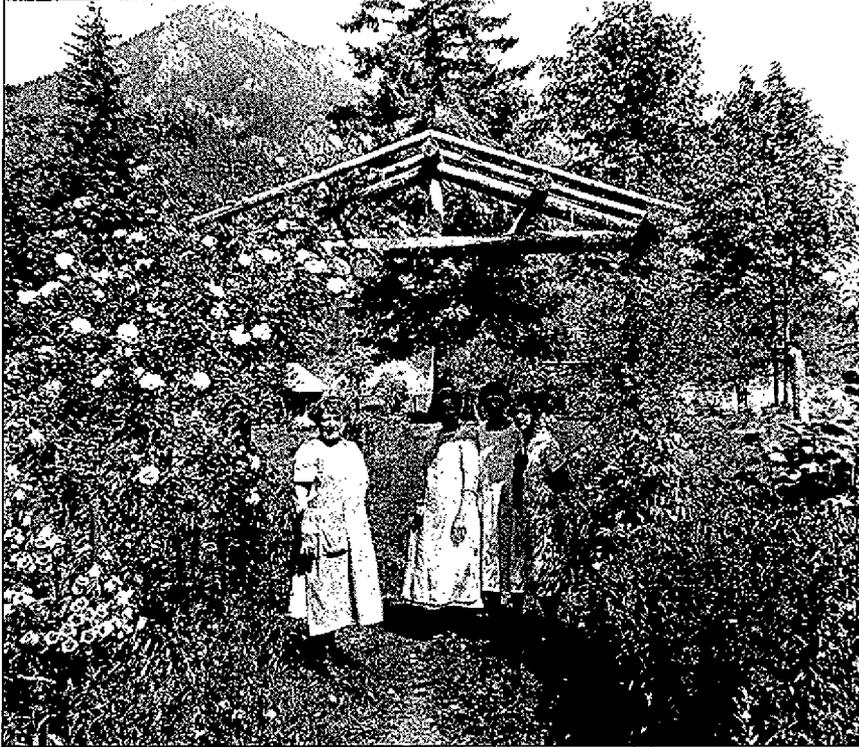
- In 1988, "cultural landscapes" were formally identified in *NPS Management Policies* as a type of cultural resource in the national park system. At this time, policy was established to mandate the recognition and protection of significant historic, design, archeological, and ethnographic values. The policy recognized the importance of considering both built and natural features, the dynamics inherent in natural processes, and continued use.

- In 1994, the guideline used to expand, clarify, and apply NPS cultural resource policy—*Cultural Resource Management Guideline*—was revised to include comprehensive procedural guidance regarding the management of cultural landscapes in the national park system.

In addition, much effort has been expended since the early 1980s to interpret and apply two documents, both which codified the preservation program in the United States since passage of the 1966 National Historic Preservation Act. The two documents are:

- The *National Register of Historic Places Criteria*, which provides the basis for evaluating the significance of a property. The criteria have been applied to a variety of landscape types, such as cemeteries, rural historic districts, and battlefields, in the form of technical bulletins. (See Figure 4.)
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, which guides the physical treatment of a significant property. The language in these standards was revised and broadened to include landscape resources.

Collectively, these activities and documents have provided the framework for the NPS park cultural landscapes program, which focuses on preserving a landscape's physical attributes, biotic systems, and use (when that use contributes to historical significance). The NPS program involves three primary activities: research, planning, and stewardship. Research defines the landscape characteristics and associated features, values, and associations that make a landscape historically significant. Planning outlines the issues and alternatives for long-term preservation. Stewardship involves such activities as condition assessment, maintenance, and training. The two documentation tools associated with these activities are the Cultural Landscapes Inventory (CLI) and the Cultural Landscape Report (CLR). The CLI provides baseline information on the location, historical development, landscape characteristics and associated



*Figure 4. In 1986, a CLR was prepared for the landscape at Rosemary Inn on Lake Crescent. The CLR used the National Register Criteria and the new NPS guidelines for evaluating the significance of the landscape. Olympic National Park. (NPS, 1920)*

features, and management of cultural landscapes in the national park system. The CLR is the primary guide for treatment and use of a cultural landscape. (See the insert titled, "Cultural Landscape Program—Timeline of Events" on the following page.)

Today, the term "cultural landscape" serves as an umbrella term that includes four general landscape types: historic designed landscapes, historic vernacular landscapes, historic sites, and ethnographic landscapes. Identifying distinct landscape types assists in distinguishing the values that make a landscape significant and aids in determining how it should be treated, managed, and interpreted. These landscape types are not mutually exclusive. A landscape may be associated with a significant event, include designed or vernacular characteristics, and be significant to a specific cultural group. (See the insert titled, "Cultural Landscape Definitions" later in this section.)

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## CULTURAL LANDSCAPE PROGRAM—TIMELINE OF EVENTS

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- 1960s** Research is broadened to include historic grounds along with historic structures. "Historic Grounds Reports" were prepared.
- 1968** Historic sites (grounds or terrain), structures, and objects are identified as historic resources in *NPS Administrative Policies*. They are defined as "a distinguishable piece of ground or area upon which occurred some important historic event, or which is importantly associated with historic event or persons, or which was subject to sustained activity of man—historic, prehistoric, or both. Examples of historic sites (grounds or terrain) are battlefields, historic campgrounds, historic trails, and historic farms."  
  
Historic gardens are classified as historic structures, and policy states that they "will be accorded treatment as indicated herein for the several classes of historic structures."
- 1973** Treatment guidance for preservation and restoration of historic sites is provided in *NPS Administrative Policies*. Policy pertains solely to topography and vegetation (such as soil erosion and exotic or intrusive vegetation).  
  
"Historic scene" is defined as "the overall appearance of all cultural resources and their surroundings as they were in the historic period."
- 1975/78** "Cultural" is identified as a preferred term to "historic" in *NPS Management Policies* regarding resources significant in the human past. Cultural resources include "sites, structures, objects, and districts." Treatment policy for historic sites pertains to the "surface and vegetative cover of the site during the historic period." Historic gardens, historic roads, and earthworks are listed individually and continue to be classified as historic structures.  
  
Historic scene protection and aesthetics guidance prohibits "any attempt to beautify, improve, enhance, or otherwise alter the appearance of the historic scene [in a manner] that does not accurately reflect the historic character."
- 1981** Historic Grounds Report is identified as a special resource study in the *Cultural Resource Management Guideline, NPS-28, Release No. 1*, but no definition or outline is provided.  
  
Cultural landscapes are first identified as a resource type in *Cultural Resource Management Guideline, NPS-28, Release No. 2*. Four types are identified: historic sites, historic scenes, historic landscapes, and sociocultural landscapes.
- 1984** *Cultural Landscapes: Rural Historic Districts in the National Park System*, is published. The document provides the first technical guidance for the identification, evaluation, and management of rural historic landscapes. Cultural Landscape Report is defined and outlined in the publication.
- 1985** Cultural landscape types are revised in *Cultural Resource Management Guideline, NPS-28, Release No. 3*, to include historic sites, historic scenes, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.  
  
Cultural Landscape Report is identified and defined in the third release of *NPS-28*. Treatment standards for rural historic districts are outlined.  
  
Twelve major tasks to enhance landscape preservation both within and outside the national park system are identified by the NPS Washington Office. The tasks call for standardized terminology, evaluation criteria, a comprehensive inventory, documentation standards, and technical information.
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- 1987** National Register begins producing publications to assist in nominating cultural landscapes to the National Register of Historic Places (for example, *Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes*, 1987; *Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes*, 1990).
- Technologies for the Preservation of Prehistoric and Historic Landscapes* is published by the Office of Technology Assessment, United States Congress. The report finds that the application of federal preservation laws to historic landscapes lags far behind similar efforts for historic structures and archeological sites.
- 1988** *NPS Management Policies* identifies cultural landscapes as a type of cultural resource in the national park system. Policy mandates the recognition and protection of significant historic, archeological, ethnographic, and design values.
- Historic Landscape Initiative is established in the NPS Washington Office to "develop and disseminate uniform standards relating to the allowable treatments of historic landscapes that meet the National Register criteria and to adopt these standards within the NPS and as guidance for federal, state, and local governments and the private sector."
- 1992** *The Secretary of the Interior's Standards for the Treatment of Historic Properties* is revised, expanding the language to include historic landscapes (the revised standards were codified in 1995 as 36 CFR 68).
- Cultural Landscapes Inventory initiative begins with design development and testing of an inventory methodology for all cultural landscapes in the national park system.
- 1994** *Cultural Resource Management Guideline, NPS-28, Release No. 4*, is prepared and includes an entire chapter titled "Cultural Landscape Management." The chapter contains a new definition and outline for the Cultural Landscape Report.
- 1995** *Preservation Brief 36: Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes* is published. The brief provides a step-by-step process for preserving historic designed and vernacular landscapes.
- 1996** *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* is published to assist in applying the standards to all project work involving the treatment of cultural landscapes.
- 1997** Cultural Landscapes Inventory is implemented Servicewide.
- 1998** *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques* is published, providing procedural and practical information related to preparing a CLR.
- Fourteen *Landscape Lines* are published, introducing a new series of technical publications related to cultural landscape management.
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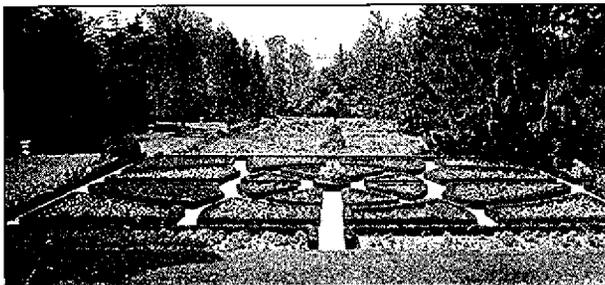
## CULTURAL LANDSCAPE DEFINITIONS

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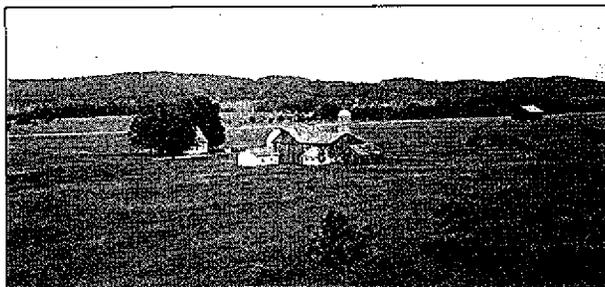
**Cultural landscape:** a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or that exhibit other cultural or aesthetic values. There are four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.



**Historic site:** a landscape significant for its association with a historic event, activity, or person.



**Historic designed landscape:** a landscape significant as a design or work of art; was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner or other amateur according to a recognized style or tradition; has a historical association with a significant person, trend, or movement in landscape gardening or architecture, or a significant relationship to the theory or practice of landscape architecture.



**Historic vernacular landscape:** a landscape whose use, construction, or physical layout reflects endemic traditions, customs, beliefs, or values; expresses cultural values, social behavior, and individual actions over time; is manifested in physical features and materials and their interrelationships, including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. It is a landscape whose physical, biological, and cultural features reflect the customs and everyday lives of people.



**Ethnographic landscape:** a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, such as the Martin Luther King, Jr. National Historic Site; New Orleans neighborhoods; the Timbisha Shoshone community at Death Valley; and massive geological formations, such as Devil's Tower. Small plant communities, animals, subsistence grounds, and ceremonial grounds are included.

*Photos from top to bottom: William Howard Taft's home, William Howard Taft National Historic Site. (NPS, 1868) The Box Garden from the upper terrace Hampton National Historic Site, published in "House & Garden," vol. 3, January, 1903. Klett Farm, Sleeping Bear Dunes National Lakeshore. (John McWilliams, HABS, NPS, 1990) Canyon de Chelly, Canyon de Chelly National Monument. (Photograph courtesy of Russell Bodnar, 1988)*

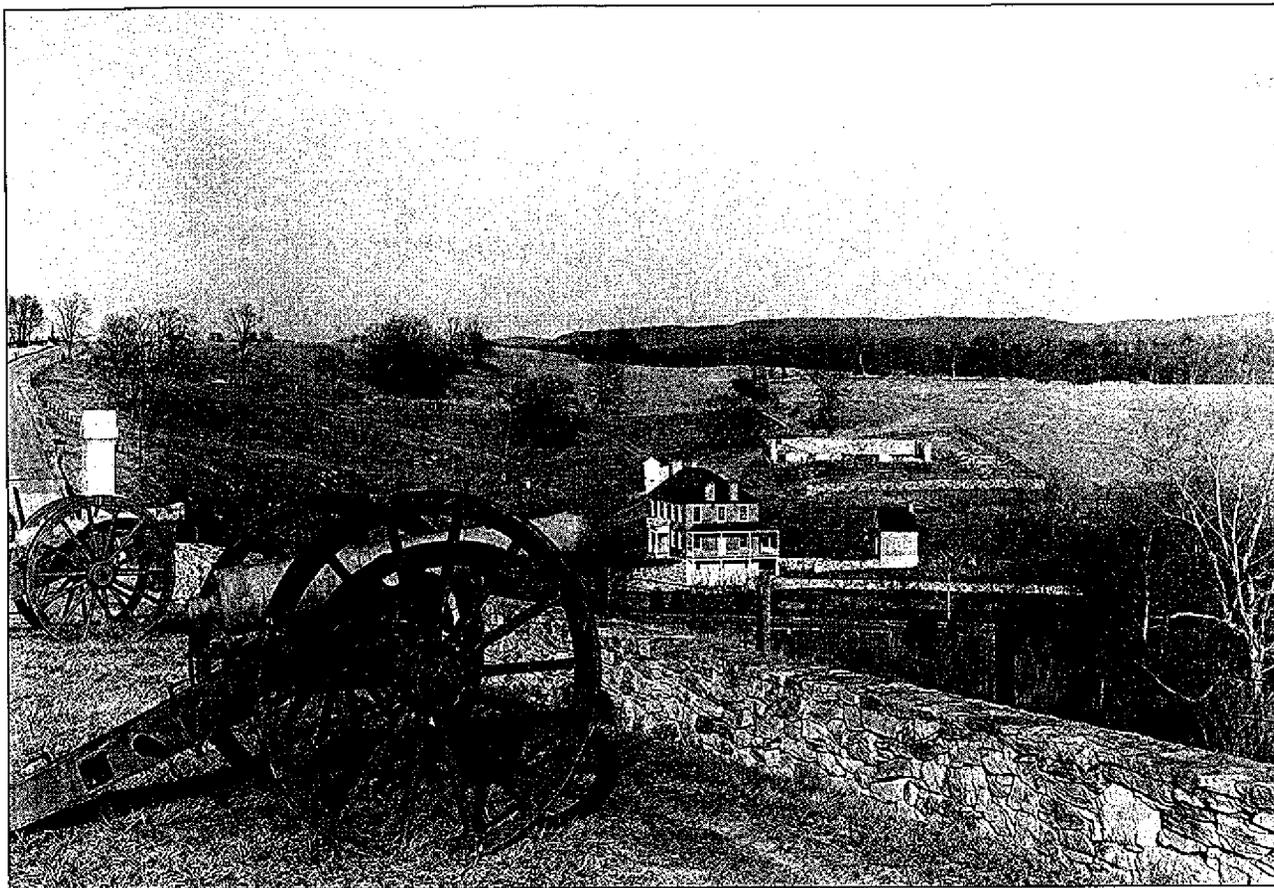
## HISTORY OF CULTURAL LANDSCAPE RESEARCH IN THE NATIONAL PARK SERVICE

**D**uring the past 50 years, research has addressed the full array of cultural landscapes in the national park system. A review of the reports containing this research reveals changing perceptions of cultural landscapes and different approaches to the research, inventory, documentation, analysis and evaluation, and treatment of these resources. As a result, the purpose, content, and format of reports has evolved. The following sections describe the major changes that have occurred during this evolution.

### EARLY REPORTS: THE FOCUS ON HISTORICAL FEATURES

Before the 1960s, research dealt primarily with historic sites and emphasized the grounds associated with historic structures. The structures were the primary interest. The landscape information contained in these reports was particularly concerned with associative values, such as troop movements. Rarely did reports deal with landscape characteristics, such as land use, spatial organization, and vegetation. Some early reports were limited to a narrative documentation of the historical base map for a park, describing the primary source material from which the base map was produced.

Early reports, addressing landscape resources, were single-discipline research projects that tended to concentrate almost exclusively on historical documentation. (See Figure 5.) They were prepared primarily by historians and based solely on research of primary sources, such as ledgers, journals, diaries, order books, historic photographs, and sketches. In most cases, these reports included some evaluation of the research, such as conclusions about the appearance of a landscape at a



*Figure 5. Antietam and other battlefield sites were the focus of early landscape research and documentation. Photo of Sherrick Farm, Antietam National Battlefield. (Jack Boucher, HABS, NPS, 1992)*

specific date or within a historical period, and a historical base map. However, in some instances, reports only contained relevant landscape references noted in chronological order with no discussion or analysis. Early reports frequently served two purposes, providing both a record of the cultural landscape and a source of interpretive material, and much of the research focused on architectural and social history.

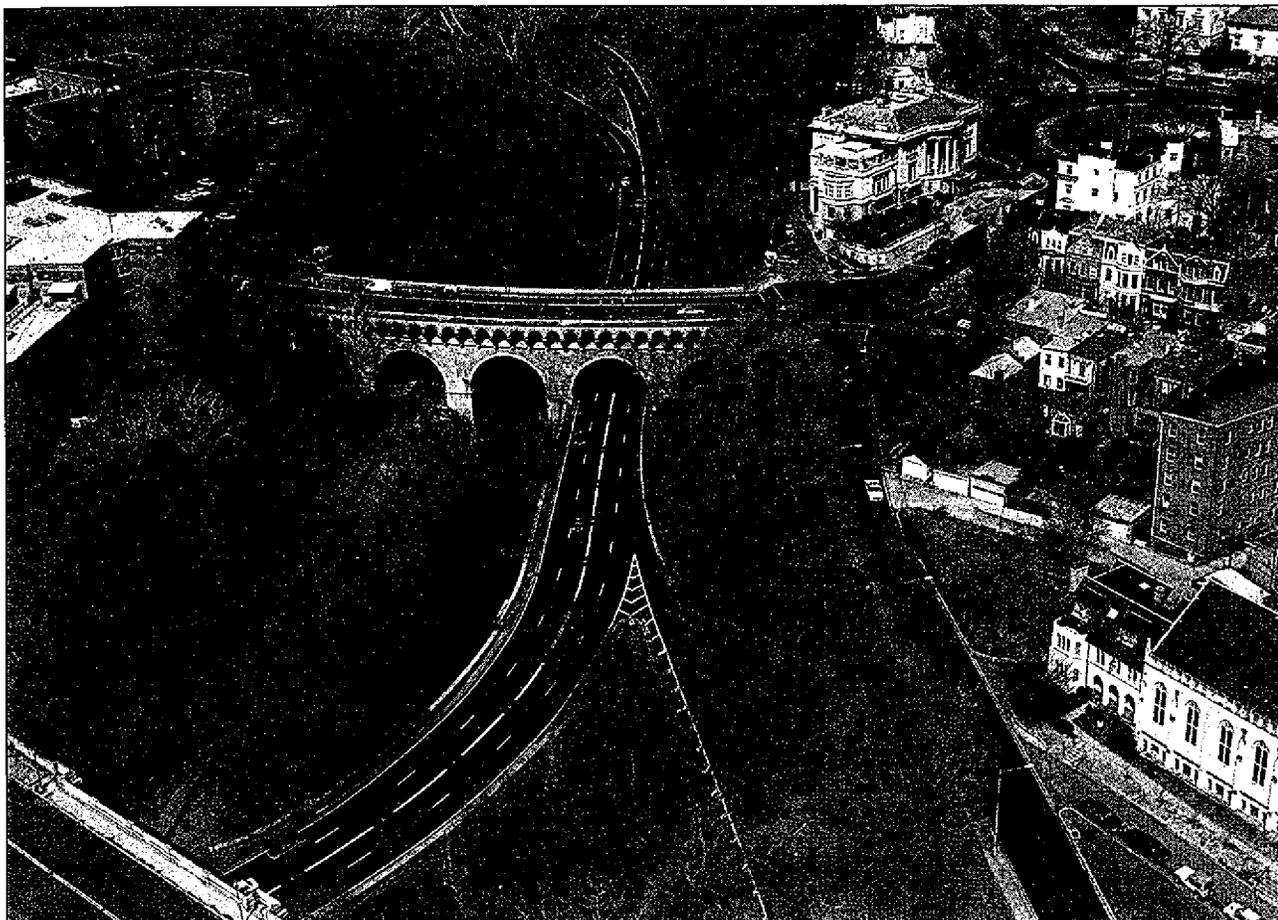
## EXPANDING THE PURPOSE AND SCOPE OF RESEARCH

With an increase in the understanding about the complexity of cultural landscapes, the scope of research expanded from historical documentation to a review of the archeological record for a site and a detailed physical investigation of the existing landscape.

Based on the expanded scope, recent reports generally are the result of a multidisciplinary effort, involving a historical landscape architect who serves as the project manager, working with a historian, archeologist, historical architect, and ethnographer, as needed. While research of historical documentation remains important, few of the reports compiled since the late 1980s rely solely on primary sources. Equal consideration is given to recording and “reading” the landscape “on the ground.” This involves a detailed field survey to document landscape characteristics and associated features, such as site boundaries, cluster arrangements, circulation systems, and views and vistas. The field survey has become an essential tool for understanding a cultural landscape.

Since 1987, the National Register program has produced several publications addressing the documentation and evaluation of cultural landscapes, such as rural historic landscapes, cemeteries, and mining landscapes. The publications provide a framework for applying the National Register criteria for significance and integrity to landscape resources. This type of evaluation is included in recent reports, where prior research efforts did not evaluate cultural landscapes within this context.

Recognizing the diversity of cultural landscapes, research addresses more landscape resources, including those with designed, vernacular, and ethnographic value. (See Figure 6.) Recent reports have focused on identifying the landscape characteristics and associated features, materials, and qualities, and analyzing and evaluating these attributes in relation to development and evolution of the landscape. Based on this information, recent reports include recommendations for treatment of landscapes. (See Figure 7.)



*Figure 6. Rock Creek Parkway is a designed landscape in the District of Columbia. Rock Creek Park. (Jack Boucher, HABS, NPS, 1992)*

## EXTENDING THE CONTENT OF REPORTS

One of the most noticeable changes in the reports is the breadth of information they contain. The increased understanding and involvement of researchers from multiple disciplines has led to the inclusion of substantive analysis, evaluation, and discussion of the information presented in a CLR. Recent reports involve research, inventory, documentation, analysis, and evaluation of both historical data and existing landscape conditions. The historical data often is organized into significant periods, with period plans (historical base maps) produced for each era. Historic and contemporary landscape base maps are often produced to identify and evaluate the integrity of landscape characteristics and associated features.



### Inclusion of Treatment Recommendations

Because early reports were research projects involving a single discipline and minimal field investigation, they rarely included treatment recommendations. Although early reports proposed restoring, reviving, recreating, or reconstructing a historic scene, very little discussion of treatment was provided. Reports often included a specific date for restoration work. Since most of the landscapes addressed were associated with structures that had been, or were in the process of being restored to a particular period, the decisions regarding the landscape were driven by the desire to represent the historic scene at a predetermined date. In some instances this resulted in reconstruction of the period landscape.

In contrast, reports completed since the mid-1980s provide an understanding of the landscape characteristics and associated features of a cultural landscape as they relate to each other and to the significant

*Figure 7. Overview of Boxley Valley farmlands. Boxley Valley served as the case study for "Cultural Landscapes: Rural Historic Districts in the National Park System," one of the earliest studies providing inventory, evaluation, and management guidelines for cultural landscapes. Buffalo National River. (NPS, 1990)*

events, trends, and people discovered through the collection, analysis, and evaluation of documentary and field data. Based on this information, a period(s) of significance is defined for a landscape in its entirety. Treatment recommendations are presented in a treatment plan or narrative guideline. In proposing treatment, *The Secretary of the Interior's Standards for the Treatment of Historic Properties* is used as the basis for evaluating proposed interventions in a landscape.

## DEFINING THE PURPOSE, CONTENT, AND FORMAT OF REPORTS

The format of early reports varied greatly depending on their purpose and scope. These reports included Historic Grounds Reports, landscape sections within Historic Structures Reports, documentation of historical base maps, Historic Ground Cover Reports, and special site/garden histories. In 1981, cultural landscapes were initially recognized as a distinct resource type in the second release of the *Cultural Resources Management Guideline, NPS-28*. At that time, the guideline identified the Historic Grounds Report as a special resource study, but no definition or outline for the document was provided.

In 1984, *Cultural Landscapes: Rural Historic Districts in the National Park System*, identified and defined for the first time the content and purpose of a CLR. This information was incorporated into *NPS-28* the following year. Since then, numerous reports have been prepared for cultural landscapes in the system, including the Cultural Landscape Report, Historic Landscape Report, Cultural Landscape Recommendations, and the Landscape Management Plan. As the titles suggest, these reports vary in purpose, format, and content. The variation is due to the lack of baseline information on cultural landscapes and the need to address a particular research, planning, or treatment issue.

The proliferation of study types resulted in confusion about what was needed to guide treatment and management decisions for a cultural landscape. The need to standardize these reports was viewed as fundamental to adequately incorporating cultural landscape research into a comprehensive park resources management program. The need also existed to outline requirements for professional adequacy. As a result, the purpose, use, and content of the CLR was reevaluated and redefined in the development of the *Cultural Resource Management Guideline*, Release No. 4, in 1994.

The recognition of cultural landscapes as significant cultural resources in their own right, and not simply for their associative qualities as the setting for a structure or scene of an event, has resulted in a greater degree of rigor by which landscape resources are managed. The evolution of the purpose, content, and format of a CLR has paralleled the increased understanding of these resources. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix B: Cultural Landscape Bibliographies.")

## USE OF CULTURAL LANDSCAPE REPORTS IN PARK MANAGEMENT

Cultural Landscape Reports (CLRs) play a significant role in park management. In park planning and design, a CLR may be required to provide information about a landscape's significance, characteristics, and features. In cultural and natural resource management, a CLR provides detailed, site-specific information that can supplement other resource management documents and describe the relationship between natural and cultural resources in a particular landscape.

### USE OF CLRS IN PARK PLANNING AND DESIGN

A special relationship exists between cultural landscapes and the planning and design process for a national park. Cultural landscapes often share the same boundary as the park itself—as in the case of many historic sites—or are discrete portions of a park. Planning for development within a cultural landscape often requires a CLR to contain specific information about the landscape's significance, characteristics, and features. The information is often needed to ensure that decisions made through the planning process do not have a negative effect on the character of a landscape.

In response to the goals of the Vail Agenda related to the National Park Service (NPS) management planning process, Special Directive 96-1, *Tables for Planning: Linking Resources Management Studies and Data to Park Planning* was issued in 1996. This document identifies the information needed to support park planning by linking studies and adequate data requirements, such as the Cultural Landscapes Inventory (CLI) and CLR, to planning documents. (See the insert titled, "Linking Cultural Landscape Data to Park Planning and Management" on the following page.)

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## LINKING CULTURAL LANDSCAPE DATA TO PARK PLANNING AND MANAGEMENT

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<b>Planning Document</b>	<b>Information Needed</b>	<b>Source</b>
Special Resource Study (New Area Study), Suitability/ Feasibility Study, and Boundary Study	Kinds of known (or expected) cultural resources and their general distribution and significance, relevant historic contexts, and important gaps in extant survey information	National Register of Historic Places files, other existing inventories and assessments, and relevant literature including Federal, state, and local sources for data on archeological resources, cultural landscapes, historic sites, and structures
Statement for Management	Location, historical development, landscape characteristics and associated features, and management of cultural landscapes in the park	Cultural Landscapes Inventory, if available
General Management Plan	Location, historical development, landscape characteristics and associated features, and management of cultural landscapes in the park	Cultural Landscapes Inventory
Site Development Plan	Physical evolution, key developments, physical relationships, patterns, and features of a cultural landscape; accurate site map; inventory, documentation, and condition assessment of landscape characteristics and associated features	Cultural Landscape Report, Part 1: Site History, Existing Conditions, and Analysis and Evaluation
	Appropriate treatment and use of a cultural landscape	Cultural Landscape Report, Part 2: Treatment (may be prepared in conjunction with an SDP that corresponds to boundary of a cultural landscape and includes schematic design)
Interpretive Perspectives	Summary of prehistory and history of the park and environs and what visitors should understand about it; which cultural resources can best interpret this history and prehistory; and what information is confidential and should not be released to the public	Historic Resource Study; cultural resources maps, National Register multiple properties and other National Register documentation; NPS and non-NPS cultural resources overviews; Resource Management Plan
Land Protection Plan	Physical evolution, key developments, physical relationships, patterns, and features of a cultural landscape; accurate site map; inventory, documentation, and condition assessment of landscape characteristics and associated features	Cultural Landscape Report, Part 1: Site History, Existing Conditions, and Analysis and Evaluation
Design and Treatment Plan	Appropriate treatment and use of a cultural landscape	Cultural Landscape Report, Part 2: Treatment

The following sections explain the relationship of two planning documents, the General Management Plan and the Site Development Plan, to the CLR.

### **General Management Plan**

The General Management Plan (GMP) sets forth the basic strategy for managing park resources, visitor use, and interpretation. Basic resource information (such as inventories) is needed to outline strategies for preserving both natural and cultural resources. The Historic Resource Study (HRS) provides a historical context for all cultural resources within a park, including cultural landscapes. More specific cultural landscape information is provided in the CLI, which includes information on the location, historical development, and management of a landscape. Ideally, the CLI is completed before any major planning effort is begun, and generally is considered to provide an adequate level of information for a GMP effort.

By definition, the GMP is the primary vehicle for determining the general treatment of all cultural resources in a park. However, many GMPs do not specifically address the treatment of cultural landscapes. As a result, treatment may be decided within the context of a Site Development Plan.

### **Site Development Plan**

The most direct relationship of a CLR to the NPS planning process occurs with the preparation of a Site Development Plan (SDP). An SDP is prepared after the GMP to implement the proposed actions. The SDP addresses visitor use and interpretation of the landscape, along with compliance and public review associated with the proposed actions. It is the intermediate step between the GMP and comprehensive design.

In comparison, a CLR is prepared to guide park management decisions regarding treatment and use. A CLR focuses on preserving the significant landscape characteristics and associated features and ensures that the treatment complies with *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Both documents may include schematic designs for treatment based on a landscape's significance, condition, and planned use.

Before preparing an SDP for a cultural landscape, or portion of it, consideration should be given to the way in which significant landscape values are addressed, and the role a CLR plays in providing information for the planning process. When the scope of an SDP corresponds to the boundary of a cultural landscape and results in changes to the landscape, Part 1, titled "Site History, Existing Conditions, and Analysis and Evaluation," and Part 2, titled "Treatment," of a CLR are prepared together with an SDP. (The documents may be combined into a CLR/SDP). Therefore, Parts 1 and 2 are completed prior to the preliminary and comprehensive designs. A historical landscape architect should oversee both the preliminary and comprehensive designs. (See Figure 8.)

In some cases, the site addressed in an SDP represents only a portion of the cultural landscape or may result in indirect effects to the landscape (such as development on adjacent lands). In these instances, preparing the CLR in conjunction with the SDP may not be necessary. However, the team preparing the SDP should include a historical landscape architect to assess the significance of the landscape and assist in minimizing the effect of development on the resource.



## **USE OF CLRS IN CULTURAL RESOURCE MANAGEMENT**

Cultural landscape research builds a better understanding of the relationship between cultural and natural resources in a park. A CLR can, therefore, provide a general framework for resource management. Cultural landscapes often include other cultural resources, such as archaeological sites, historic structures, and ethnographic resources, so site-specific information about these resources is part of the CLR documentation process. Within the context of cultural resource management studies, a CLR is most directly related to the Historic Resource Study, Cultural Landscapes Inventory, the Historic Structure Report, and the Ethnographic Landscape Study, which are described in the following sections.

### **Historic Resource Study and Cultural Landscapes Inventory**

The initial identification of cultural landscapes in a park occurs in a Historic Resource Study (HRS) and the CLI. The HRS provides a historical context for all cultural resources within a park, including cultural landscapes, and entails the preparation of National Register nominations for all eligible properties. The CLI identifies the cultural landscapes in a park and provides information on their location, historical development, landscape characteristics and associated features, and management. (See Figure 9.)

The HRS and CLI support one another. The HRS provides a context that is often necessary to determine the relative significance of cultural landscapes in a park, while the CLI provides a basic inventory of the landscape resources to assist in defining the contexts and resources to be included in the HRS. The level of detail provided in an HRS will vary depending upon the complexity of a park. For example, an HRS for Saint-Gaudens National Historic Site would provide much more detail

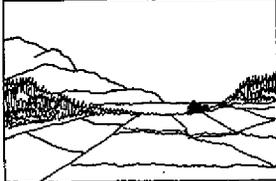
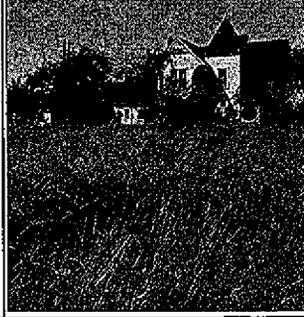
	<b>EBEY'S LANDING NATIONAL HISTORICAL RESERVE</b>		<b>PNRO INVENTORY</b>		National Park Service Pacific Northwest Region Cultural Resources Division	Westin Building, Room 1920 2001 Sixth Avenue Seattle, Washington 98121	
	SITE ID: N. SEC 4, T. 51 N., R. 1 E.		QUAD NAME: COUPEVILLE		FILM UNITS: LA 13-26, 31 LA 41-21, 22, 24, 27		
SOURCES: <input checked="" type="checkbox"/> USGS <input checked="" type="checkbox"/> FIELD OBSERVATION <input checked="" type="checkbox"/> AIR PHOTOS <input type="checkbox"/> OTHER		DATE: SEPT. 1983		INVENTORIED BY: GILBERT/SCENA			
DESCRIPTION This half section in the northern portion of Ebey's Prairie and includes the commercial part of Coupeville known as Prairie Center. Primary access is along Engle and Terry roads which intersect in Prairie Center and along Cook Road which runs northwest across the prairie. Pasture lands and croplands surround the commercial district with higher residential densities clustered within the Coupeville city limits.							
<b>LANDUSE CATEGORY</b>		<b>LANDUSE ACTIVITY</b>			<b>BOUNDARY DEMARCATION</b>		
	< 10	10-35	35-60	60-75	75-100		
% AGRICULTURE						TOPOGRAPHIC: EDGE OF RIDGE IN NW DIVIDES UPLANDS FROM PRAIRIE	
% RANCHING						VEGETATIVE: SMALL WETLAND EAST OF CITY LIMITS	
% NATURAL VEGETATION						ROAD: TERRY ROAD, ENGLE ROAD, COOK RD.	
% RESIDENTIAL						FENCE: WOOD POST AND WIRE IN PASTURE AND ALONG PROPERTY LINES	
% COMMERCIAL						WATER:	
% PARK						OTHER: COUPEVILLE CITY LIMITS	
		CROPLAND: <input checked="" type="checkbox"/> ROTATING <input type="checkbox"/> PERMANENT					
		PASTURE: <input checked="" type="checkbox"/> GRAZING <input type="checkbox"/> HOLDING					
		<input type="checkbox"/> FOREST <input type="checkbox"/> GRASSLAND <input type="checkbox"/> WETLAND					
		DWELLINGS: <input checked="" type="checkbox"/> MULTIPLE <input checked="" type="checkbox"/> SINGLE					
		<input checked="" type="checkbox"/> TOWN <input type="checkbox"/> SINGLE BUILDING <input checked="" type="checkbox"/> GROUP					
		RECREATION:					
NOTES: PRAIRIE CENTER COMMERCIAL DISTRICT							
DESCRIPTION: 		DESCRIPTION: 		DESCRIPTION: 		DESCRIPTION: 	
							

Figure 9. The Cultural Landscapes Inventory, which precedes a CLR, provides baseline information on the significance and physical character of a landscape. This is an example of an early inventory format used to document cultural landscape resources. Ebey's Landing National Historical Reserve. (NPS, 1983)

on the significance and character of the landscape than an HRS for Olympic National Park would provide on back country homesteads within the Elwha River Drainage.

The baseline documentation provided in the HRS (including National Register nominations) and CLI should be available at the time a CLR is undertaken. However, depending on the scope of the HRS, certain information about the landscape may be inadequate or nonexistent. In these cases, the information provided in the CLI and CLR can be used to revise or amend the HRS or National Register nomination.

Ideally, a CLI should precede the preparation of a CLR or other research on the cultural landscape. A completed CLI provides information about the significance and historic character of a particular landscape and identifies other research needs. Conversely, the information collected in a CLR can serve to update and expand the CLI as needed.

### Historic Structure Report

Historic structures are a characteristic of many landscapes. The research, analysis, evaluation, and treatment for historic structures is the same as that for cultural landscapes. The primary guide to treatment and use of historic structures is the Historic Structure Report (HSR). The purpose, content, and use of the report parallels that of a CLR. Treatment and use of historic structures can directly affect a landscape. For example, in establishing the period of restoration for a building, the entire property should be evaluated to establish a common period of significance for treatment and management. (See Figure 10.)

*Figure 10. The treatment of historic structures should not be undertaken prior to documentation and assessment of a cultural landscape. Treatment of many historic structures along Auburn Avenue in Martin Luther King, Jr. National Historic Site was undertaken based solely on Historic Structure Reports. A CLR prepared in 1995 provided contextual information on the landscape and revealed the significance of later additions to the structures, prompting reconsideration of prior treatment decisions. Martin Luther King, Jr. National Historic Site. (NPS, 1994)*



Appropriate sequencing of research associated with cultural landscapes and historic structures ensures that critical decisions are not made in isolation from one another. In general, a CLR should be prepared prior to or in conjunction with the HSR. Decisions about the sequencing of research are based on the scope of work, level of investigation, and management objectives of a given project.

### **Ethnographic Landscape Study**

Ethnographic landscapes are one of the four general types of cultural landscapes. (See the insert titled, "Cultural Landscape Definitions" earlier in this guide.) Many cultural landscapes have ethnographic value to associated communities. The ethnographic significance of a landscape may be documented in a CLR or an Ethnographic Landscape Study (ELS). (See Figure 11.)

CLRs focus on landscapes that are listed in or eligible for the National Register, and document the landscape characteristics and associated features, values, and associations that make the landscape historically significant (according to National Register criteria). An ELS addresses



*Figure 11. Native American and Hispanic petroglyphs stretch 17 miles along Albuquerque's West Mesa escarpment. The escarpment is listed on the National Register based on its archeological significance. An Ethnographic Landscape Study is being conducted to understand the meaning of the escarpment and the surrounding landscape to all associated communities. Petroglyph National Monument. (Photo courtesy of Peggy Nelson, 1994.)*

landscapes that may or may not be eligible for the National Register and documents the names, locations, distributions, and meanings of landscape features from the perspective of the associated communities.

To document and identify the ethnographic significance of a cultural landscape in a CLR, a cultural anthropologist should be part of the multidisciplinary team. Additionally, treatment and use decisions in a CLR should be made in consultation with the associated communities. Landscapes primarily significant for their ethnographic value should be documented by conducting an ELS; however, a historical landscape architect may be involved in their documentation and treatment.

## USE OF CLRS IN NATURAL RESOURCE MANAGEMENT

Virtually all cultural landscapes are influenced by and depend on natural resources and processes. Therefore, as the primary guide for managing the cultural landscape, a CLR addresses the dynamics inherent in natural processes and systems, as well as the relationship between natural and cultural resources in a particular landscape. The site history, existing conditions, analysis and evaluation, and treatment sections of a CLR generally contain information related to a variety of natural resource concerns and issues. As a result, a CLR can directly affect vegetation management, ecosystem restoration, integrated pest management, grazing practices, wetland management, and biotic diversity.

In evaluating cultural and natural resource values, conflicts may arise that make it necessary to establish priorities based on the significance of the resources. (See Figure 12.) The treatment section in a CLR addresses any potential conflicts and ensures that all values are integrated into the recommendations for treatment. Management decisions should not be limited to preserving one resource value at the expense of another. In



Figure 12. Beginning in the early 1900s, Mirror Lake in Yosemite National Park was dredged to retain its reflective character. Management has considered suspending dredging to allow the natural processes to occur. The historic character of the lake contributes to the cultural significance of landscape, therefore, this decision would threaten its historic integrity. Yosemite National Park. (NPS, 1865)

some cases, certain values take precedence in the landscape (such as the retention of exotic vegetation in a designed landscape, and the protection of an area associated with endangered species). In all cases, natural resource specialists should be involved in defining the treatment of natural systems, such as large scale vegetation restoration projects, to provide the necessary expertise. For example, a CLR may recommend reestablishing native grasses in a portion of a large vernacular landscape. A natural resource professional on the CLR team provides preliminary objectives and techniques for implementing the treatment. Subsequently, depending on the complexity of the project, it may be appropriate to prepare a Vegetation Management Plan (as outlined in the *Natural Resource Management Guideline, NPS-77*) to provide a more comprehensive approach.

Research regarding cultural and natural resources is coordinated to avoid contradictions in management recommendations. A CLR identifies general treatment and establishes preservation goals based on the significance, integrity, and use of the landscape. These goals provide the framework for natural resource management of the landscape (for example, establishing the limits of pesticide use for integrated pest management). Management plans (such as vegetation, grazing, fire) therefore serve as tools for preserving and perpetuating the significant characteristics and features of the landscape identified in the CLR.

# Preparing a Cultural Landscape Report

## OVERVIEW OF CONTENT AND FORMAT

The contents and format of a Cultural Landscape Report (CLR) reflect the development of cultural landscape research during the past several years. The contents and format follow National Park Service (NPS) guidelines and are relatively standard, but the document is flexible to allow for a wide range of cultural landscapes and different management objectives.

The CLR has three primary parts:

- Part 1: Site History, Existing Conditions, and Analysis and Evaluation
- Part 2: Treatment
- Part 3: Record of Treatment

In addition to these, a CLR includes an introduction, one or more appendices, a bibliography, and an index. (See the insert titled, "Model Outline for a Cultural Landscape Report" on the following page.)

The three main parts should be completed sequentially. It is important to note, however, that information and findings acquired while completing a later section of the document may result in revisions to an earlier section. For example, findings from the analysis and evaluation of a landscape may identify the location of a lost feature, such as a pathway, which was not clearly documented in the site history or existing conditions. The site history may be prepared concurrently with the documentation of existing conditions so that both sections benefit from the findings of the multidisciplinary investigations.

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## MODEL OUTLINE FOR A CULTURAL LANDSCAPE REPORT

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### Table of Contents

### INTRODUCTION

This section includes: a management summary describing the purpose of the project; a historical overview that provides a brief historical context for the landscape; a description of the scope of the project and methodology for completing it; a description of study boundaries; a summary of findings.

### PART 1: SITE HISTORY, EXISTING CONDITIONS, ANALYSIS & EVALUATION

**Site History** gives a historical description of the landscape and all significant characteristics and features. The text is based on research and historical documentation, with enough support material to illustrate the physical character, attributes, features, and materials that contribute to the significance of the landscape. This section identifies and describes the historical context and the period or periods of significance associated with the landscape.

**Existing Conditions** describes the landscape as it currently exists, including the documentation of such landscape characteristics as land use, vegetation, circulation, and structures. It is based on both site research and site surveys, including on-the-ground observation and documentation of significant features. Contemporary site functions, visitor services, and natural resources are described to the extent that they contribute to or influence treatment.

**Analysis and Evaluation** compares findings from the site history and existing conditions to identify the significance of landscape characteristics and features in the context of the landscape as a whole. Historic integrity is evaluated to determine if the characteristics and features that defined the landscape during the historic period are present. A statement of significance

for the landscape is included, and the analysis and evaluation may be summarized in the identification of character areas, or the development of management zones.

### PART 2: TREATMENT

This section describes the preservation strategy for long-term management of the cultural landscape based on its significance, existing condition, and use. It also includes a discussion of overall management objectives for the site as documented in planning studies or other management documents. The treatment section may address the entire landscape, a portion of the landscape, or a specific feature within it. Treatment is described in a narrative text, treatment plan, and/or design alternatives.

### PART 3: RECORD OF TREATMENT

This section summarizes the intent of the work, the way in which the work was approached and accomplished, the time required to do the work, and the cost of the work. This section also contains copies of the field reports, condition assessments, and contract summaries. Based on when the record of treatment generally is prepared and its content, this section usually is included as an appendix or addendum to a report.

### APPENDICES, BIBLIOGRAPHY, AND INDEX

The appendices contain supplemental drawings, illustrations, maps, photographs, technical information, or other supplemental support documentation. The bibliography lists the sources used in the preparation of the document. The index includes an alphabetized list of topics contained in the CLR.

## CLR INTRODUCTION

The first section of a CLR is the introduction. It provides the administrative context for a project. The introduction includes the following:

- Management Summary
- Historical Overview
- Scope of Work and Methodology
- Description of Study Boundaries
- Summary of Findings

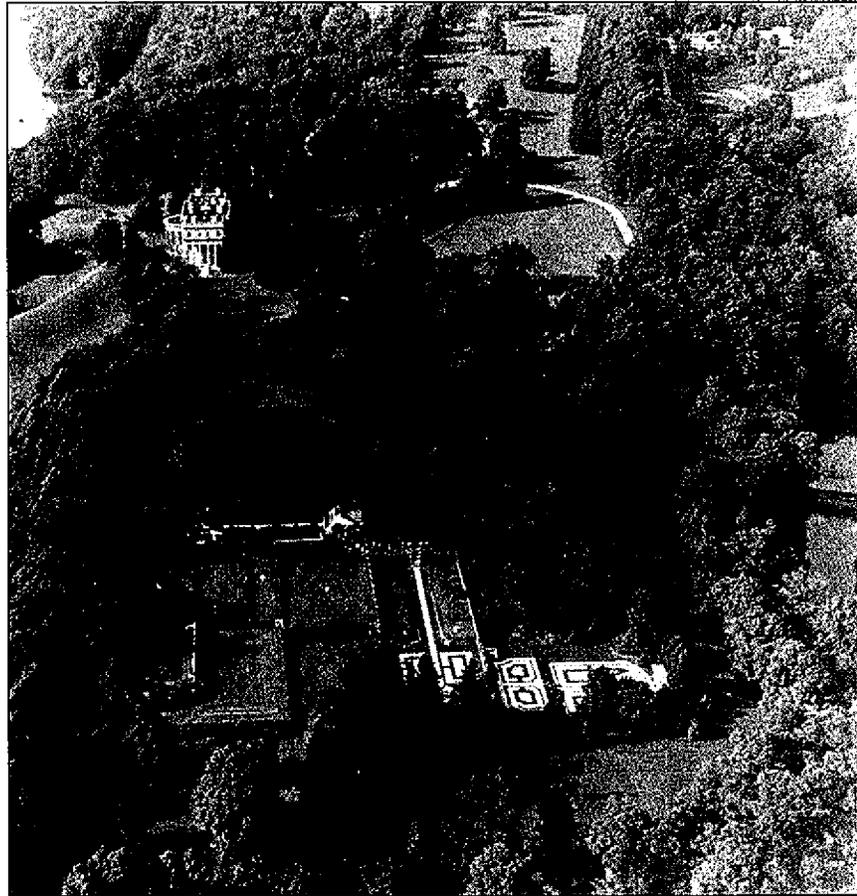
### MANAGEMENT SUMMARY

The management summary describes the purpose of the project. It includes a discussion of whether and how the existing planning and management documents identify issues that influence the project. For example, the management summary addresses any treatment decisions made for the landscape through prior park planning documents, such as a General Management Plan (GMP) or a Site Development Plan (SDP).

### HISTORICAL SUMMARY

The historical summary is an abbreviated physical history of the cultural landscape focusing on human interaction with and modifications to the natural landscape. The historical summary provides a historical context for the property. (See Figure 13.) Additionally, the relationship of the cultural landscape to specific historic contexts, National Register criteria, and periods of significance are summarized. The summary is usually prepared as a narrative.

Figure 13. The scope of work for the CLR for Vanderbilt Mansion National Historic Site, Volume 1, involved an exhaustive level of historical research and field analysis to reconstruct a detailed evolution of the landscape, establish a historic context, and evaluate the landscape's significance and integrity. Vanderbilt Mansion National Historic Site. (NPS, 1976)



## SCOPE OF WORK AND METHODOLOGY

The scope of work and methodology used to complete a CLR includes a concise description of the following:

- purpose of the project
- issue(s) to be addressed in the report
- level of investigation required to complete the work
- limitations defined in the project agreement
- process for conducting the work and the techniques used to complete it
- format for the report

(See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (nos. 18, 30, 38, 40, 41, and 42)," and *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 1: Project Agreement" and "Landscape Lines 2: Levels of Investigation.")

## DESCRIPTION OF STUDY BOUNDARIES

A description of study boundaries for the project defines the physical limits of the investigation as outlined in the project agreement. For most projects there are at least two physical boundaries that need to be defined. The first is the site boundary, defining the cultural landscape addressed in the report. This boundary is defined according to National Register guidelines and generally conforms to the boundary defined in the Cultural Landscapes Inventory (CLI) or National Register nomination. The boundary may conform to existing natural features, political jurisdictions, cultural elements, and if appropriate, to historic boundaries. Boundaries are described both in narrative form and graphically on a map or drawing. (See Figure 14.)

The second boundary to define is the regional context, locating the site in the larger landscape context as defined by a physiographic area or landscape system, such as a drainage or watershed, or political area, such as a state or region. Depending on the scale of the site, this can be represented as a location on a state map, a United States Geological Survey (USGS) map, or an aerial photograph illustrating the regional setting of the site. (See the insert titled, "Guidelines for Selecting Boundaries" later in this guide.)

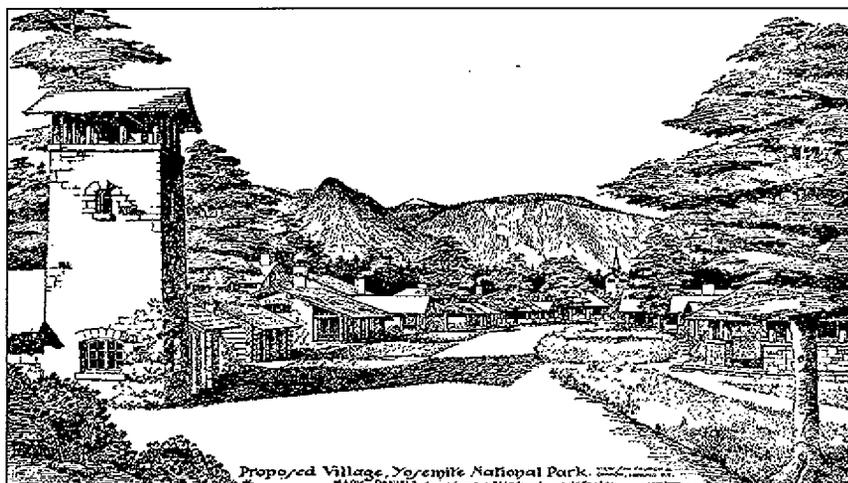


## CLR PART I: SITE HISTORY, EXISTING CONDITIONS, AND ANALYSIS AND EVALUATION

**P**art I provides documentation about and an evaluation of landscape characteristics and associated features, materials, and qualities that make a landscape eligible for the National Register. The site history, existing conditions, and analysis and evaluation sections identify the historical values associated with the landscape, document extant landscape characteristics and associated features, and define the significance and integrity of the landscape. All three sections of Part I must be completed before any treatment decisions for a landscape can be made.

### SITE HISTORY

The site history provides a description of the landscape through every historic period up to the present, and it identifies and describes the historic context and period(s) of significance associated with the landscape. The site history documents the physical development of the landscape, focusing on human interaction with, and modification to, the natural landscape. (See Figures 15 through 19.) It describes the physical



*Figure 15. The site history of Yosemite Valley includes this proposed village, which was never built, by Mark Daniels. Yosemite National Park. (NPS, c. 1914)*



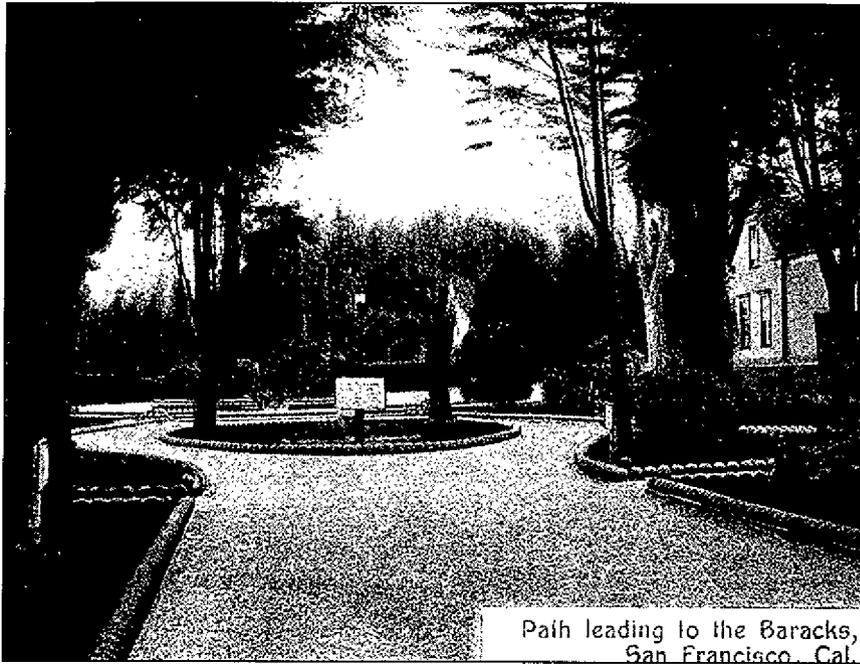


Figure 18. Period illustrations can assist in documenting the character of a landscape during distinct historic periods. For example, this postcard image illustrates the character of the Presidio in the late nineteenth century. Golden Gate National Recreation Area. (NPS, n.d.)

Path leading to the Baracks, San Francisco, Cal.

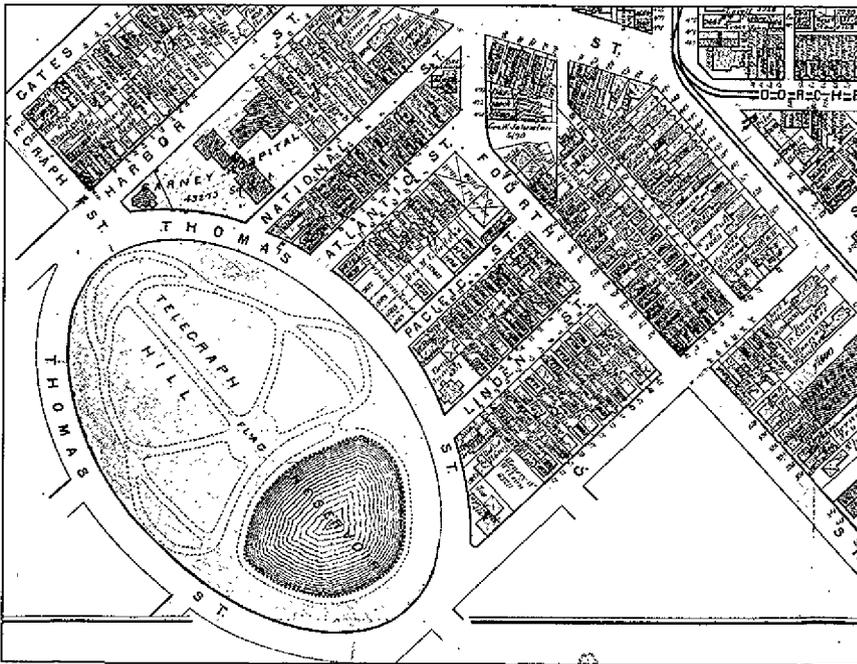


Figure 19. Historic surveys can assist in documenting the historic boundaries and conditions of a landscape. For example, G. M. Hopkins' Atlas of the County of Suffolk, Volume III, South Boston and Dorchester, Massachusetts, illustrates the nineteenth century boundary of Dorchester Heights-Thomas Park. (Image courtesy of the Society for the Preservation of New England Antiquities, 1874.)

character, attributes, features, and materials (the landscape characteristics and associated features) that contribute to the significance of the landscape. Other types of historical information, such as stylistic trends, social history, the history of technology, and cultural history are detailed in the report if they have a direct bearing on the physical development of the property. This is often the case with vernacular landscapes. The site history should include the experiences and stories of all individuals associated with the physical development and use of the landscape, including those who have traditionally been under-represented.

The type of cultural landscape often influences the type of research and history prepared for a CLR. For example, in a historic designed landscape, it is important that the site history discuss design intent, primary design principles, physical relationships, patterns, features, and important individuals or events that have influenced the design of the landscape. In a historic vernacular landscape, such as a mining district, it may be more important for the history to focus on the environment systems, transportation networks, technology, and legal aspects of claims and ownership.

Site histories are typically prepared by a historian or historical landscape architect. Depending on the character of the landscape, however, other professionals may be involved, such as cultural anthropologists, horticulturists, and historical architects. Site histories are prepared using appropriate research techniques and source materials.

Historical research involves the study, analysis, evaluation, and use of both primary and secondary source materials. Primary source materials include historic plans, photographs, newspapers, period literature, journals and other written records, oral histories, maps, tax records, drawings, and illustrations. These source materials are very useful for profiling the landscape's appearance through time. Secondary source materials include special studies, recent scholarship, reports, and cultural resource inventories. These are used to help establish the

historical and physical context within which a landscape developed. Oral histories from people directly associated with a cultural landscape can provide a subjective view of its history. Historical information about a landscape can also be collected by documenting changes in the type, location, and composition of ecological systems and vegetation. For example, on the Olympic Peninsula in Washington State, plant succession indicates how long a homestead has been abandoned; young alder and fir trees, along with bracken fern are good indicators that an area was once cleared or more open.

Two important steps in planning a CLR project are defining the scope of historical research and determining the appropriate research materials and sources for the particular cultural landscape. Historical information about the development and significance of the landscape may be adequately recorded in other sources, such as a Historic Resource Study, Historic Structure Report, or Archeological Overview. In this case, the site history section of a CLR consolidates the information from these sources and focuses on additional research related directly to the landscape or to a single feature in the landscape. If the history of the landscape has not been previously documented, research will need to include appropriate primary and secondary source materials as part of the investigation.

(See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix B: Cultural Landscape Bibliographies," "Appendix D: Preservation Briefs (no. 36)," and "Appendix E: Oral History Guidelines.")

### **Determining the Scope of the History**

The scope of the history is determined by three factors: management objectives, including the scope of the project and treatment; the complexity of the cultural landscape; and, the availability of relevant documents.

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## DOCUMENTATION SOURCES FOR LANDSCAPE RESEARCH

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### WRITTEN SOURCES

#### Published Secondary Sources

Published histories of the site, park guide books, biographies of owners and other key people.

#### Unpublished Secondary Sources

Research and seminar papers, theses, dissertations, and unpublished reports.

#### Diaries and Journals

Documentation by people who occupied the site at various periods, or recorded impressions as visitors. These are published or unpublished.

#### Landscape Design Journals, General Periodicals, and Catalogs

Useful for the early twentieth century and to some extent for the late nineteenth century. Examples are *Landscape Architecture*, *House Beautiful*, *Scribner's*.

#### Newspapers

Most newspapers are unindexed, and are best used when there are specific references and target dates for information.

#### Local Records

Consulted for any site that has ever been in state or municipal ownership. For any site that has been in private ownership, town or city tax records are helpful for dating structures on the site, and indicate improvements to the property such as orchards, croplands, or livestock.

#### Manuscript Collections

Correspondence, financial records, and diaries of owners or other people closely connected with the site.

#### Registry of Deeds

Map and plan files, or surveys bound with the deeds. These records are consulted if a complete historical title search has not been done. It may be important to know the earlier boundaries and uses of a site, even if not all of it is currently in NPS ownership.

#### Registry of Probate

The wills of previous owners are often useful. These may include surveys of the property and inventories of contents.

#### National Park Service Administrative Files

Available in the park archives, field area offices, Support offices, or National Archives and Records centers.

#### Plant Lists and Catalogs

Plant lists prepared in conjunction with planting plans by professional landscape firms may be available. Nursery catalogs are useful to identify plants commonly available in a specific year.

### RECORDS OF FIRMS

Records of architectural firms, landscape architectural firms, engineering firms, green house design and construction firms, and nurseries. These include written records, such as correspondence and plant lists, as well as plans and photographs. For well known, well published firms these records are easily located; for example, the Olmsted firm-Library of Congress and Frederick Law Olmsted National Historic Site. Others will require more searching. (See Computer Databases listed here under "Other Types of Repositories.") Many universities maintain collections associated with individual designers or firms. Examples include Beatrix Farrand-University of California, Berkeley; Charles Platt-Avery Architectural Library, Columbia University; Ellen Shipman-Cornell University.

### VISUAL SOURCES

#### Maps, Site Plans, and Surveys

The accuracy of maps of all kinds varies greatly. It is best to have maps from a number of sources. Sanborn maps (fire insurance maps) and real estate atlases, for example, were prepared in the late nineteenth and early twentieth centuries at frequent intervals for many cities, towns, and counties, especially in the northeast. These generally show the location of all buildings, including outbuildings, as well as interior drives, and sometimes include garden layouts. They do not show topography or vegetation.

#### Design Plans

Design plans by professional landscape architects and drawings by owners, and friends and relatives of owners.

#### Paintings, Prints, and Drawings

Especially important for earlier sites, with periods of significance that predate the use of photography (pre-1839). These are important also for later periods in conjunction with photographs.

#### Photographs

Historic photographs, including aerial photographs, if available, are one of the most important sources. More recent photographs are also very helpful.

**Films**

Professional films, commercial films, such as real estate films, and home movies.

**Videos**

May be available for very recent periods.

**ORAL HISTORIES**

Tapes and transcripts of interviews from previous owners; family members and relatives of owners; residents at the site, who were not owners; workers at the site, especially gardeners; landscape architects/designers if living, if not, their associates or descendants; members of the community; representatives of occupational, ethnic, and other social groups; people who have done earlier research on the property; and earlier NPS managers and employees.

**NATIONAL PARK SYSTEM REPOSITORIES****Park Libraries and Archives**

May include photographs and other park collections related to the landscape. Recent records, in particular maintenance files, may be useful.

**NPS Computer Databases**

A variety of computer databases have been developed to provide information on cultural landscapes in the national park system. Examples include the Cultural Landscapes Inventory, the List of Classified Structures, Cultural Resources Management Bibliography, and a variety of park natural resource inventories.

**Harpers Ferry Center Library and Photography Collection**

A collection of primary and secondary sources and photographs related to the national parks.

**Denver Service Center Technical Information Center**

A source for microfilm and hardcopies of NPS reports and drawings.

**OTHER TYPES OF REPOSITORIES****Computer Databases**

A variety of computer databases have been developed to provide information on cultural landscapes in the United States. Examples include The Catalog of Landscape

Records in the United States, which provides information on the location of historical landscape documentation, the NPS Pioneers of American Landscape Design, which provides information on the lives and work of the predecessors of contemporary landscape architecture, and the National Register Information System, which provides information on properties listed in the National Register of Historic Places.

**Libraries**

Most large libraries have print, drawing, and photograph collections. Most municipal libraries have local history rooms and collections, as well as local newspapers on microfilm. Libraries to investigate might include the Library of Congress; Smithsonian (Garden Club of America slide collection); presidential libraries; university libraries; state libraries; local town and city libraries; private libraries; libraries of agricultural societies; botanic gardens and horticultural societies; libraries of other federal agencies; and libraries of genealogical societies.

**National Archives**

Washington D.C. and regional record centers.

**Historical and Preservation Societies**

Collections vary but many local, county, state, and regional historical societies have large photograph and/or drawing collections.

**County Courthouses**

Registry of Deeds; Map Collections (usually within the Registry of Deeds); Registry of Probate.

**Museums and Galleries**

Paintings, drawings, and prints by recognized artists.

**Community Resources**

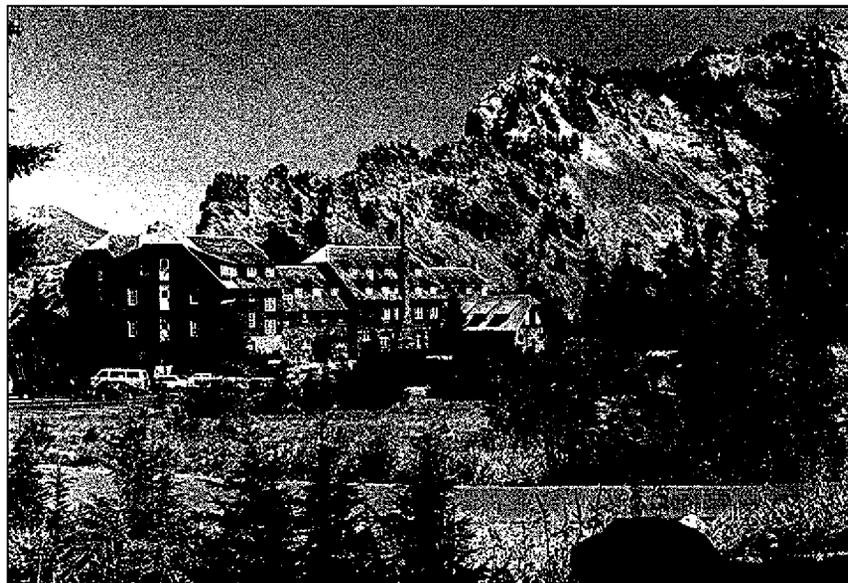
Libraries and societies, community leaders, citizens' and neighborhood groups.

**Archives of Landscape Architectural Firms, Architects, Engineers, and Nursery Companies**

Such as the archives at the Olmsted Firm, 1857-ca.1970, Frederick Law Olmsted National Historic Site, Brookline, Mass.

**Internet/World Wide Web**

*Figure 20. Rehabilitation of Rim Village at Crater Lake was proposed based on a series of park planning documents. A CLR was prepared to guide and direct treatment of significant landscape characteristics and associated features. Crater Lake National Park. (NPS, 1990)*



### *Management Objectives—Project Scope and Treatment*

The scope of research and level of detail required in a landscape history are determined by a CLR's management objectives and purpose. The scope of the history increases as the project scope and the extent of physical intervention planned for a landscape increases. For example, if a restoration or reconstruction is proposed, then a significant amount of detailed historical information is required to guide and direct treatment. (See Figure 20.) Without this information, the treatment cannot be implemented. Conversely, if the project scope is focused on one feature in the landscape, such as a hedge or a path, and the recommended treatment is preservation, then a comprehensive and detailed history of the entire landscape is not necessary.

### *Complexity of the Site*

Research efforts are also influenced by the complexity of a landscape in terms of physical character, age, and degree of change. For example, a rural historic district that is large in size, physically complex in terms of topography, vegetation, structures, and roads, and which also has multiple

periods of development, will require more time to research than a small homestead site with one period of significance and limited records. (See Figures 21 and 22.)

### *Availability of Source Materials*

The availability of source materials has a direct influence on the scope of historical research. If many sources are available, all materials must be reviewed and pertinent information extracted. If, on the other hand, few sources are known at the outset, part of the scoping for the history should include time to investigate potential repositories. In many cases, historical data directly related to a landscape is not readily available, making secondary sources the most important initial source material. This is especially true for many vernacular landscapes, such as back country homesteads or abandoned mining sites, where records may not have existed or were lost.

*Figure 21. Aerial view of Grant-Kohrs Ranch. The ranch is physically complex and includes approximately 1,500 acres with over 90 historic structures related to the cattle industry from 1860 to the 1930s. Grant-Kohrs Ranch National Historic Site. (NPS, c. 1970)*

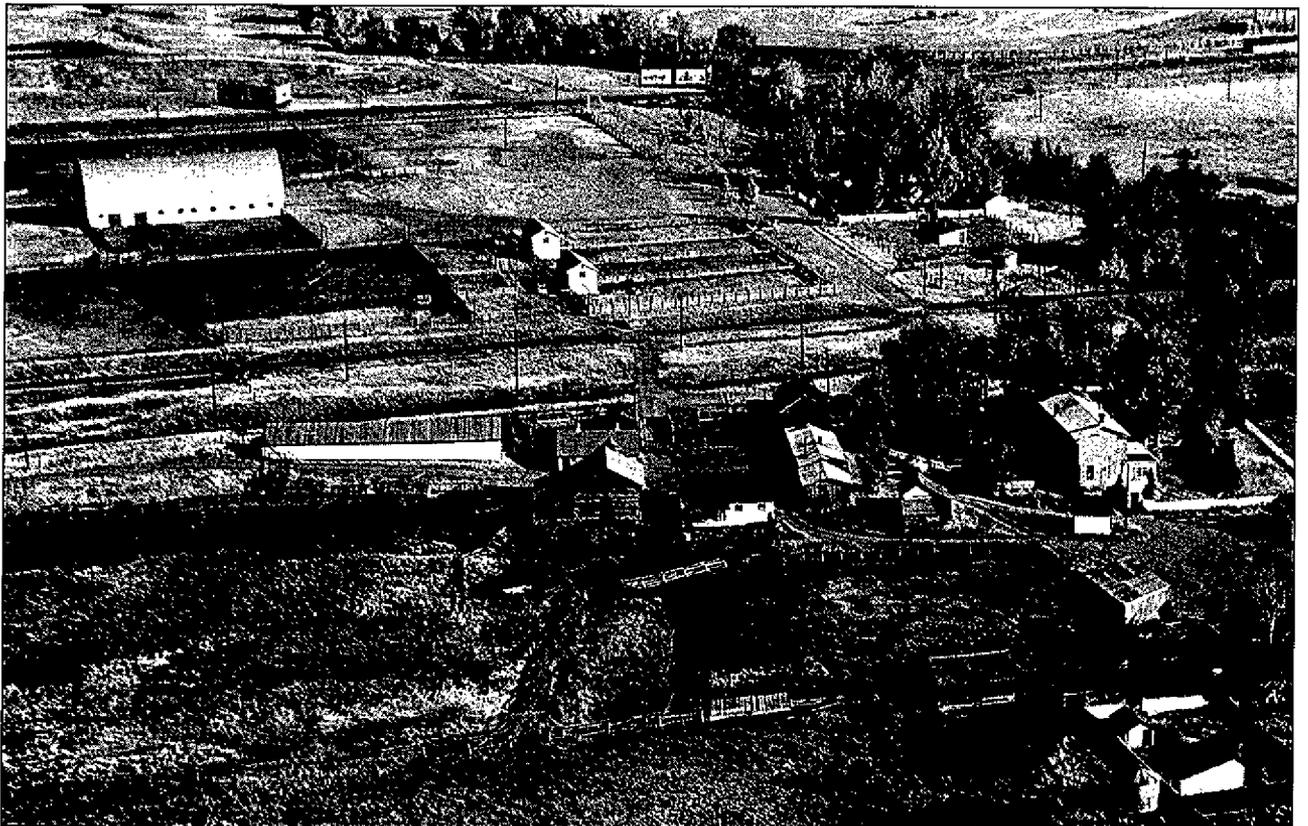


Figure 22. Home and west yard of Harry S Truman. Known as the Summer White House, the park is small (1.4 acres) and includes the main house, carriage house, and various other features. However, it is surrounded by the Harry S Truman Heritage District, a local preservation district. Harry S Truman National Historic Site. (Jack Boucher, HABS, NPS, n.d.)



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## HISTORIC CONTEXT

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To determine whether a property is significant within its historic context, the following five factors must be evaluated:

- The facet of prehistory or history of the local area, state, or the nation that the property represents.
- Whether the facet of prehistory or history is significant.
- Whether it is a type of property that has relevance and importance in illustrating the historic context.
- How the property illustrates history.
- Whether the property possesses the physical features necessary to convey the aspect of prehistory or history with which it is associated.

(Excerpted from *National Register Bulletin 15: How to Apply National Register Criteria for Evaluation*)

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## Historic Context

The historic context for a cultural landscape consists of information related to a specific theme, time, and place in American history (for example, *Landscape Architecture of the Civilian Conservation Corps in the U.S. Southwest, 1930-1942*). Every cultural landscape relates to one or more historic contexts that provides the basis for its relative significance. Evaluating an individual landscape in relation to a historic context involves research of other properties associated with a given theme, so that the significance of the landscape can be evaluated in comparison to those other properties. (See the insert titled, "Historic Context" on this page, and see Figures 23 and 24.)

The NPS conducts thematic research through a variety of formats, including Historic Resource Studies, multiple property nominations, National Historic Landmark nominations, and special history studies. The historic context for a cultural landscape is traditionally defined in the Historic Resource Study for the park, or through academic work based on scholarly research. In addition, several State Historic Preservation Offices (SHPO) have undertaken thematic research to



Figure 23. The Sunrise Historic District is located in a subalpine meadow at the foot of a glacier and is nationally significant in relation to the historic context of landscape architecture designed by NPS and the 1926 master plan for the park. Mount Rainier National Park. (NPS, 1990)

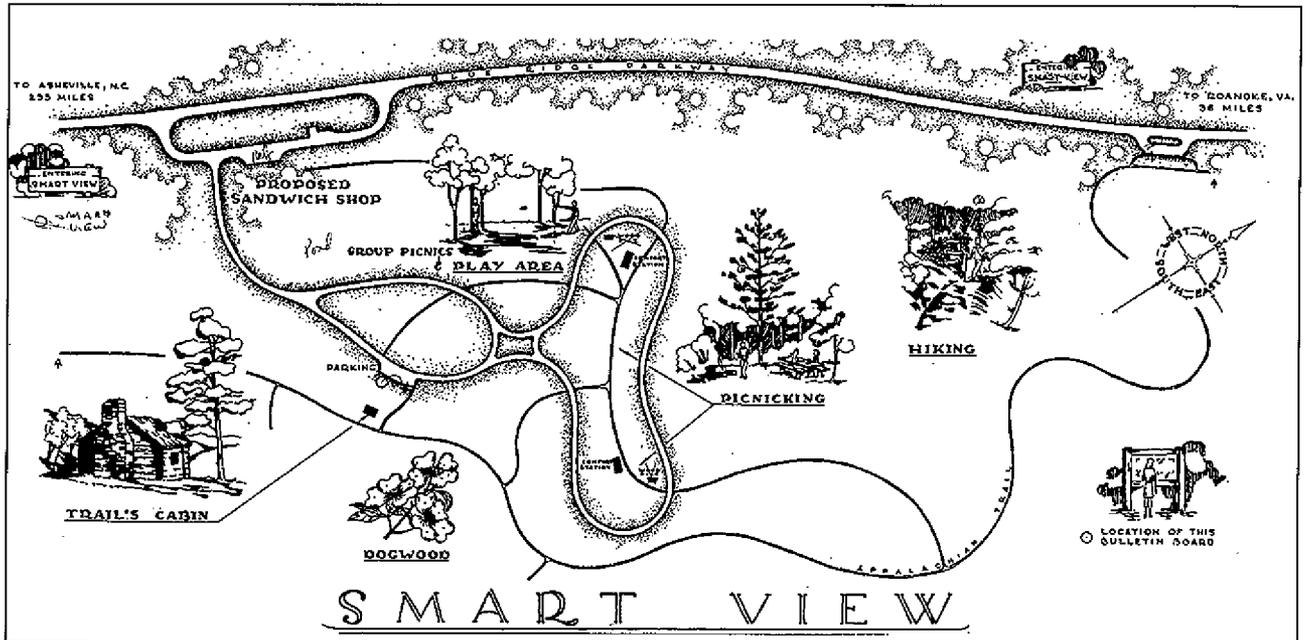


Figure 24. Drawing from the Blue Ridge Parkway Master Plan. Blue Ridge Parkway is a nationally significant landscape related to the historic context of landscape architecture designed by NPS. Blue Ridge Parkway. (NPS, 1942)

establish historic contexts that may be used for evaluating landscapes in the system (for example, *Grain Production in Eastern Washington, 1810-1942*).

While some research is required to evaluate significance, a CLR is not the primary vehicle for developing a historic context. However, if a historic context for a particular landscape does not exist, then research is necessary to document the context for which the landscape is significant. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins.")

## **Documentation of Research Findings**

Documentation of research findings is most often consolidated into two formats: a narrative text and one or more period plans.

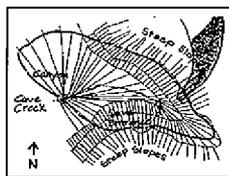
### ***Narrative Text***

The primary format for recording historical research findings is a written text describing the physical development and all the landscape characteristics and associated features, people, and events that influenced the design and character of a landscape. Pertinent landscape characteristics and associated features are identified and documented for each historic period, depicting the degree to which the characteristics and features have stayed the same or changed. (See the insert titled, "Overview of Landscape Characteristics" on the following page.)

A historian usually writes the historical narrative and includes all references in the form of endnotes or footnotes in compliance with guidelines given in the most recent edition of *The Chicago Manual of Style*. The text is illustrated with period drawings, sketches, maps, photographs, and other graphic materials that supplement information in the narrative, and provide a visual record of the landscape through time.

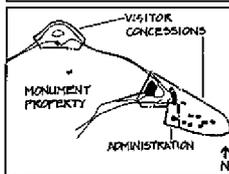
## OVERVIEW OF LANDSCAPE CHARACTERISTICS

Landscape characteristics include tangible and intangible aspects of a landscape from the historic period(s); these aspects individually and collectively give a landscape its historic character and aid in the understanding of its cultural importance. Landscape characteristics range from large-scale patterns and relationships to site details and materials. The characteristics are categories under which individual associated features can be grouped. For example, the landscape characteristic, vegetation, may include such features as a specimen tree, hedgerow, woodlot, and perennial bed. Not all characteristics are always present in any one landscape. The following landscape characteristics may be documented in a CLR.



### Natural Systems and Features

Natural aspects that often influence the development and resultant form of a landscape.



### Spatial Organization

Arrangement of elements creating the ground, vertical, and overhead planes that define and create spaces.



### Land Use

Organization, form, and shape of the landscape in response to land use.



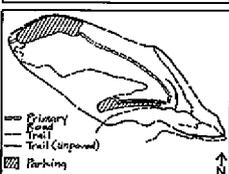
### Cultural Traditions

Practices that influence land use, patterns of division, building forms, and the use of materials.



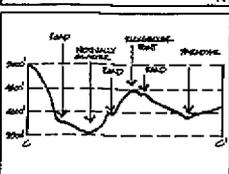
### Cluster Arrangement

The location of buildings and structures in the landscape.



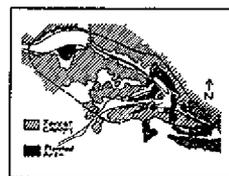
### Circulation

Spaces, features, and materials that constitute systems of movement.



### Topography

Three-dimensional configuration of the landscape surface characterized by features and orientation.



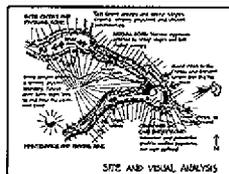
### Vegetation

Indigenous or introduced trees, shrubs, vines, ground covers, and herbaceous materials.



### Buildings and Structures

Three-dimensional constructs such as houses, barns, garages, stables, bridges, and memorials.



### Views and Vistas

Features that create or allow a range of vision which can be natural or designed and controlled.



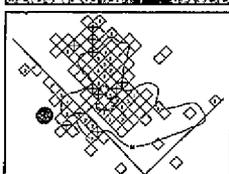
### Constructed Water Features

The built features and elements that utilize water for aesthetic or utilitarian functions.



### Small-Scale Features

Elements that provide detail and diversity combined with function and aesthetics.



### Archeological Sites

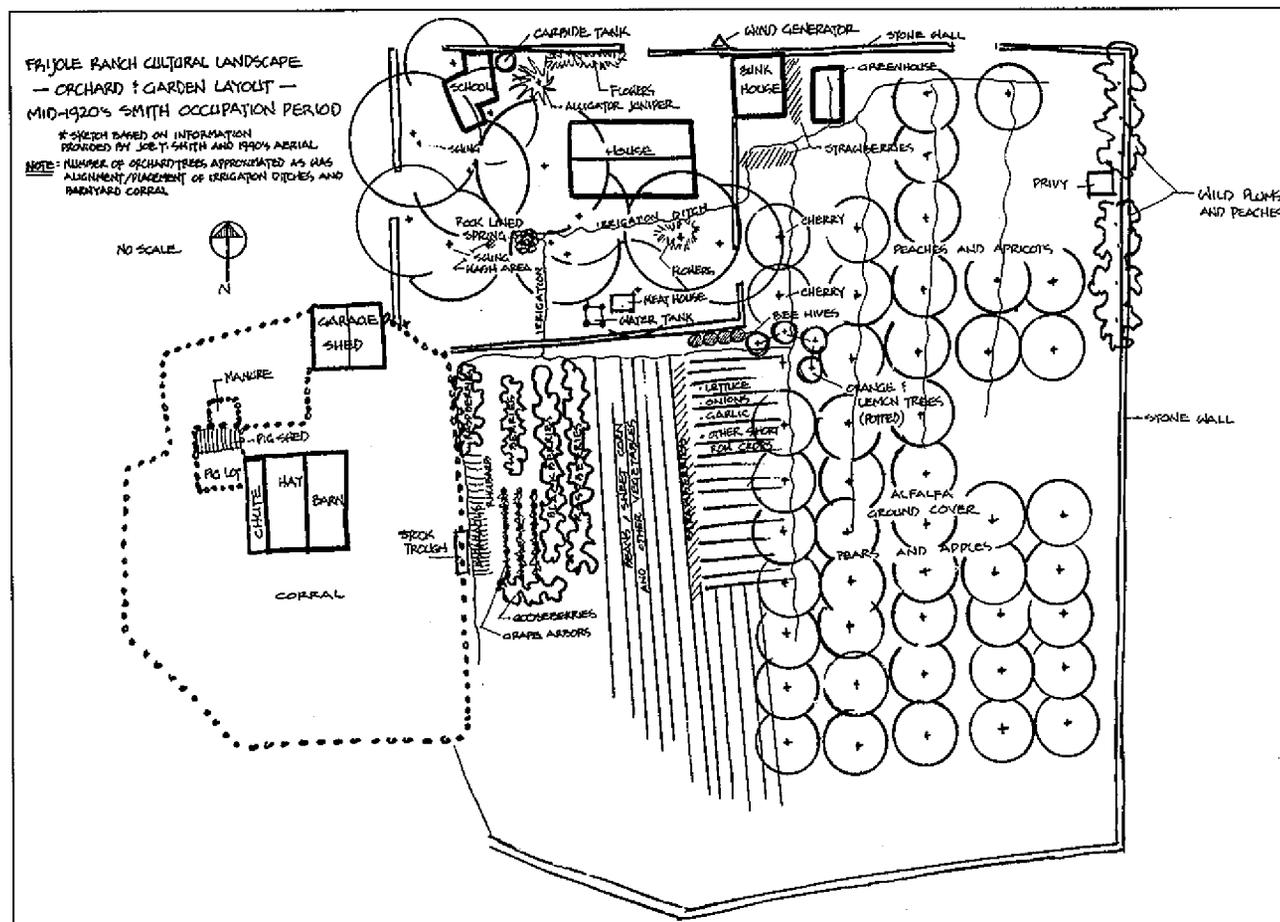
Sites containing surface and subsurface remnants related to historic or prehistoric land use.

## Period Plans

The term, period plan, describes the graphic format used to record a landscape during a designated period or specific date. (Historical base map is an old term used in early landscape research.) A period plan is compiled from an analysis and evaluation of all research findings, including site investigations. One period plan is prepared for every period of significance. (See Figures 25 and 26.)

Figure 25. This period plan graphically documents the orchard and garden layout in the mid-1920s at Frijole Ranch, Guadalupe Mountains National Park. (NPS, 1994)

The period plan documents the landscape characteristics and associated features that have influenced the history and development of a landscape or are the products of its development. The information is recorded at a scale, or variety of scales, that are useful for analysis and



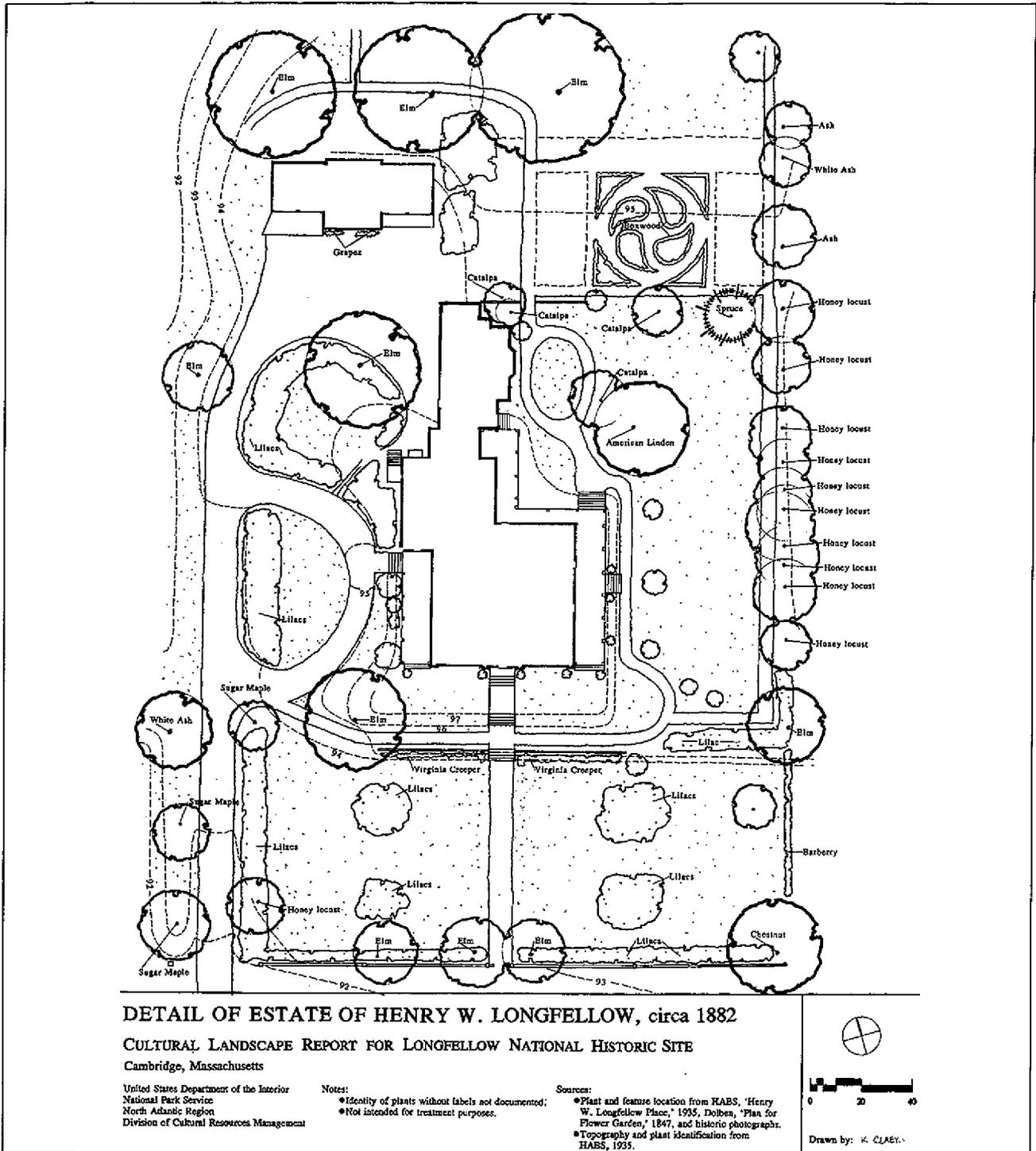


Figure 26. This circa 1882 period plan was developed based on research conducted on the home of Henry W. Longfellow. Longfellow National Historic Site. (NPS, 1993)

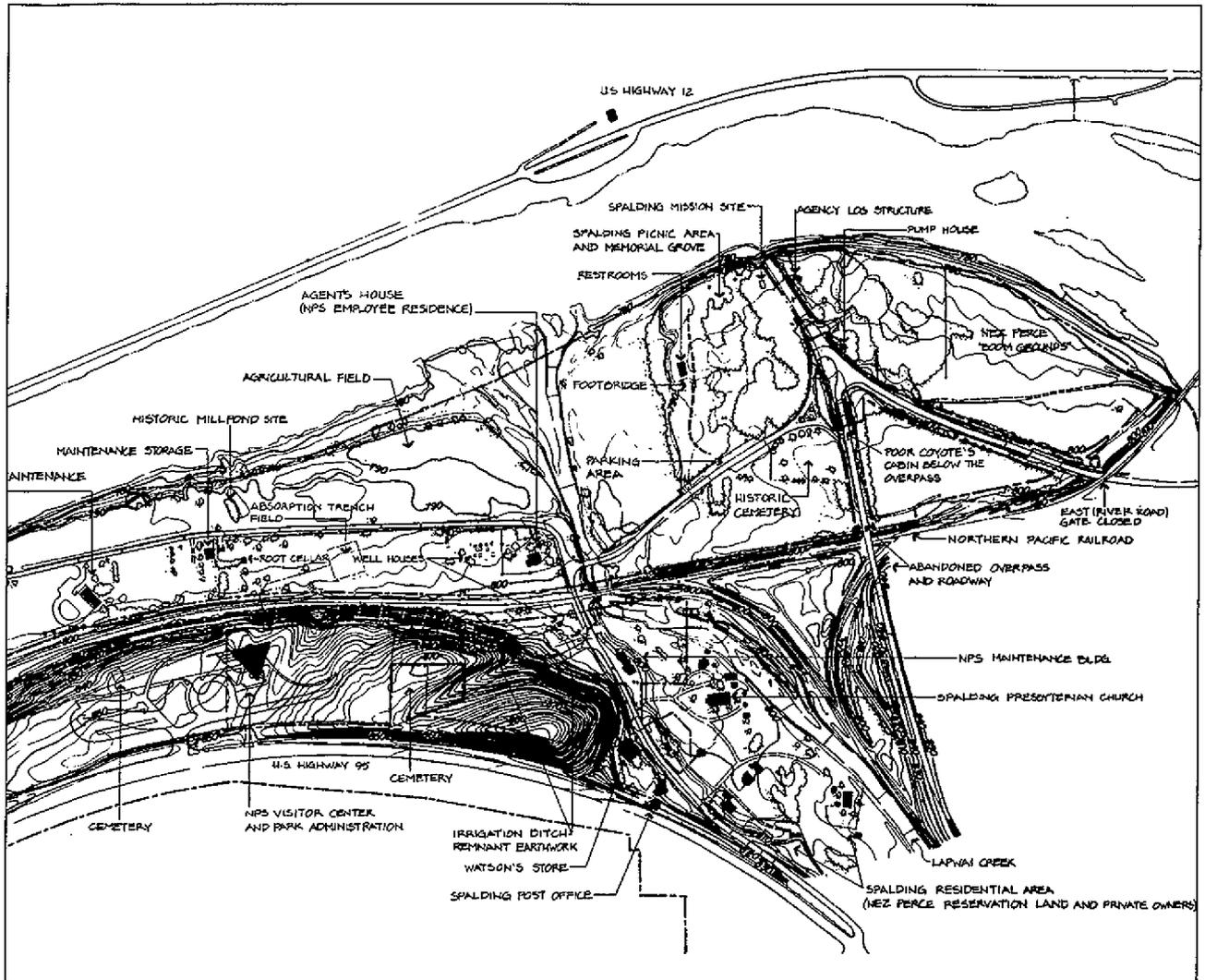
evaluation and development of treatment recommendations. A historical landscape architect, with technical assistance from a historian, prepares the period plan. (See *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 3: Landscape Characteristics" and "Landscape Lines 5: Graphic Documentation.")

## EXISTING CONDITIONS

Existing conditions are documented to clearly identify and describe the landscape characteristics that compose a cultural landscape. (See Figure 27.) Contemporary site functions, visitor services, interpretation, park operations, and maintenance are described to the degree they contribute to or influence treatment of a landscape. Also recorded, when appropriate, is detailed technical information, such as data on soils, floodplain, slope, archeological resources, or natural resources that influence or affect the investigation or treatment of a landscape. (See Figure 28.) In terms of process, documentation of existing conditions requires a site investigation, which usually includes two components: site research and site survey.

### Site Research

Research is an ongoing and integral part of site investigation and recording. Prior to field work, research of park files and a review of historical information related to a cultural landscape is undertaken to develop an overall strategy for documenting existing conditions. (See Figure 29.) Information is collected and consolidated into a format that allows easy reference and helps structure time spent in the field. For example, transferring site data from secondary sources directly to a field map allows verification of the information, without having to discover the feature in the field (or perhaps miss it altogether). Site research is usually conducted by a historical landscape architect and a historian. There are five general tasks in the research phase of site investigation. All are related to review of various source materials. Each task is discussed in the following text.

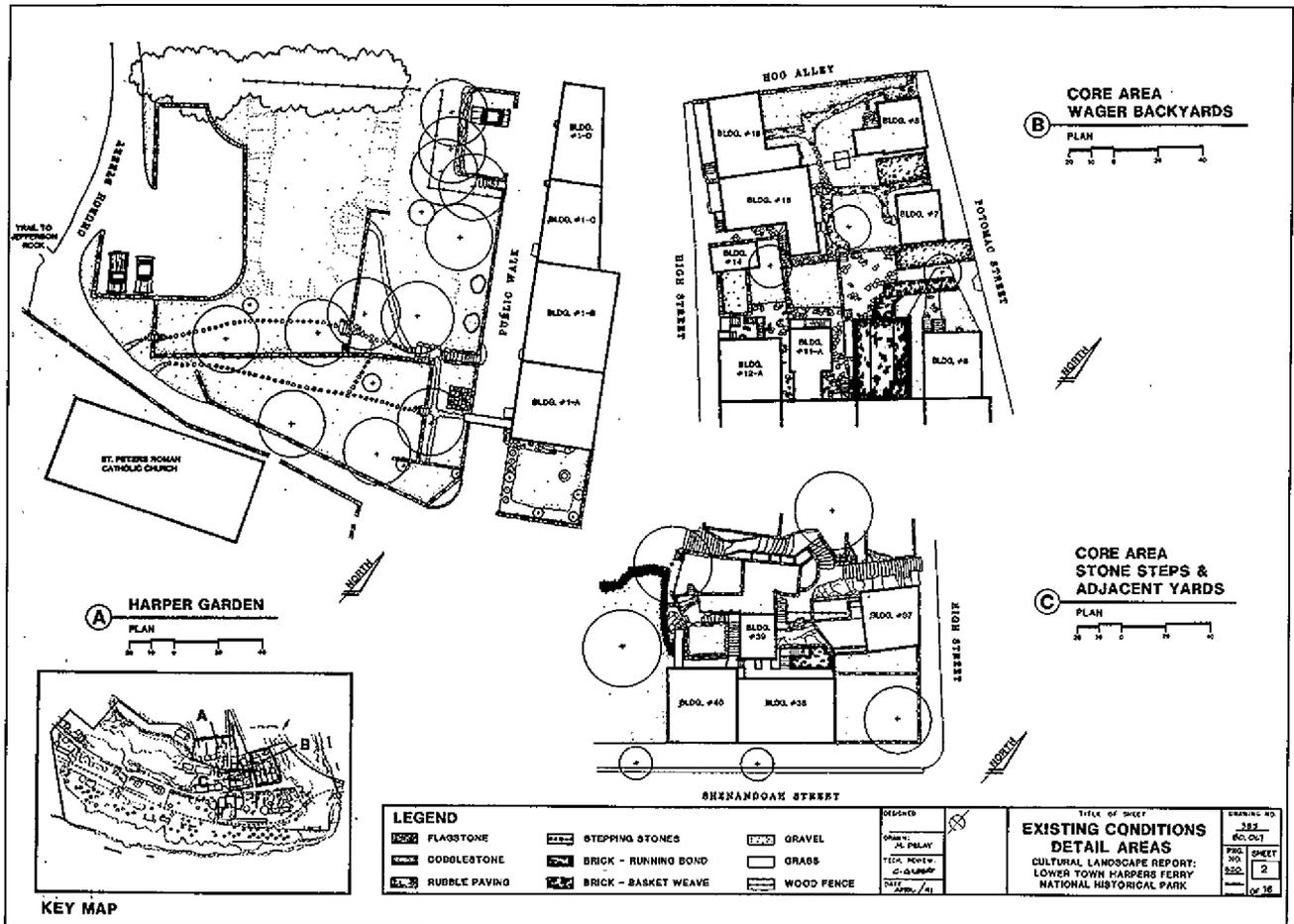


### Databases

A review of existing natural and cultural resources databases is a valuable first step in conducting a site investigation. The NPS maintains numerous automated inventories that provide good baseline site information on vegetation, archeological resources, hydrology, soils, topography, geological features, and historic structures. Most of the databases are maintained in individual parks, although some are kept in central offices or Support offices. A few databases are kept at universities, especially those with Cooperative Park Study Units. Databases particularly useful

Figure 27. Existing Conditions drawing for the Spalding Unit, Nez Perce National Historical Park. (NPS, 1990)





for preparing a CLR are the Cultural Landscapes Inventory (CLI) and the List of Classified Structures (LCS), both of which are evaluated inventories. The CLI provides data about a cultural landscape’s history, analysis, evaluation, and management, while the LCS contains the same type of data for historic structures.

Figure 29. Based on the complexity of the cultural landscape of Lower Town Harpers Ferry, existing conditions were documented for the whole property and for detail areas. Harpers Ferry National Historical Park. (NPS, 1987)

Information found in Geographical Information Systems (GIS) and computer-aided design (CAD) databases is also useful when the scale and asset information is current and relevant. GIS is generally most useful for large landscapes where detailed information is not required. CAD databases usually record detailed information required for treatment and provide useful basemaps for needed field work.

### *Park Files*

Park files are a good place to initiate research before developing a strategy for field work. Files vary in terms of extent and condition, but generally include administrative files, flat (map) files, maintenance records, photograph collections (including aerial photographs), a library and archives, and natural history collections. (See Figure 30.) For example, the park may or may not have a current map for a site at a useful scale and level of detail. If this is known during the scoping process, the time and cost to generate a base map can be factored into the schedule for field work. Usually, however, park files include materials that supplement and reinforce the needed field work.

*Figure 30. This historic photograph of Rosemary Inn as viewed from Lake Crescent was collected from park files during research on the landscape. Olympic National Park. (NPS, c. 1920s)*



### *Park Reports and Special Studies*

In addition to park records, many NPS reports and special studies contain information on a variety of resources within a cultural landscape. Archeological surveys and overviews, ethnographic overviews and assessments, traditional use studies, building inventories, vegetation management plans, National Register nominations, and Historic Resource Studies all provide critical data useful in preparing a CLR. Management documents related to a landscape are also helpful for understanding the administrative and management history for a site. Primary park planning and management documents, such as the General Management Plan, Interpretive Prospectus, and Resource Management Plan provide both general and specific information on treatment decisions, site access, land use, visitor services, park operations, and interpretive programs related to a landscape.

### *Other Site Materials*

Other valuable sources of site data include a variety of materials related to documentation of natural systems. Soil surveys and associated maps, aerial and infrared photographs, and United States Geological Survey (USGS) maps are among the most useful. Many of these materials are located in government offices, such as city or county planning departments. If this material does not exist, collecting the information may be part of the scope of work related to research and site documentation. For example, if the research focuses on a large rural landscape, aerial photographs are the best source for illustrating large scale patterns of land use. If aerial photographs are not available, acquiring them would be included in the site research.

### *Findings from Historical Research*

Historical information about a site is reviewed and integrated into the strategy for undertaking a site investigation. This information includes the primary source material used to develop a site history, and the findings

from research as analyzed and prepared by the historian. This is especially valuable for interpreting the potential significance of features in a landscape and understanding how a landscape physically appeared during the historic period(s). Photographs, for example, illustrate the location, character, and function of any number of features that may or may not remain in the landscape today. The feature may be recorded during field documentation as a foundation ruin or as an imprint on the ground plane, but without the historical information, the potential value of the landscape feature cannot be understood.

A large number of source materials used by historians are equally useful for documenting a site as it exists today, such as zoning records, plat maps, and tax records. Some materials, such as engineering drawings, which depict the construction of a specific road, or deed information that describes property boundaries, are quite literal in the information they yield. Other materials, however, may yield less obvious aspects of a landscape. For example, pioneer journals may describe in some detail how a specific area of a landscape was used, or describe the experiential qualities of a landscape that may not be evident at the site due to modifications to adjacent lands over the years.

### **Site Survey**

The second component of site investigation involves conducting systematic site surveys to document a cultural landscape. These surveys range from general reconnaissance and windshield surveys to detailed condition assessments for individual site features. Site surveys require on-the-ground field work to inventory and document the existing landscape characteristics and associated features. The goal of the site survey is to record the landscape as objectively as possible.

A site survey of existing landscape characteristics and associated features also provides additional information about the history of a landscape. This is particularly true for vegetation. The age, composition, and structure of

vegetation communities can reveal a great deal about the historic period of a cultural landscape. For example, at the Moses Cone Estate along the Blue Ridge Highway, the form and spacing of the white pine plantations around Bass Lake provide information about the site conditions at the time of the planting. Given that the trees are spaced too far apart to produce high quality timber, the plantations may also indicate design intent. Additionally, the age and composition of the understory indicate that the ground between the trees was kept clear until 50 years ago, providing insight into the management history of the landscape.

Site surveys are usually conducted by a historical landscape architect, and require the recording of as much information as is pertinent to and defined by the project scope. (See *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 3: Landscape Characteristics," and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix G: Biotic Cultural Resources," and "Appendix D: Preservation Briefs (no. 36).")

### *Documentation Techniques*

There are several techniques for documenting a cultural landscape. At a minimum, three types of documentation are needed: existing conditions plan, narrative text, and black and white photographs.

Other methods of documentation, such as condition assessments, site sections, detail drawings, repeat photography, color slides, and video recording may also be part of the documentation for a CLR. These documentation techniques can be used alone, or in combination, depending on the goals and objectives of the project.

### *Existing Conditions Plan*

The existing conditions plan is a graphic picture of the landscape as it presently exists. It facilitates the recording of information at a scale that is useful and relevant to the purpose of the project. An existing conditions plan is needed for every landscape addressed in a CLR.

The level of detail and accuracy of an existing conditions plan varies depending on the type of landscape, scale of information required for the project, and management objectives. For example, if the scope of a project follows through to construction drawings, then a very accurate plan is required. In every situation, the goal is to develop an existing conditions plan with the greatest level of detail and accuracy possible. There are two primary types of existing conditions plans used in a CLR: schematic drawings and measured drawings. Both may be hand-drawn or computer-generated. In addition, digitized drawings from aerial photography and GIS systems may be used to create an existing conditions plan.

#### Schematic Drawings

Schematic drawings illustrate the location of landscape characteristics and associated features and depict the relationships among them. (See Figure 31.) They contain more information than simple sketches and diagrams, but do not include precise dimensions. Schematic drawings are useful for documenting landscapes when small-scale detail elements do not need to be addressed in treatment. They also aid in recording large-scale patterns in the landscape, such as land use, circulation, and spatial organization. Schematic drawings are generated from field notes, supplementary graphic material, and professional interpretation of other conceptual material.

#### Measured Drawings

For many landscapes, a surveyed or measured drawing, depicting topography, vegetation, circulation features, structures, and boundaries with a high degree of precision and clarity is appropriate. (See Figure 32.) These drawings are generated using survey equipment to locate features and landforms at an appropriate scale. Measured drawings are needed when treatment requires a high degree of accuracy in relation to the level of intervention.

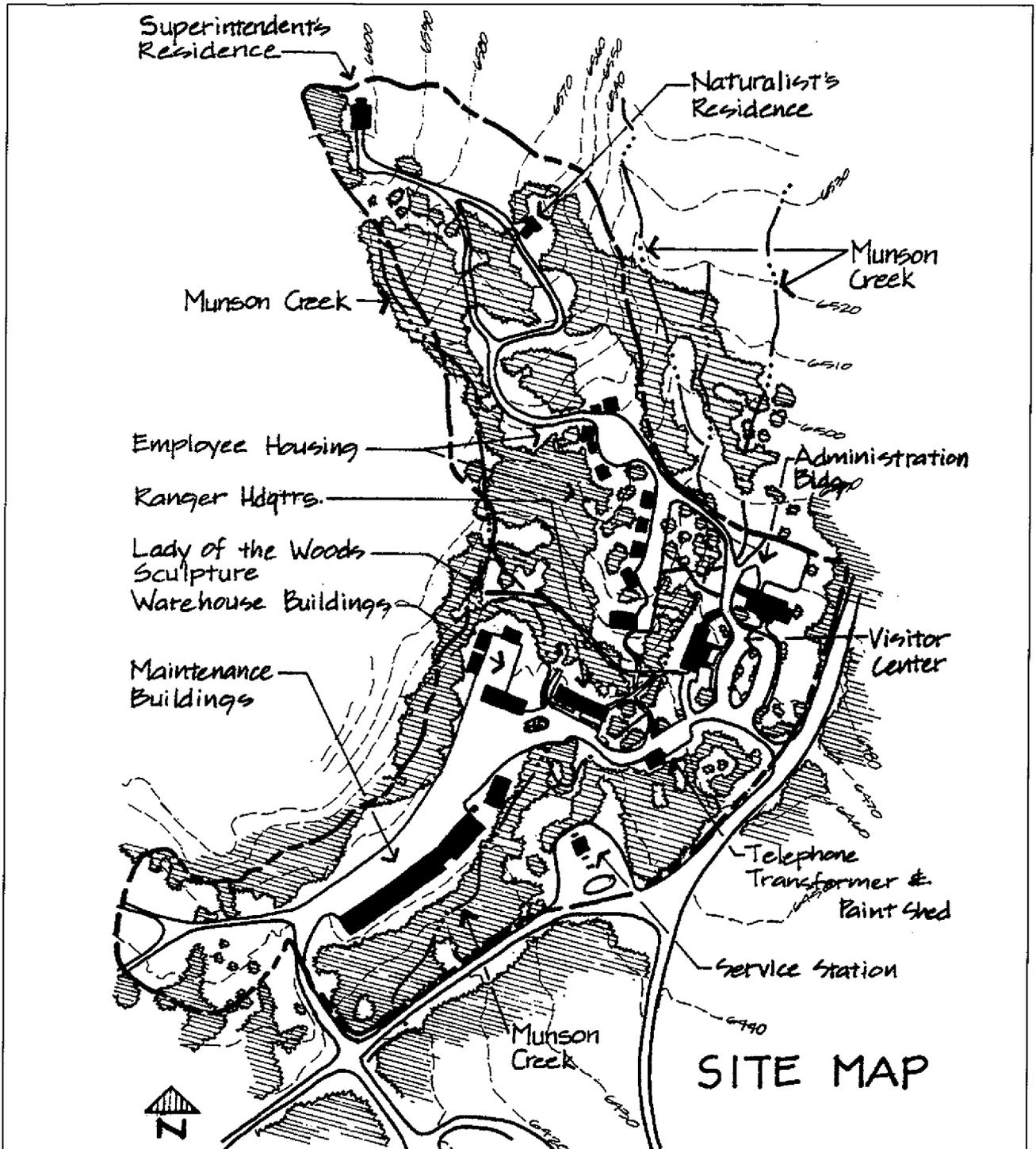
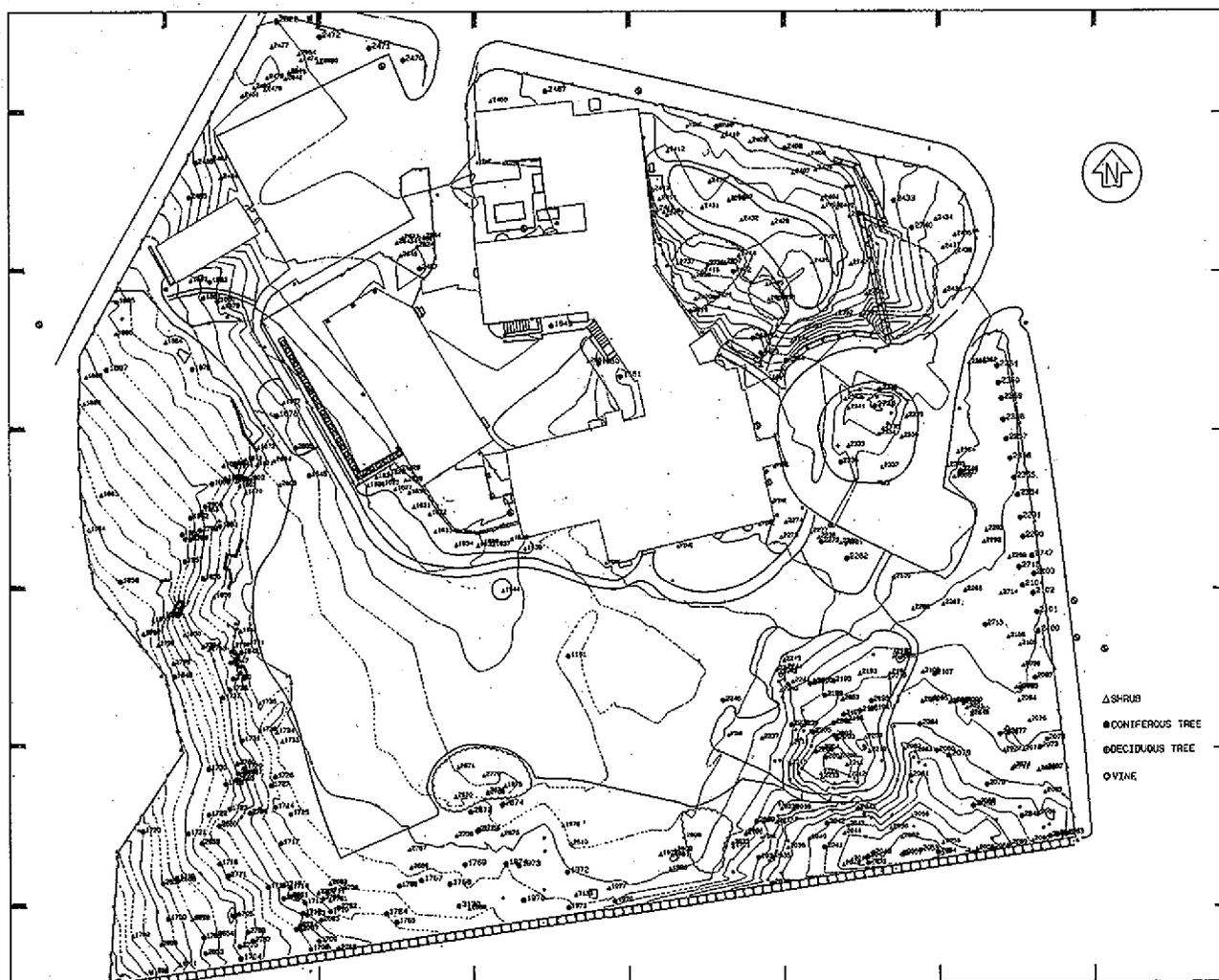


Figure 31. Schematic drawings illustrating the existing conditions at the NPS Administration Headquarters in Munson Valley, Crater Lake National Park. (NPS, 1991)

### Narrative Text

The existing conditions narrative describes the overall character of a landscape and gives detailed descriptions of landscape characteristics, such as circulation systems, vegetation, structures, and land use. Contemporary site functions, visitor services, interpretation, park operations, and maintenance are described to the degree they contribute to or influence treatment of a landscape. The narrative is usually written by a historical landscape architect in compliance with format guidelines

Figure 32. A computer-generated survey was prepared to document the existing conditions at the home of Frederick Law Olmsted. Frederick Law Olmsted National Historic Site. (Prepared by the Boston University of Public Archeology, NPS, 1993)



outlined in the most recent edition of *The Chicago Manual of Style*. The text may be illustrated with maps, photographs, and other graphic materials that supplement information in the narrative.

### *Photographs*

Photographic documentation of a landscape, a critical part of site recording, is integral to field work and documentation. Contemporary photographs provide a concise visual record of a cultural landscape at a specific moment in time and are useful for depicting site features and character that may be difficult to describe in the narrative. Within a CLR, photographs are used to supplement the text and provide detail whenever possible. Standards for photographic materials used in a CLR vary depending on the level of investigation, management objectives, type of significance, and proposed treatments. For many CLRs, standard 35mm black and white film is adequate for field documentation and recording existing conditions. Medium and large format photographs are recommended for record photographs of the site and for publication purposes. All photographic records should be labeled and referenced as part of the project. (See *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 5: Graphic Documentation," and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (no. 23).")

### *Condition Assessments*

Condition assessments may be conducted as part of the documentation process in a CLR. They describe the physical condition of landscape features measured against an applicable standard or guideline. Sources for establishing condition standards are found in the *Cultural Resource Management Guideline*, the Cultural Landscapes Inventory (CLI), maintenance requirements, laws and regulations, and NPS publications that give guidance about specific features, intended use, operational needs, historical significance, and health and safety issues. Condition is usually expressed as a rating of good, fair, or poor. Condition assessments require field inspection and often

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## DEFINING THE CONDITION OF A CULTURAL LANDSCAPE

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**Good:** indicates the cultural landscape shows no clear evidence of major negative disturbances and deterioration by natural and/or human forces. The cultural landscape's historical and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

**Fair:** indicates the cultural landscape shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within three to five years to prevent further harm to its historical and/or natural values. The cumulative effect of the deterioration of many of the significant characteristics and features of the cultural landscape, if left to continue without the appropriate corrective action, will cause the landscape to degrade to a poor condition.

**Poor:** indicates the cultural landscape shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural areas.

**Unknown:** indicates that not enough information is available to make an evaluation.

(Excerpted from the *Resources Management Plan Guideline*, 1994.)

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The analysis and evaluation compares findings from the site history and existing conditions to identify which landscape characteristics and associated features have historical significance. Each landscape characteristic is analyzed in an objective manner based on what was present historically and what currently remains in the landscape. The historic integrity and significance of each landscape characteristic and associated feature are then evaluated in the context of the landscape as a whole.

The analysis and evaluation is prepared by a historical landscape architect working with other disciplines, as appropriate. For example, a botanist may be involved to provide insight regarding changes in vegetation and ecological processes, or a historical architect may analyze and evaluate the buildings and structures in the landscape. Information is presented in a variety of formats, such as period plans, schematic drawings, matrices, and narratives. A statement of significance for the landscape is prepared, along with summary statements that consolidate the information in a format useful for developing treatment recommendations. The information from the analysis and evaluation can be used to prepare or amend a National Register nomination.

Information for the analysis and evaluation is compiled and organized for each historic period, allowing comparison of patterns and features through time. (See Figure 34.) This process establishes a framework against which all changes in the landscape are measured. Additionally, the physical condition of significant characteristics and features is also considered during analysis and evaluation. Although physical condition (good, fair, poor, or unknown) does not equal integrity (for example, poor condition does not mean low integrity), condition assessments do influence treatment decisions.

### **Defining Significance**

A cultural landscape must possess significance in at least one of the four aspects of cultural heritage defined by the National Register criteria. Because of their complex evolution, many landscapes have significance

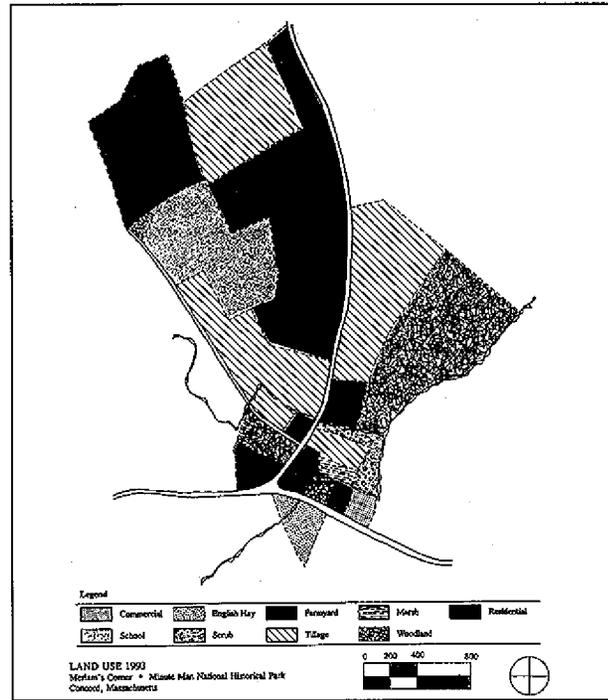
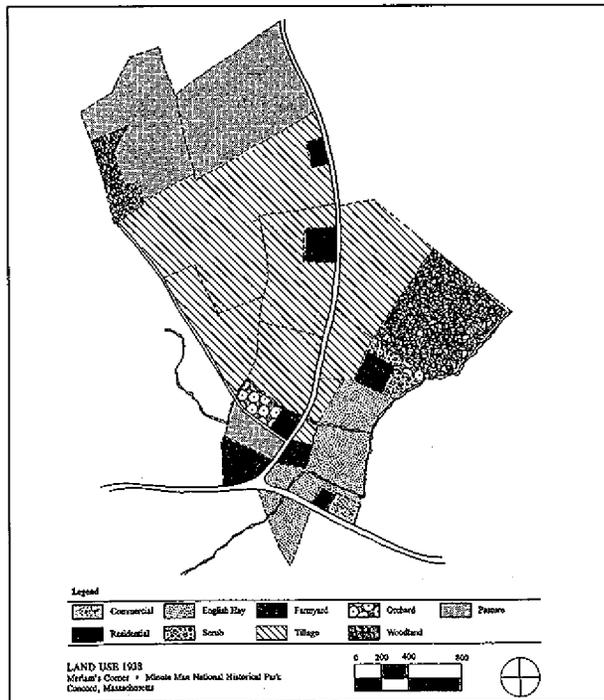
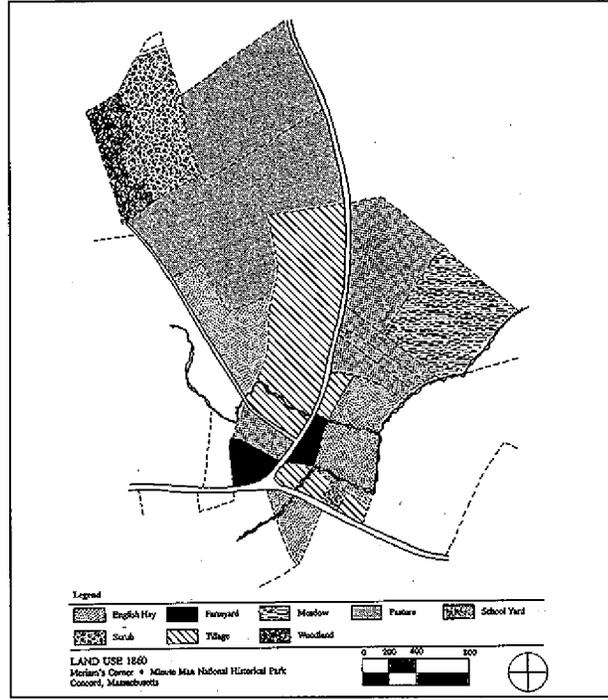
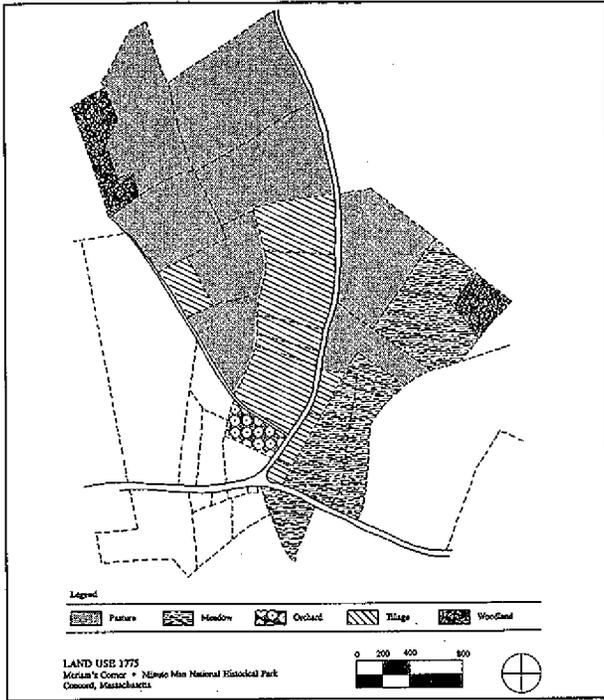


Figure 34. Diagrams chronicle land use activities and patterns of the vernacular landscape, allowing comparison of patterns through time. Minute Man National Historical Park. (NPS, 1993)

under several criteria. Defining the significance of a landscape involves relating findings from the site history and existing conditions to the historic context associated with the landscape. Additionally, the significance of individual landscape characteristics and associated features is defined in the context of the landscape as a whole. Understanding the significance of a landscape is necessary to guide treatment and management decisions. (See the insert titled, "National Register Criteria" on this page, and *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 3: Landscape Characteristics.")

### Statement of Significance

Every CLR has a written statement of significance that explains the relationship between the cultural landscape and specific historic contexts, National Register criteria, and period(s) of significance. If a statement of significance already exists in the CLI or National Register nomination form, it can be excerpted for use in the CLR. However, when a statement does not exist, or exists but is inadequate, it needs to be developed based on research findings in the CLR.

### Assessing Historic Integrity

The historic integrity of a cultural landscape relates to the ability of the landscape to convey its significance. The National Register defines seven aspects of integrity that address the cohesiveness, setting, and character of a landscape, as well as the material, composition, and workmanship of associated features. Historic integrity is assessed to determine if the landscape characteristics and associated features, and the spatial qualities that shaped the landscape during the historic period, are present in much the same way as they were historically. (See the insert titled, "Seven Aspects of Historic Integrity" on the following page.)

Because important aspects of the landscape change over time, assessing integrity can be complex. No landscape appears exactly as it did 50 or 100 years ago. Vegetation grows, land uses change, and structures

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## NATIONAL REGISTER CRITERIA

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As defined by the National Historic Preservation Act of 1966 and the National Register criteria, to be eligible for the National Register a cultural landscape must possess the quality of significance in American history, architecture (interpreted in the broadest sense to include landscape architecture and planning), archeology, engineering and culture. To be eligible, a cultural landscape must be shown to be significant for one or more of the following Criteria for Evaluation:

- A. Associated with events that have made a significant contribution to the broad patterns of our history, or
- B. Associated with the lives of persons significant in our past, or
- C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. Have yielded, or may be likely to yield, information important in prehistory or history.

(Excerpted from the *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*.)

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## SEVEN ASPECTS OF HISTORIC INTEGRITY

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**Location**

the place where the cultural landscape was constructed or the landscape where the historic event occurred.

**Design**

the combination of elements that create the form, plan, space, structure, and style of a cultural landscape

**Setting**

the physical environment of the cultural landscape

**Materials**

the physical elements that were combined or deposited during the particular period(s) of time and in a particular pattern or configuration to form the cultural landscape.

**Workmanship**

the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.

**Feeling**

a cultural landscape's expression of the aesthetic or historic sense of a particular period of time.

**Association**

the direct link between the important historic event or person and a cultural landscape.

(Excerpted from *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*)

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deteriorate. Historic integrity is determined by the extent to which the general character of the historic period is evident, and the degree to which incompatible elements obscuring that character can be reversed. For example, as vegetation matures, the change in tree canopy, scale, and massing may affect the overall character of the landscape. It is important not only to consider changes to the individual feature, but how such changes affect the landscape as a whole. (See Figure 35.)

With some landscapes, change itself is a significant factor and is considered in assessing integrity. Depending on the type of significance, the presence of some characteristics is more critical to integrity than others. In a large rural landscape, for example, spatial organization and patterns of land use are more important than individual features, such as buildings and fences.

Decisions about integrity require professional judgement to assess whether a landscape retains the characteristics, physical attributes, and historical associations that it had during the period of significance. The historic integrity of a landscape can be documented through a narrative or graphics. The amount and type of documentation is based on the complexity of the resource, the type of significance, and the scale of the landscape. (See Figures 36 and 37, the insert titled, "Analysis and Evaluation of Landscape Characteristics—Two Examples," later in this section, and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (nos. 15, 18, 30, 38, 40, 41, and 42)," and "Appendix G: Biotic Cultural Resources.")

### Redefining Boundaries

The boundaries of a cultural landscape are initially defined in the project agreement according to National Register guidelines. Boundaries generally conform to the boundaries defined in the CLI. A boundary may conform to existing natural features, political jurisdictions, cultural elements, or if appropriate, historic boundaries. Based on the findings of the analysis

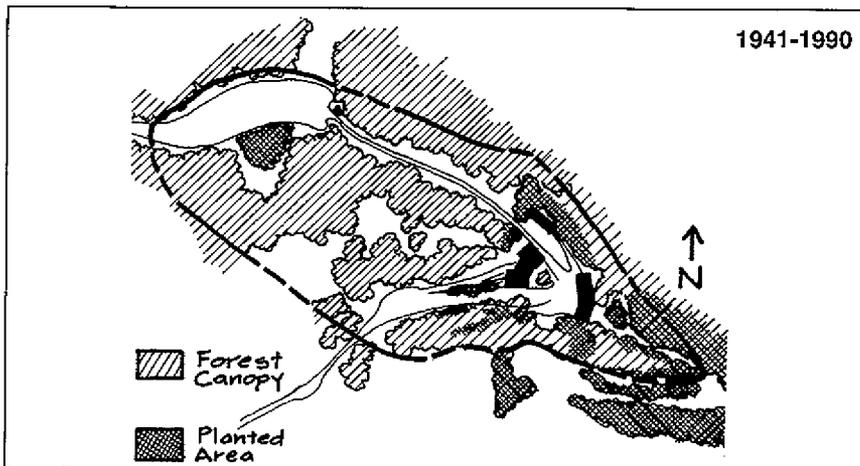
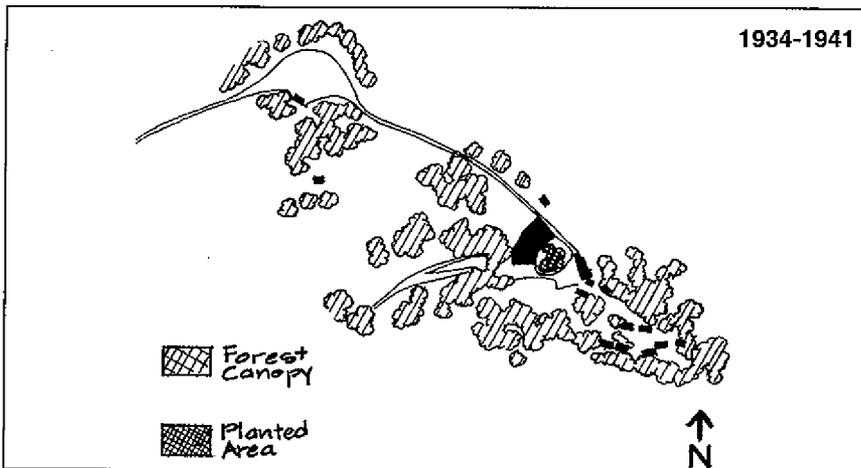
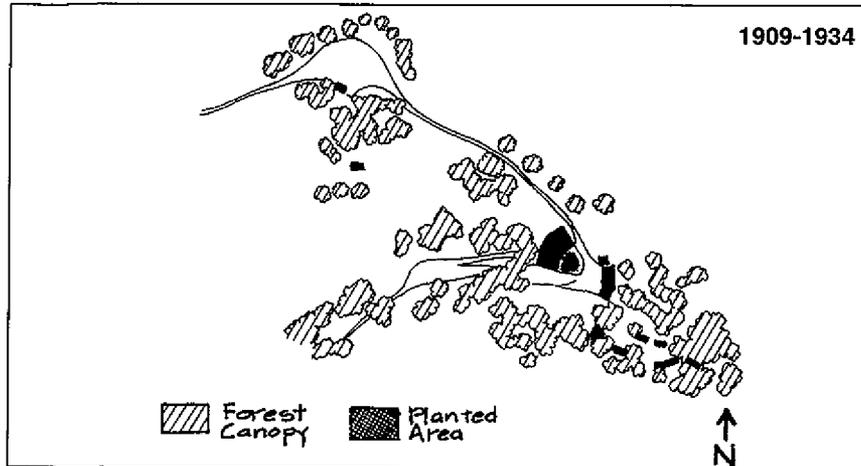
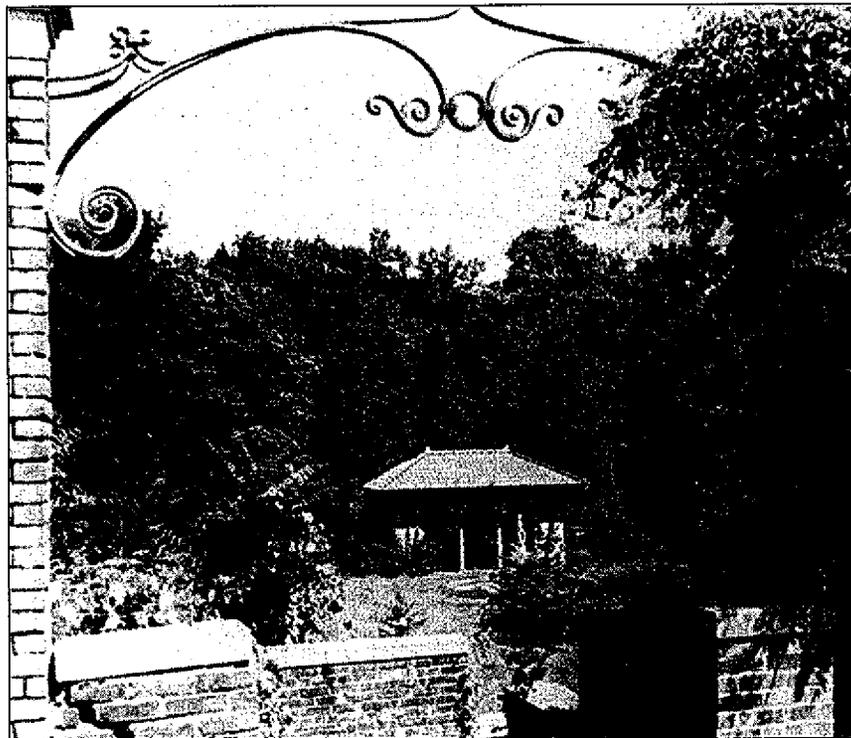


Figure 35. Analysis of vegetation changes between 1909 and 1990 in this designed landscape was used to assess integrity. Oregon Caves National Monument. (NPS, 1992)

Figure 36. The historic view of the rose garden at the Vanderbilt Mansion in early summer with some roses and edge shrubs in bloom. Roses also in upper beds and partial vine cover on the Pavilion. Vanderbilt Mansion National Historic Site. (NPS, c. late 1920s)



Figure 37. More recent view of the rose garden illustrates a loss of integrity with the addition of invasive plants in the garden, and the loss the of garden circulation and beds. Vanderbilt Mansion National Historic Site. (NPS, 1964)



and evaluation, boundaries should be reassessed to ensure that all significant resources and land areas are included. (See the insert titled, "Guidelines for Selecting Boundaries" later in this section.)

### **Summary Statement**

Information compiled as part of the analysis and evaluation is summarized in a format useful for developing treatment recommendations. The format can be a written summary of significant resources, a graphic (such as a matrix or a schematic drawing), or it can be defined in the development of cultural landscape character areas and management zones based on specific landscape values.

### ***Cultural Landscape Character Areas***

Cultural landscape character areas are defined by the physical qualities of a landscape (such as landforms, structural clusters, and masses of vegetation) and the type and concentration of cultural resources. Character areas are based on the existing condition of the characteristics and features that define and illustrate the significance of the landscape. (See Figure 38.)

### ***Management Zones***

Management zones define areas of a cultural landscape that have been assigned specific treatment objectives. (See Figure 39.) They are defined by the type and degree of historical integrity within a landscape. Management zones are identified in collaboration with park management when there is a need (based on management objectives and the analysis and evaluation) to develop a range of treatment strategies for individual features or areas within a single property (such as when a landscape contains features with different levels of significance as they relate to distinct historic contexts). In some parks, management zones have been defined prior to a CLR through the park planning process. A CLR may be used to redefine these zones based on the significance of the cultural landscape.

Figure 38. Landscape character areas were identified here on the basis of historic land use patterns. Fort Vancouver National Historic Site. (NPS, 1992)

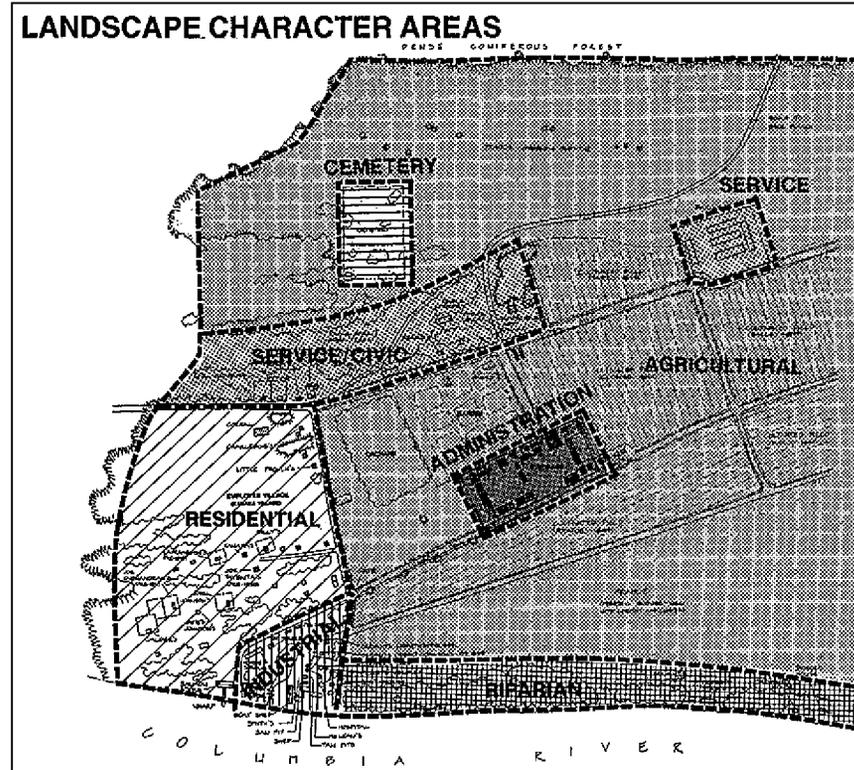


Figure 39. Cultural landscape management zones were defined based on the type and degree of historical integrity and management responsibilities. Spalding Unit, Nez Perce National Historical Park. (NPS, 1990)

### CULTURAL LANDSCAPE MANAGEMENT ZONES

#### ZONE I

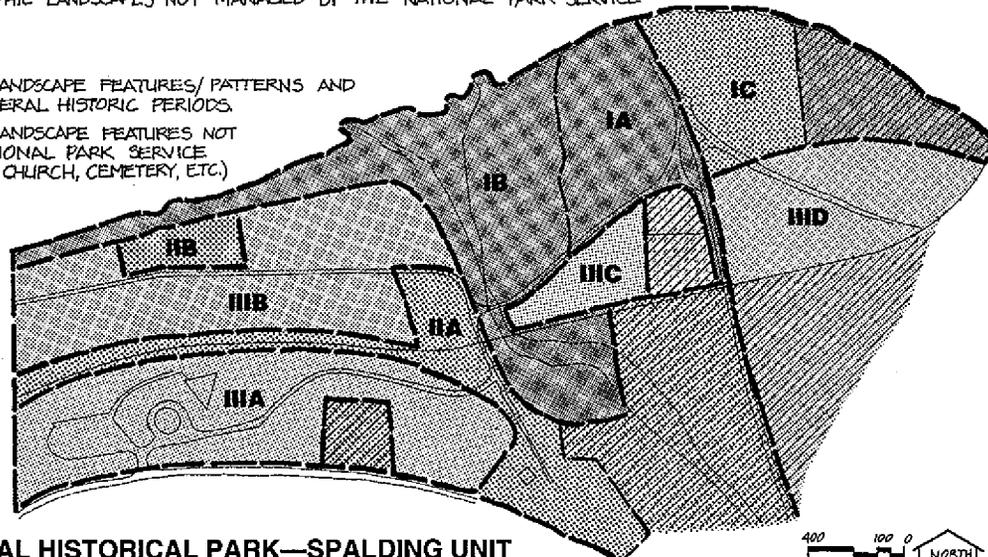
- SIGNIFICANT CONCENTRATION OF CULTURAL LANDSCAPE FEATURES/PATTERNS AND COMPONENTS FROM ALL FIVE HISTORIC PERIODS; THAT POSSESS CULTURAL VALUE; HISTORIC SCENES WITH INTEGRITY.
- SIGNIFICANT ETHNOGRAPHIC LANDSCAPES NOT MANAGED BY THE NATIONAL PARK SERVICE

#### ZONE II

- IMPORTANT CULTURAL LANDSCAPE FEATURES/PATTERNS AND COMPONENTS FROM SEVERAL HISTORIC PERIODS
- IMPORTANT CULTURAL LANDSCAPE FEATURES NOT MANAGED BY THE NATIONAL PARK SERVICE (SPALDING TOWN SITE, CHURCH, CEMETERY, ETC.)

#### ZONE III

- AREAS OF CULTURAL LANDSCAPE VALUE CONTRIBUTING TO THE HISTORIC SCENE ASSOCIATED WITH AGRICULTURAL USE OF THE LANDSCAPE OVER SEVERAL HISTORIC PERIODS
- AREAS OF CULTURAL LANDSCAPE VALUE, NOT MANAGED BY THE NATIONAL PARK SERVICE



NEZ PERCE NATIONAL HISTORICAL PARK—SPALDING UNIT

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## GUIDELINES FOR SELECTING BOUNDARIES

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- ▶ Carefully select boundaries to encompass, but not exceed, the full extent of the significant resources and land area making up the cultural landscape.
- ▶ The area to be registered should be large enough to include all historic features of the cultural landscape, but should not include "buffer zones" or acreage not directly contributing to the significance of the property.
- ▶ Leave out peripheral areas of the cultural landscape that no longer retain integrity, due to subdivision, development, or other changes.
- ▶ Use the following features to mark the boundaries:
  1. Legally recorded boundary lines.
  2. Natural topographic features, such as ridges, valleys, rivers, and forests.
  3. Constructed features, such as stone walls; hedgerows; the curblines of highways, streets, and roads; areas of new construction.
  4. Topographic features, contour lines, and section lines marked on USGS maps (for large properties).
- ▶ Be mindful of the following:

**Historic legal boundaries** of a single property, a group of properties, or an entire political jurisdiction when the cultural landscape possesses continuity of landscape characteristics throughout, even when the ownership or division of land may have changed.

**Boundary demarcations** that are relatively permanent, such as stone fences, irrigation or drainage ditches, and mature hedges, when such barriers are based on historic land use or ownership and encompass the concentration of related historic landscape characteristics and features.

**Rights-of-way**, such as roads, paths, and highways, when they separate areas of land that are historically significant from those that are either unrelated, insignificant, or not historic.

**Natural Features**, such as rivers, lakeshores, ridges, plateaus, and contour elevations when such features limited the historic development of the land and continue to contain historic landscape characteristics and features.

**Changes in nature of development or spatial organization**, such as the departure of a community having vast tracts of communally-owned farm land from the typical Midwestern grid of 160-acre farms, when differences are related to significance.

**Edges of new development**, such as modern housing, limited access highways, or industrial parks.

**Current legal boundaries**, when they coincide with the area containing historic landscape characteristics today. Acreage may be the same or smaller than that within the historic boundaries.

**Lines drawn along or between fixed points**, such stone walls, shore lines, or the intersection of two roads, when they contain the area retaining historic landscape features.

**Long-standing vegetation**, that is visible at all seasons, such as rows of hardwoods, when it marks the edge of the area containing historic landscape characteristics and features.

(Excerpted from *National Register Bulletin 16A: How to Complete the National Register Registration Form*. See also *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (nos. 15, 18, 30, 38, 40, 41, and 42).")

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## ANALYSIS AND EVALUATION OF LANDSCAPE CHARACTERISTICS—TWO EXAMPLES

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The historic integrity of a cultural landscape is documented through an analysis and evaluation of landscape characteristics. This documentation can include both narrative and graphics. Following are two examples of analysis and evaluation documentation.

### Example 1: Circulation

The analysis and evaluation for the cultural landscape at Martin Van Buren National Historic Site is presented in a narrative organized in three parts: historic, existing, and analysis. The following is an excerpt from the *Cultural Landscape Report for the Martin Van Buren National Historic Site, Volume 1: Site History, Existing Conditions and Analysis*, regarding the landscape characteristic, circulation.

#### Entry Drive

**HISTORIC:** A semicircular entrance drive approached the main house, extending from Post Road from two locations and meeting at the front of the house. As it approached the house, the drive divided and circled the house. It was one lane and constructed with compacted soil.

**EXISTING:** A semicircular entrance drive approaches the main house, extending from Post Road from two locations and meeting at the front of the house. As it approaches the house, the drive divides and circles the house. It is one lane and constructed with compacted soil. The south portion has crushed stone over the top of the soil.

**ANALYSIS:** Existing, contributing.

The only alteration made to the drive since the period of significance is the addition of crushed stone along the south side. The crushed stone is minimal and does not greatly affect the historic character. The current condition of the entry drive is very similar to its historic and, therefore, it is not a priority for treatment.

#### Roads to Farm Cottage, Carriage Barn, and Fields

**HISTORIC:** A series of roads connected the different areas of the farm to the main house. Roads extended from the main house to the carriage barn, farm cottage, stone house, barns, and agriculture fields.

**EXISTING:** The main house is not connected to any other areas of the farm. The majority of the historic roads have been plowed under within the agriculture fields. Some of the roads within the fields remain, but no connection exists to the main house. Visual traces of some portions of these roads exist in the ground configuration with the house lot.

**ANALYSIS:** Not existing.

Most of the features that were connected by these roads no longer exist, but the most important aspect of these roads is they connected the main house to the remainder of the farm. Without them, that connection is lost, making them a priority for treatment.

### Example 2: Land Use

The analysis and evaluation for the Cant Ranch Historic District in John Day Fossil Beds National Monument is presented in a narrative format illustrated with sketches and photographs. The following is an excerpt from the *Cultural Landscape Report: Cant Ranch Historic District, John Day Fossil Beds National Monument*, regarding the landscape characteristic, land use.

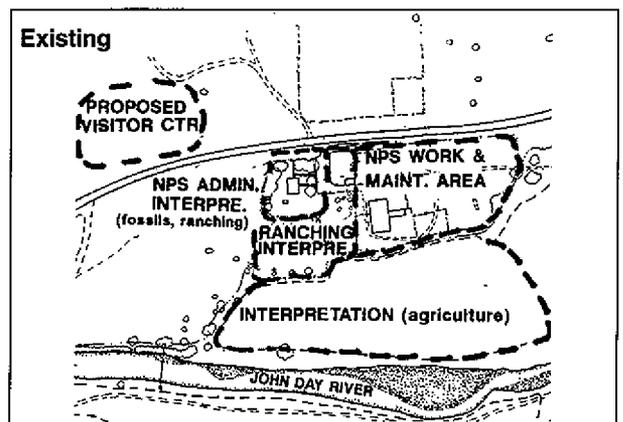
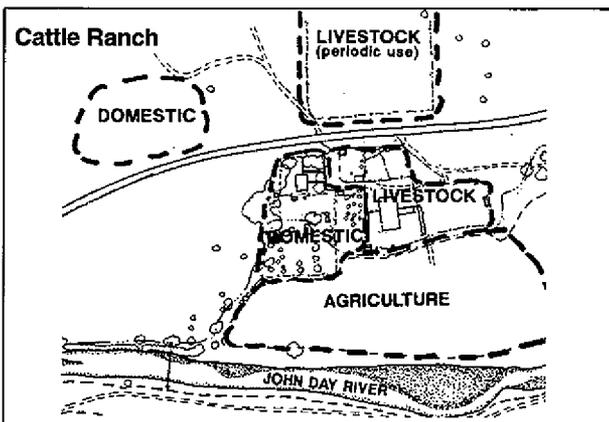
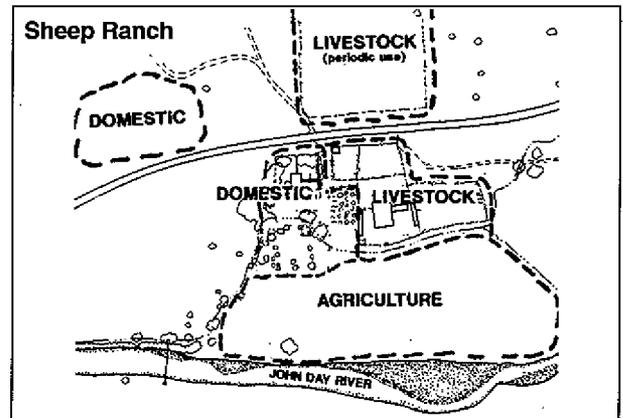
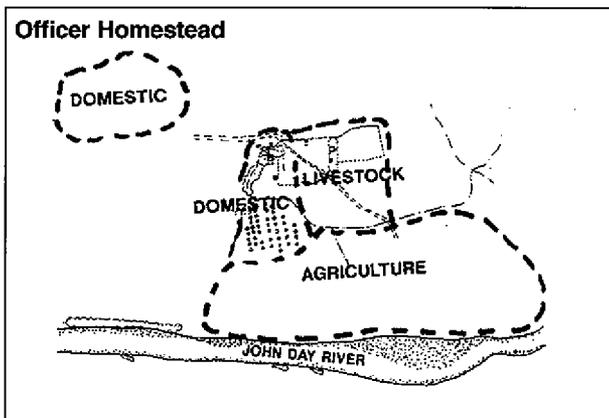
Land use patterns at the Cant Ranch historically correspond to activities associated with the three phases of development in ranch operations: subsistence agriculture, sheep ranching, and cattle ranching.

Each of these uses was physically tied to, and was built upon, the previous development and structure at the site. In addition to the three general land uses, the ranch was also the home site for both the Officer and Cant families, occupying the south side of the complex. Early in the development of the site, a garden and orchard were established to provide some level of self-sufficiency prior to the establishment of a road to the ranch. Early buildings also reflected basic needs providing shelter and accommodating functions of the working ranch.

As the ranch grew during the Cant eras, these land use patterns were maintained and in some cases, expanded within the physical framework established during the Officer era. For example, agricultural lands along the John Day River were expanded to the east side doubling the amount of land under cultivation.

The structural complex of the ranch also expanded significantly with the addition of several new buildings and corrals. Most significant in terms of land use is that this expansion occurred within the framework of existing land use patterns and functions, and these patterns are evident in the landscape today.

Existing land uses include administration and interpretation in the house and south end of the complex, and most maintenance activities (workshop, work area, storage) occurring on the north side of the ranch complex.

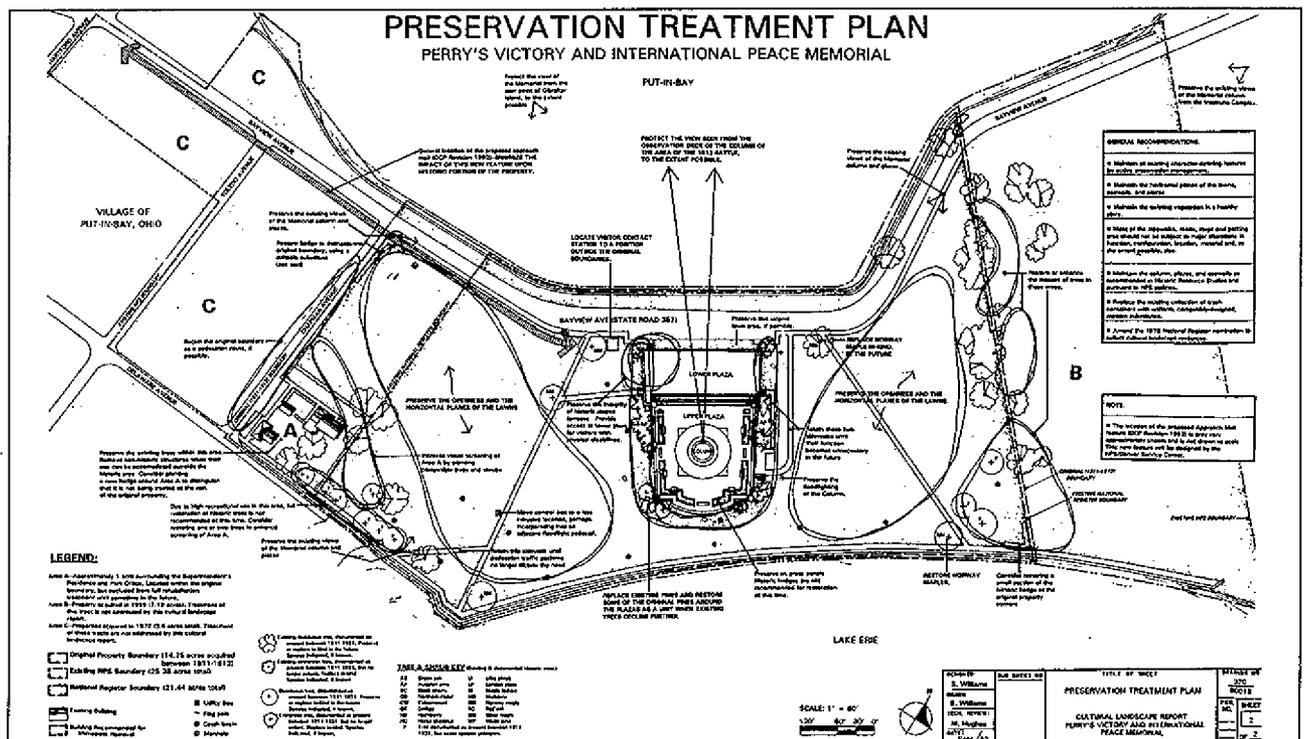


# CLR PART 2: TREATMENT

Part 2 is the treatment section of a Cultural Landscape Report (CLR). It articulates a preservation strategy for long-term management of a cultural landscape based on its significance, existing conditions, and use. (See Figure 40.) Part 2 considers management goals, such as public access, preservation of natural resources, contemporary use, and interpretation. Part 2 may address an entire landscape, a portion of a landscape, or a specific feature. The foundation for the preservation strategy is the historical research, existing conditions, and analysis and evaluation documentation contained in Part 1 of a CLR.

Part 2 must be prepared in collaboration with park management and staff to ensure that management goals are addressed and that the proposed treatment can be implemented and maintained over time. (See the section titled, "Maintenance and Sustainability" later in this guide.) The

Figure 40. A treatment plan specifies actions necessary for preservation of a landscape. Perry's Victory and International Peace Memorial. (NPS, 1994)



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## TREATMENT DEFINITIONS

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**Preservation:** the act or process of applying measures necessary to sustain the existing form, integrity, and material of a historic property. Includes initial stabilization work, where necessary, as well as ongoing preservation maintenance and repair of historic materials and features.

**Rehabilitation:** the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

**Restoration:** the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by removing features from other periods in its history and reconstructing missing features from the restoration period.

**Reconstruction:** the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

(Excerpted from *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, 1995.)

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content of Part 2 is prepared by a historical landscape architect working with other disciplines as needed. For example, a horticulturist may recommend disease-resistant cultivars to replace a particular historic plant; a historical architect may recommend stabilizing a structure in poor condition; or a natural resource specialist may prescribe methods to protect a threatened habitat.

## POLICIES, GUIDELINES, AND STANDARDS

Treatment of a cultural resource must be guided by the policies, guidelines, and standards contained within *NPS Management Policies*, the *Cultural Resource Management Guideline*, and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. These documents identify four types of treatment: preservation, rehabilitation, restoration, and reconstruction. (See the insert titled, "Treatment Definitions" on this page.)

Specific policies, guidelines, and standards exist for each of the four types of treatments. Collectively, the four treatments form the philosophical basis for responsible preservation practice and enable long-term preservation of a landscape's historic features, qualities, and materials. The four treatments allow for both traditional and contemporary treatment techniques while supporting continued use.

The goal of any treatment program is long-term preservation of a landscape's historic features, qualities, and materials. Generally, the amount of physical intervention in a landscape increases from preservation to reconstruction. Preservation attempts to maintain a landscape in its existing state. Rehabilitation recommends some change to accommodate contemporary use. Restoration often involves removing later additions and reconstructing missing features to depict a landscape at a particular time. Reconstruction replicates a nonsurviving landscape through new construction.

As physical intervention increases, the policies, guidelines, and standards require more documentation and justification for treatment actions. (See the insert titled, "Secretary of the Interior's Standards for the Treatment of Historic Properties" later in this section, and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix H: Treatment Policy, Guidelines, and Standards.")

## DEFINING A MANAGEMENT PHILOSOPHY

When a CLR addresses an entire cultural landscape, it is appropriate to define a management philosophy for the landscape as a whole. This management philosophy guides long-term management and maintenance and provides a reference for future treatment decisions. The management philosophy consists of a narrative that clearly states the goals and objectives for managing the landscape as a cultural resource, including the intent of the primary treatment, specific considerations for long-term management, and general maintenance requirements. (See the section titled, "Defining a Primary Treatment" later in this section, and the insert titled, "Cant Ranch Historic District Management Philosophy" on the following page.)

## DETERMINING TREATMENT

The General Management Plan (GMP) is the primary planning document for determining the general treatment of all cultural resources in a park based on cultural and natural resource inventories. However, many GMPs do not specifically address the treatment of cultural landscapes. As a result, specific treatment of the cultural landscape may be decided in the Site Development Plan (SDP). When treatment of a landscape has not been prescribed through the planning process, a CLR may augment or be combined with an SDP to determine a preferred treatment and physical design.

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## CANT RANCH HISTORIC DISTRICT MANAGEMENT PHILOSOPHY

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The Cant Ranch Historic District is a valuable cultural resource within John Day Fossil Beds National Monument. Significant cultural landscape resources and values provide a range of options for management that are generally compatible with the proposed use of the site for NPS administration and visitor services as specified in the proposed Site Development Plan (SDP). Based on the cultural landscape evaluation, the character of the ranch ties most directly to the sheep ranch period from 1910 to 1946. Although the NPS has modified the landscape over the years to accommodate park operations and programmatic needs, key cultural landscape patterns, relationships, and individual features remain. Not all areas on the ranch exhibit the same type or degree of significance, so different management strategies are appropriate for specific areas within the district.

From an interpretive point of view, no attempt is made to "freeze" the cultural landscape of the Cant Ranch to a single date or period. What makes the ranch interesting and significant is the high degree of integrity to all three periods. Each historic period enforced the land use patterns and overall landscape organization of the previous era, providing a cultural landscape with a relatively high level of integrity. Design treatments and cultural landscape management focus on the integration and interpretation of features remaining from all significant historic periods as a way to enhance visitor understanding of the complexity and continuity of the site over nearly a century of use.

In addition, the landscape of Cant Ranch historically extended for miles beyond the physical boundaries of the existing 200-acre district, and the concept of designing for, or managing the landscape as a "working ranch" is not appropriate.

Finally, many historic ranching practices had an adverse impact on natural landscape features and systems. For example, allowing livestock unrestricted grazing along the John Day River eroded the river bank and compacted soils. No effort will be made to reestablish these practices just because they are historic. Rather, the philosophy for treating the cultural landscape will be to retain existing historic features and patterns. However, when considering reestablishment of nonextant features, such as fences, or rehabilitation of biotic cultural resources, such as the agricultural fields, a more integrated and sustainable approach to management will be encouraged.

*(Excerpted from Cultural Landscape Report: Cant Ranch Historic District, John Day Fossil Beds National Monument.)*



*View of Cant Ranch Historic District,  
John Day Fossil Beds National  
Monument. (NPS, 1993)*

Treatment decisions are based on many factors, including:

- Legislative and management factors
  - ▶ park-enabling legislation
  - ▶ policy, guidelines, and standards
  - ▶ park management objectives
  - ▶ proposed use (as defined in planning documents)
- Resource-based factors
  - ▶ historical integrity and significance
  - ▶ level of historical documentation
  - ▶ existing conditions
  - ▶ threats and resource conflicts
- Operational factors
  - ▶ health and safety
  - ▶ maintenance requirements
  - ▶ projected costs

The above factors, especially those pertaining to legislation and management, directly influence the project agreement for a CLR. In addition, they help define a preservation strategy for long-term management of a cultural landscape. (See the section titled, “Use of Cultural Landscape Reports in Park Planning and Design” earlier in this guide.)

### **Defining a Primary Treatment**

Defining a primary treatment for a property is important because it ensures consistency in treatment activities. This is emphasized in *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. In selecting a primary treatment, each treatment action is evaluated on the basis of the landscape's value as a cultural resource. One

goal of the primary treatment is to ensure that the historic features contained in the landscape actually existed together. A landscape's "period of significance" (defined through research) provides the best frame of reference for evaluating the congruity of treatment actions, especially those related to removal and reconstruction. A recommendation to remove or reconstruct a particular feature should be evaluated on the basis of whether the feature was present in the landscape at the end of the period of significance.

Because of the complexity of many cultural landscapes, the primary treatment often serves as a general treatment for the entire landscape. The primary treatment is defined by the overall level of intervention and change proposed for the landscape. Take, for example, the Eugene O'Neill National Historic Site. Here, restoration was selected as the primary treatment to reestablish the courtyard design at the time of O'Neill's tenure. The restoration involved reconstructing the circulation system and terrace areas, removing later additions, and replanting vegetation. (See Figures 41 and 42.)

Certain portions of the O'Neill design were rehabilitated to accommodate public access and use of the site. For example, a subsurface grass paver path was installed to accommodate universal accessibility. This required removing some historic vegetation and changing the grade of a secondary historic walkway. In a few cases, plantings were also altered. In the lower patio of the courtyard, the loss of a significant historic tree increased the sunlight in the area, requiring substitute, sun-tolerant plant material to be placed in an area that historically had been in full shade. (See the insert titled, "Evaluating Treatment Actions" later in this section, and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix D: Preservation Briefs (no. 36)," and *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 13: Accessibility.")



Figure 41. Lower terrace of courtyard at the Tao House, Eugene O'Neill's primary residence from 1937-1944. Historically, the lower terrace was heavily shaded by a large Walnut tree and included shade-tolerant plants. Eugene O'Neill National Historic Site. (NPS, c. 1940)

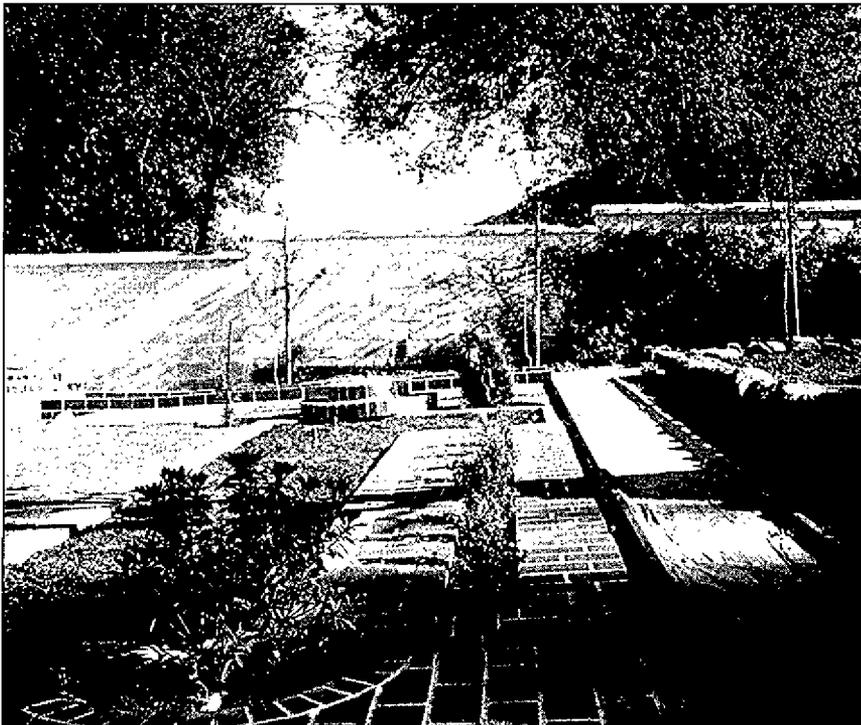


Figure 42. Lower terrace during project work. Restoration was selected as the primary treatment for the courtyard. However, certain courtyard features were rehabilitated based on changes in use and growing conditions. Some historic paths were altered to increase accessibility, and original plant material was substituted with sun-tolerant plants based on the loss of the adjacent tree (the tree will be replanted and original plants will be installed once the necessary growing conditions have been established). Eugene O'Neill National Historic Site. (NPS, c. 1988)

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## SECRETARY OF THE INTERIOR'S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES

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### Standards for Preservation

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

### Standards for Rehabilitation

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new material will match the old in composition, design, color, texture, and where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

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10. New additions or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

#### **Standards for Restoration**

1. A property will be used as it was historically, or be given a new use that reflects the property's restoration period.
2. Materials and features from the restoration period will be retained and preserved. The removal of materials or alteration of features, spaces, and spatial relationships that characterize the period will not be undertaken.
3. Each property will be recognized as a physical record of its time, place and use. Work needed to stabilize, consolidate, and conserve materials and features from the restoration period will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Materials, features, spaces, and finishes that characterize other historical periods will be documented prior to their alteration or removal.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize the restoration period will be preserved.
6. Deteriorated features from the restoration period will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new material will match the old in design, color, texture, and where possible, materials.
7. Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence. A false sense of history will not be created by adding conjectural features, features from other properties, or by combining features that never existed together historically.
8. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

9. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

10. Designs that were never executed historically will not be constructed.

#### **Standards for Reconstruction**

1. Reconstruction will be used to depict vanished or non-surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.
2. Reconstruction of a landscape, building, structure, or object in its historic location will be preceded by a thorough archeological investigation to identify and evaluate those features and artifacts which are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures will be undertaken.
3. Reconstruction will include measures to preserve any remaining historic materials, features, and spatial relationships.
4. Reconstruction will be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property will recreate the appearance on a nonsurviving historic property in materials, design, color, and texture.
5. A reconstruction will be clearly identified as a contemporary re-creation.
6. Designs that were never executed historically will not be constructed.

(Excerpted from *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, 1995.)

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## EVALUATING TREATMENT ACTIONS

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Based on the management philosophy and primary treatment defined for a cultural landscape, detailed treatment actions are outlined in the CLR. Each proposed action is evaluated, using the applicable policy, guidelines, and standards, to ensure consistency in the treatment of the landscape as a whole. The following basic process underlies all treatment actions and is followed to guide decisions about physical work in a cultural landscape.

### Identify, Retain and Preserve

Basic to the treatment of all cultural landscapes is the need to identify, retain, and preserve the characteristics, features, and qualities that contribute to the significance and integrity of the landscape and, as such, are important in defining its historic character (such as topography, vegetation, circulation, spatial organization).

### Protect and Maintain

After identifying the characteristics, features, and qualities that are important and must be retained in the process of treatment work, measures are taken to protect and maintain them in good condition (preservation maintenance). For example, proper pruning, fertilization, pest control, and tree cabling to maintain structural stability are measures used to protect and maintain the health and vigor of vegetation.

### Repair

If the physical condition of the identified characteristics, features, and qualities is poor, then repair is recommended. For example, limited replacement in-kind of deteriorated portions of a structure in the landscape and rejuvenative pruning of overgrown plant material constitutes repair of a landscape.

### Replace

If the condition of a feature precludes repair, then replace the feature. The replacement is in-kind; that is, with the same form, detail, character, material, etc., as the original. If replacement in-kind is not possible, for technical, economic, or environmental reasons, then a compatible substitute material is considered. Examples of in-kind replacement include replacing a brick walkway where the bricks are spalling and broken beyond repair, and propagating over mature historic plant material for eventual replacement. An example of substitution includes replanting of an American Elm with a cultivar that is resistant to Dutch Elm disease.

### Design for Missing Features

When an entire feature is missing, and it is determined desirable to reestablish the feature as part of the landscape's historical appearance, then a design for the missing historic feature is undertaken. If adequate historical, pictorial, and physical evidence exists to accurately reproduce the feature, then designing, constructing, and/or installing a new feature based on the information is appropriate. Examples include reestablishing an allee of trees along an entry drive or a series of steps leading to an overlook, based on adequate physical evidence. If there is inadequate information, the replacement reflects a new design that is compatible with the character of the landscape, yet contemporary so that a false historical appearance is not created.

Determining what is compatible yet contemporary is one of the most challenging aspects within the construct of treatment. The key to designing a compatible feature is identifying the historic character of the feature and determining a contemporary design which references the historic character in scale, detail, composition, and materials. For example, a treatment recommendation is to reestablish a fence around a farmstead but there is insufficient evidence regarding the exact historic design. Based on the knowledge that picket fencing was historically used, the design principles that guide the replacement might include the siting, use of certain materials, and incorporation of the vertical, uniform character of a picket fence in the design. In order to distinguish the fencing from an accurate reproduction, a contemporary design (such as a square) for the top of each picket might be chosen.

### Compatible Alterations and Additions

Alterations and additions to a landscape are often needed to assure continued use. Such additions and alterations, however, do not radically change, obscure, or destroy significant historic spatial organization, materials, and features. Alterations, additions, or related new construction are differentiated from the historic fabric yet compatible with the character of the landscape to protect its historic integrity. Examples of compatible additions and alterations include locating a new parking area for visitors outside the historic core of a landscape, installing a ramp for accessibility in a manner that is visually compatible and does not destroy historic materials, and substituting unhealthy historic plant material with disease resistant modern varieties.

(Derived from *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. 1995.)

## LEVEL OF DETAIL

The level of detail in the treatment section of a CLR depends on the management objectives for the cultural landscape as described in the project agreement. When a CLR is prepared to augment park planning documents (such as, a Site Development Plan), the treatment section may define the parameters for development and preservation in the form of written guidelines or a schematic design, or both. When a CLR is prepared to implement the proposed actions outlined in park planning documents, the treatment section may include a detailed treatment plan for implementation. (See Figures 43 and 44.)

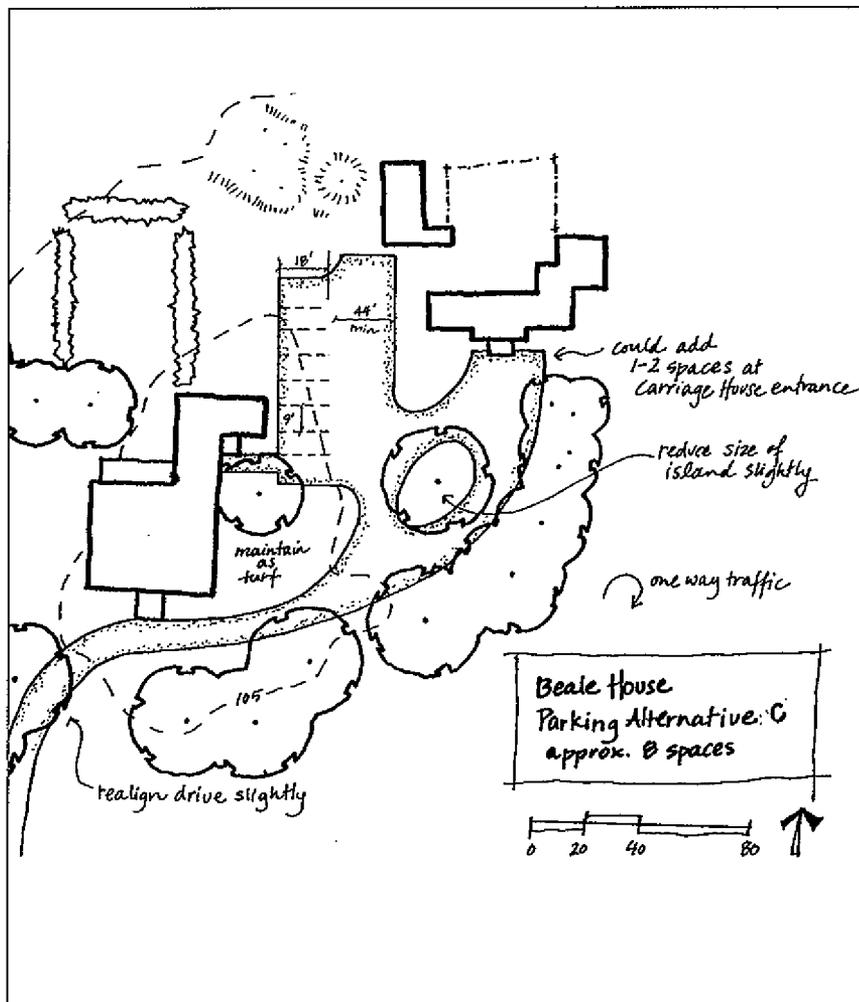


Figure 43. This parking alternative plan provides a schematic level of detail for parking treatment. Beale House, Adams National Historic Site. (NPS, n.d.)

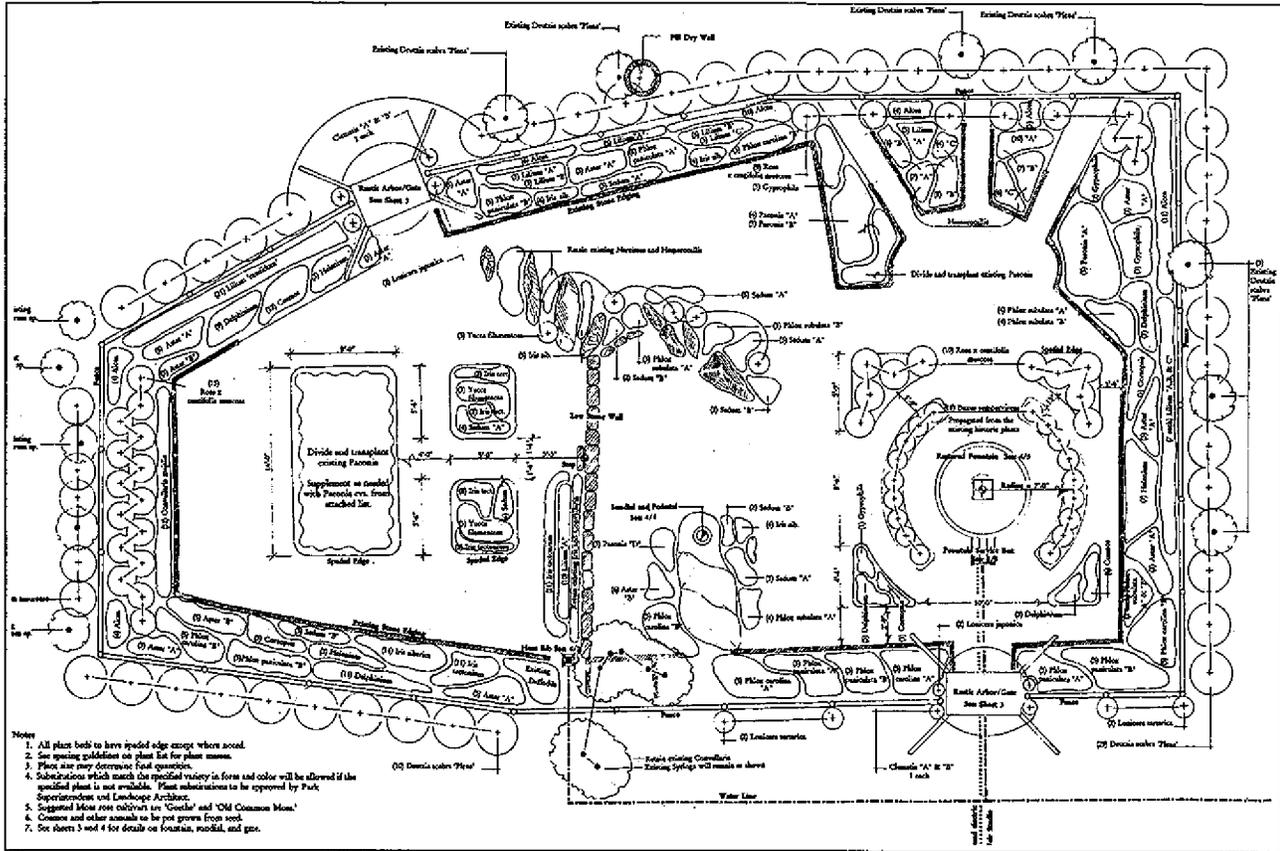


Figure 44. This planting plan for garden restoration illustrates a detailed treatment plan based on historic photographs and archeology. Weir Farm National Historic Site. (NPS, 1994)

The type of landscape resource is also a factor in the level of detail provided. For example, a plan to restore a formal garden at Saint-Gaudens National Historic Site may involve development of a detailed treatment plan, detail drawings, phasing plan, and cost estimates, whereas a plan to preserve the agricultural character of Ebey's Landing National Historical Reserve may only include written guidelines to guide continued use. (See the insert titled, "Narrative Design Guidelines—An Example" later in this section.)

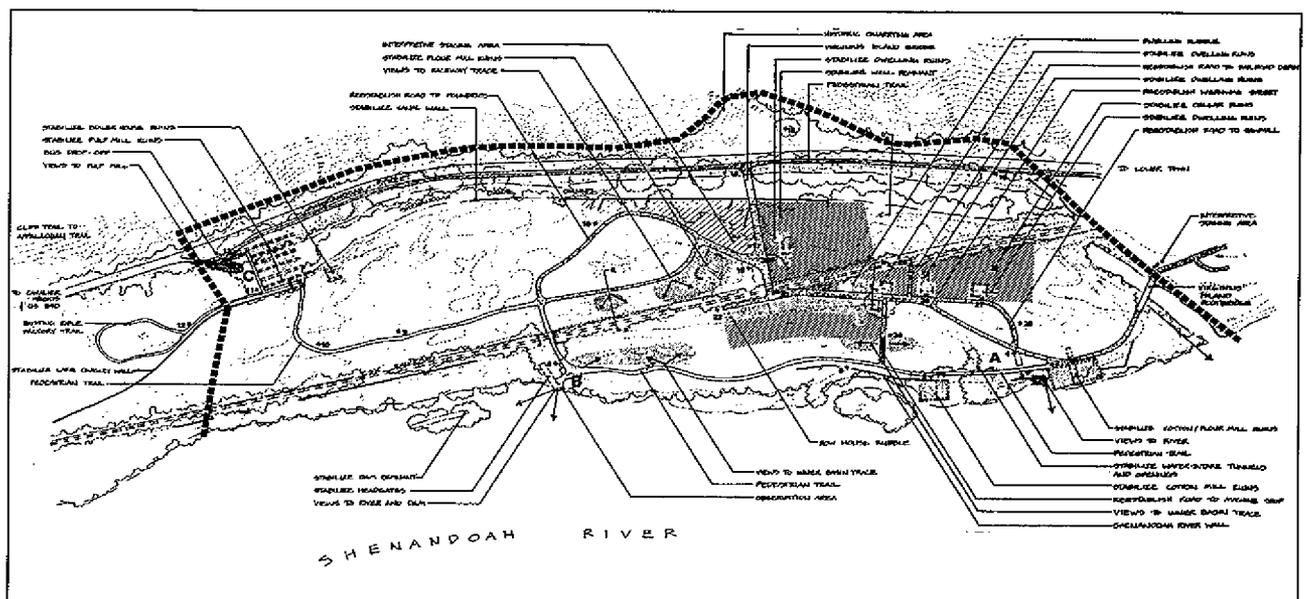
## FORMAT

Recommendations for treatment are presented in a CLR in several forms. Generally, treatment recommendations are presented in either a treatment plan, narrative guidelines, or both. In some cases, treatment alternatives are presented in a CLR.

## Treatment Plan

A treatment plan is a schematic or detailed design drawing that graphically depicts all proposed changes to a cultural landscape in a manner that allows the entire site to be viewed. (See Figures 43 through 46.) The plan addresses treatment of the landscape characteristics and associated features throughout the site. Additionally, the plan may identify various phases for implementing the proposed work. Detailed treatment plans are extremely useful for illustrating the proposed modifications or alterations to the cultural landscape, and the relationship of one treatment action to another within the entire property. A treatment plan should be annotated and supplemented with a narrative description of the proposed actions.

Figure 45. Treatment plan for Virginus Island, Harpers Ferry National Historical Park. (NPS, 1992)





Treatment drawings developed as part of a CLR comply with current drafting standards in *Drawing Format and Drafting Practices Guideline*, Denver Service Center computer graphic standards (CAD/GIS), and the graphic documentation guidelines outlined in *A Guide to Cultural Landscape Reports: Landscape Lines*. Drawings are developed to a scale and level of detail that permits pertinent information to be communicated in a useful manner. All supplementary text and source material is recorded on the drawing. All drawings are given a NPS drawing number and sent to Denver Service Center Technical Information Center to be microfilmed. (See *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 5: Graphic Documentation," and *A Guide to Cultural Landscape Reports: Appendices*, "Appendix D: Preservation Briefs (no. 36).")

### **Narrative Guidelines**

Narrative guidelines provide written recommendations for treatment of a cultural landscape. These guidelines supplement a treatment plan or constitute the treatment section of a CLR. Written guidelines are often used to provide a context for planning decisions made in a Site Development Plan. In this situation, the treatment portion of a CLR sets the design context (based on the significance and integrity of the landscape) and physical parameters for modification of the landscape based on a contemporary program or operational use of the site.

Written guidelines may be the most appropriate format for prescribing treatment and management of specific types of landscape resources, primarily landscapes that are significant because of the pattern of use that has evolved from traditional activities, such as agriculture. Written guidelines state the optimum preservation treatment and also recommend compatible new design when change is imminent. (See the insert titled, "Narrative Design Guidelines—An Example" on the following page.)

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## NARRATIVE DESIGN GUIDELINES — AN EXAMPLE

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### Planting Concepts

Planting beds between Rim Village Road and the caldera have integrity and should be retained whenever possible in the redevelopment of the area.

Plant materials within each planting bed should be evaluated to determine the physical condition of individual plants, and then stabilized, rejuvenated, or replaced in-kind, as appropriate.

Historic planting beds that will be retained in the new design and have lost plant materials (due to visitor impacts and snow loads) should be restored following historic design principles, including the selection and use of native plant materials.

A detailed site plan should be prepared for the plaza south of the lodge that addresses rehabilitation of the planting beds and all associated features.

In the rehabilitation of Crater Lake Lodge, individual plant materials around the foundation should be salvaged and reused, or replaced in-kind. Special attention should be given to the preservation of the large trees on the southwest and northwest corners of the structure.

The establishment of new planting areas at Rim Village should follow historic design principles including the use of native plant materials, massing, and a clear gradation of canopy, under story, and ground cover.

Revegetation of disturbed areas should target restoration of the materials and visual character of the surrounding landscape. Plants used along roads and walkways should be grouped to reflect natural associations and habitats marking the transition between forest and meadow.

(Excerpted from *The Rustic Landscape of Rim Village, 1927-1941, Crater Lake National Park, Oregon.*)



Figure 47. Vegetation at Rim Village, Crater Lake National Park. (NPS, 1988)

## Treatment Alternatives

In some cases, the objective of the treatment section in a CLR is to provide a range of treatment alternatives based on management, planning, and preservation requirements. Individual alternatives generally reflect distinct types of treatment, leading to the selection of a primary treatment. Alternatives may also reflect a series of phases in the implementation of a primary treatment. (See Figures 48 and 49.)

## COST ESTIMATES

Cost estimates for treatment may be a component of a CLR and generally will be based on Class C or B estimates. When available, costs should consider the following: technical reports/surveys, hazardous materials reports/surveys, soils or geotechnical reports/surveys, project site photos or video, and other reports or surveys as needed.

Class A estimates are based on “working drawings,” or final construction drawings and specifications. They include contractor costs for overhead, profit, and general conditions.

Class B estimates are based on “preliminary plans,” which include the following:

- site design, including existing and proposed utilities, grading, drainage, and plantings
- site design, including plans, elevations, and typical details
- outline specifications, including cut sheets of proposed equipment, fixtures or specialty items that might significantly affect the estimate
- initial quantity takeoffs for utilities, site work, and building systems (civil, landscape architectural, and architectural)

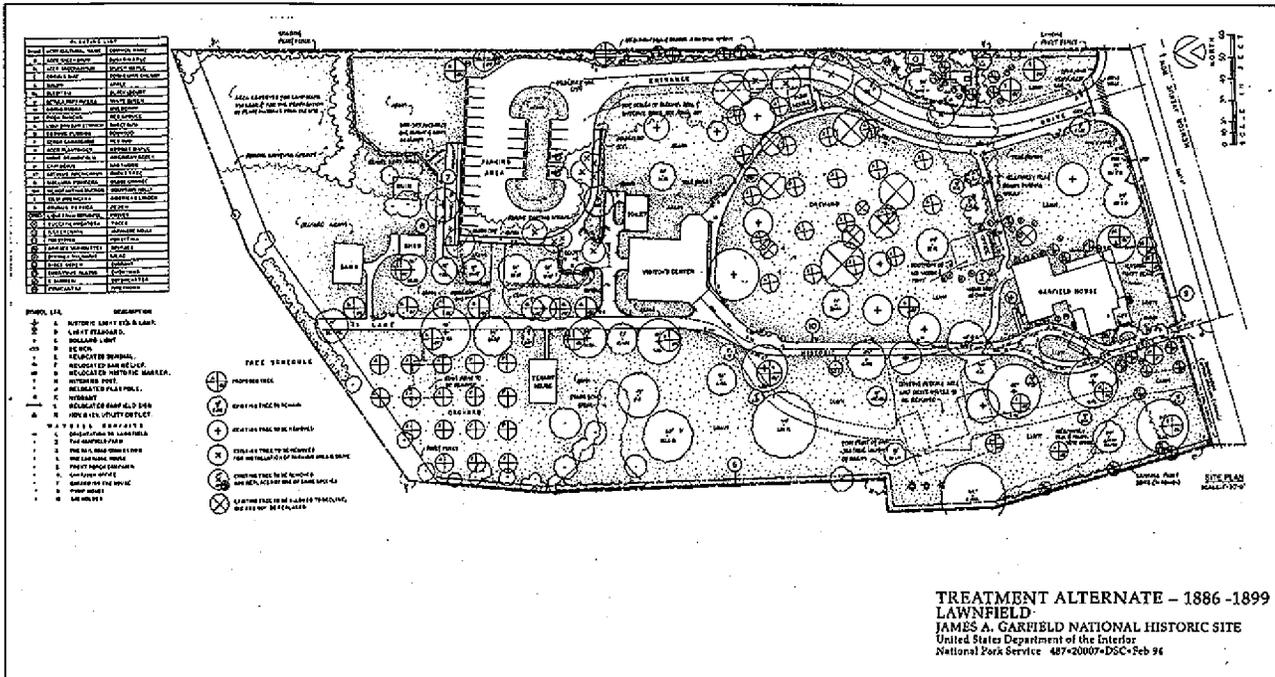


Figure 48. The CLR for Lawnfield includes treatment alternatives. James A. Garfield National Historic Site. (NPS, 1994)

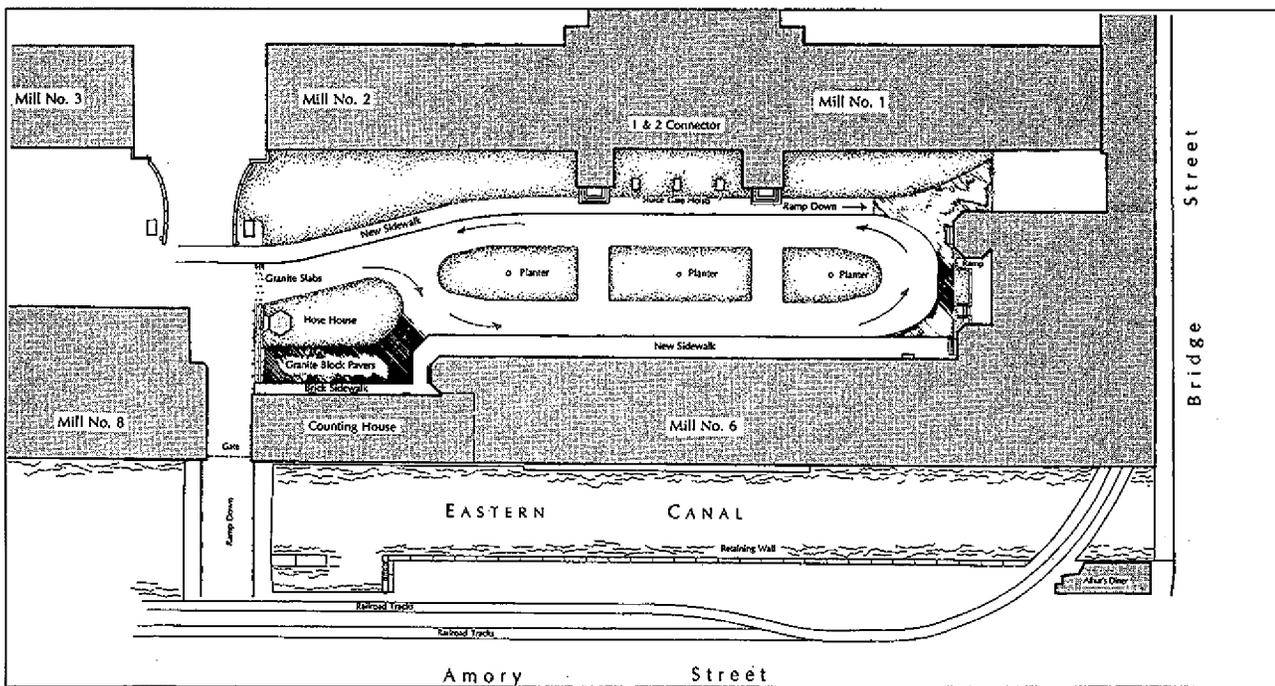


Figure 49. Rehabilitation was one treatment alternative considered for the Boott Cotton Mill No. 6. Lowell National Historical Park. (NPS, 1994)

Class C estimates are based on “similar facilities,” which include the following:

- anticipated acreage and landscape type
- anticipated site development, including existing and proposed utilities
- special environmental controls or systems
- anticipated structural systems
- known or anticipated unusual site conditions

(For more information, refer to *R.S. Means Building Construction Cost Data* and Denver Service Center’s *Class C Estimated Guide, New Construction*. Other specific cost references are available through R.S. Means.)

## TREATMENT CONSIDERATIONS

The greatest challenge in prescribing treatment for a cultural landscape is applying the philosophical basis underlying policy, guidelines, and standards to the dynamic qualities inherent in the landscape—a resource where change, function, and use are as significant as design and material. Following are a variety of considerations to address in defining a management philosophy, primary treatment, and specific actions to take in relation to a strategy for long-term management of a cultural landscape.

### Defining Type and Degree of Change

Because of the dynamic quality of a landscape, treatment addresses the type and degree of change that occurs while maintaining significant landscape characteristics and associated features. The appropriate level of change in a cultural landscape is closely related to its significance. In a landscape significant for its association with a specific style, individual, trend, or event, change may diminish its integrity and needs to be carefully monitored and controlled. (See Figure 50.)

Figure 50. In a historic designed landscape, change may diminish integrity and needs to be controlled. For example, a comparison of the character of the foundation plantings along the east facade of Vanderbilt Mansion in the 1940s (top) and the 1970s (middle) illustrates how the plantings had become overgrown, covering portions of the windows, and no longer reflected the original design intent. Vanderbilt Mansion National Historic Site. (NPS, c. 1940s and 1972)

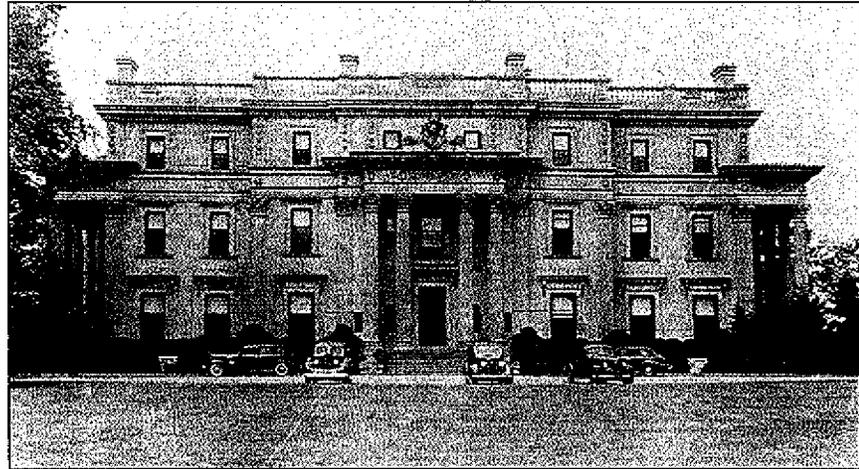
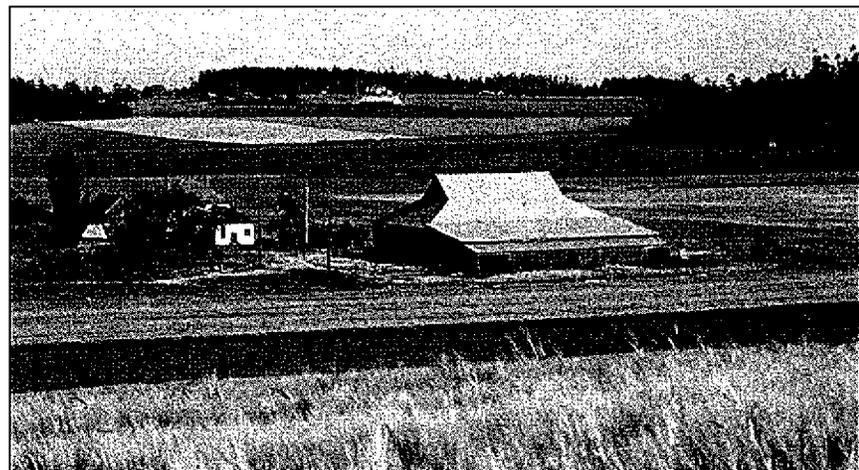


Figure 51. Smith Farm on Ebey's Prairie (bottom). As an agricultural landscape, land use is one of the primary characteristics that contributes to the significance of a historical reserve and, therefore, treatment needs to allow for change related to continued use. Ebey's Landing National Historical Reserve. (NPS, 1990)



In contrast, in a landscape significant for the pattern of use that has evolved, physical change may be essential to the continuation of the use. In this case the focus is on perpetuating the use while maintaining the general character and feeling of the historic period, rather than on preserving a specific appearance. (See Figure 51.)

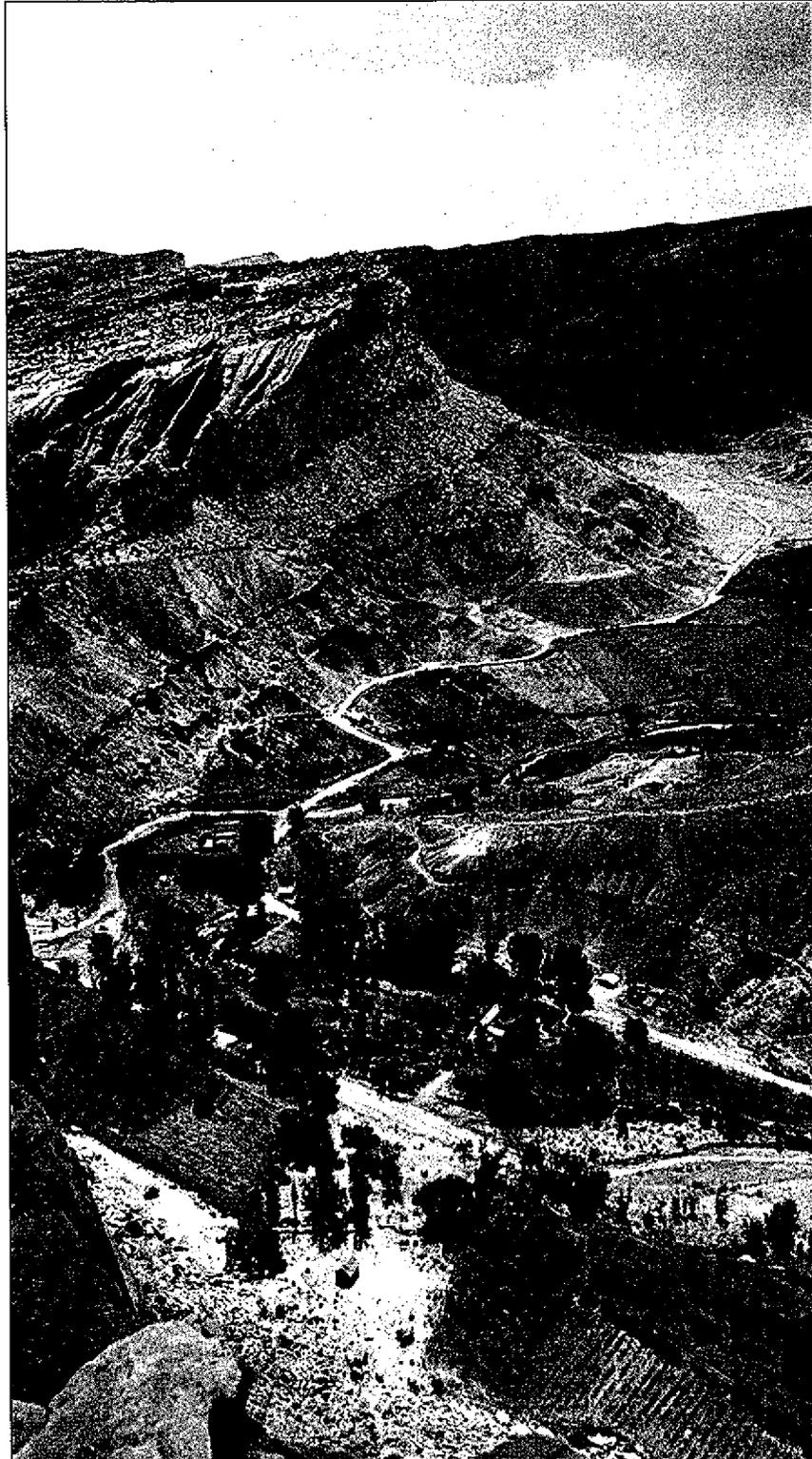
### Integrity

A primary consideration in determining treatment is the physical integrity of the landscape; that is, the ability of a property to convey its significance. The level of integrity influences treatment decisions regarding what features to preserve, where to accommodate change for contemporary use, and where to reestablish missing features. Integrity evaluations are based on a holistic assessment of the qualities that constitute the historic significance of a property.

Cultural landscapes are not separate systems or characteristics, but integrated, living, dynamic constructs. Focusing on the integrity of limited or singular components may obscure the real meaning or value in the landscape as a whole. (See Figure 52.) Judging the integrity of biotic material is approached with an understanding that these materials are inherently dynamic and subject to myriad factors that affect their growth and decline. Intentional alterations and substitutions, as well as the loss of historic plant material due to pests, disease, or neglect, are more often the norm than the exception in the history of many landscapes. These changes may not diminish the overall integrity of a landscape. The key question to consider is whether the change is reversible. For example, an open field that has been lost to succession may easily be reinstated in the landscape. (See Figure 53.)

The analysis and evaluation section of a CLR should define the physical qualities of a landscape that are extant from the historic period(s). For a landscape with multiple periods of significance, it is important to understand the relative integrity of all periods. One

Figure 52. Aerial view of Fruita Historic District. The integrity of a large vernacular landscape may be difficult to assess if individual components are evaluated in isolation from the larger landscape context. An initial evaluation determined that the Fruita Historic District was not eligible for the National Register based on an evaluation of the buildings within the district. A subsequent reevaluation of the district analyzed all the landscape characteristics and found that the district retained integrity of spatial organization, land use, circulation, and response to natural features. Capitol Reef National Park. (NPS, c. 1930)



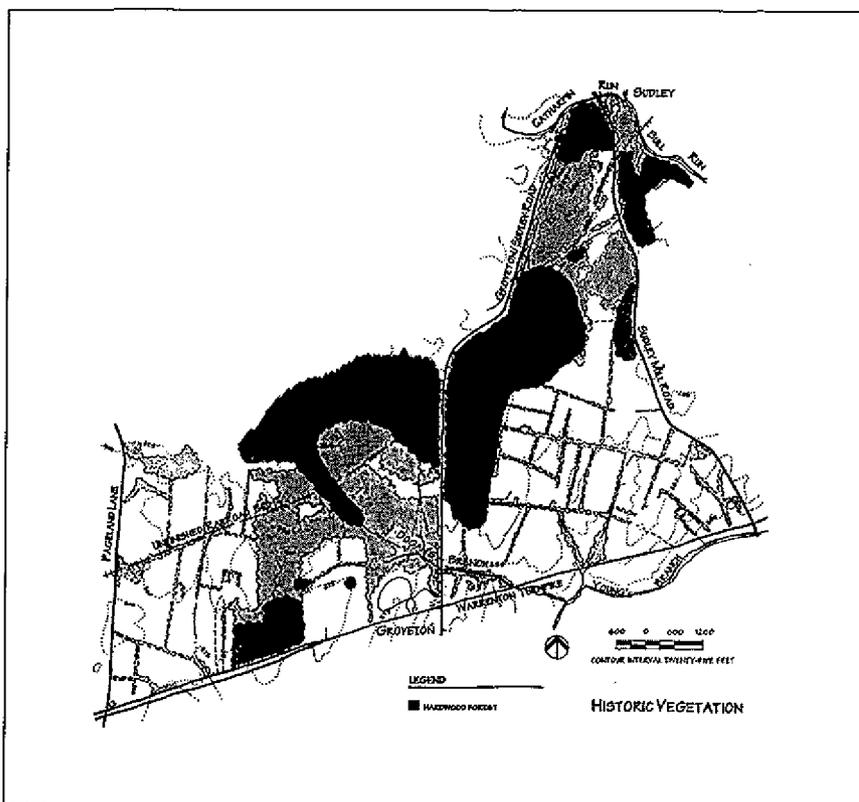


Figure 53. An evaluation of the integrity of Manassas Battlefield included a comparison of historic and existing vegetation patterns to determine which open fields had been lost to succession. A CLR for this section of the battlefield may recommend restoration of these open spaces and the views they allow. (NPS, 1996)

factor that may complicate decision-making is that certain associative meanings or cultural values related to a particular period of time may be thought of as more important than other periods of significance for which integrity can be more readily demonstrated. For example, the significance of the Vanderbilt Mansion National Historic Site is primarily associated with the Vanderbilt family tenure. Recent research revealed the significance of a period predating the Vanderbilt tenure, as one of only five landscapes authenticated to be designed by Andre Parmentier, a Belgian born landscape gardener and nursery owner who is a very important figure in the picturesque landscape style in the United States. This information was clearly documented in the CLR and should influence future decision making and treatment proposals. (See Figure 54.) (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (nos. 18, 30, 38, 40, 41, and 42).")

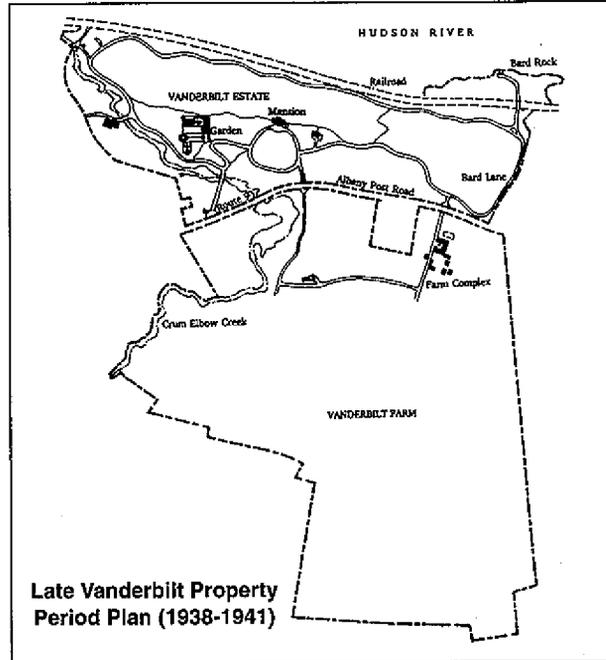
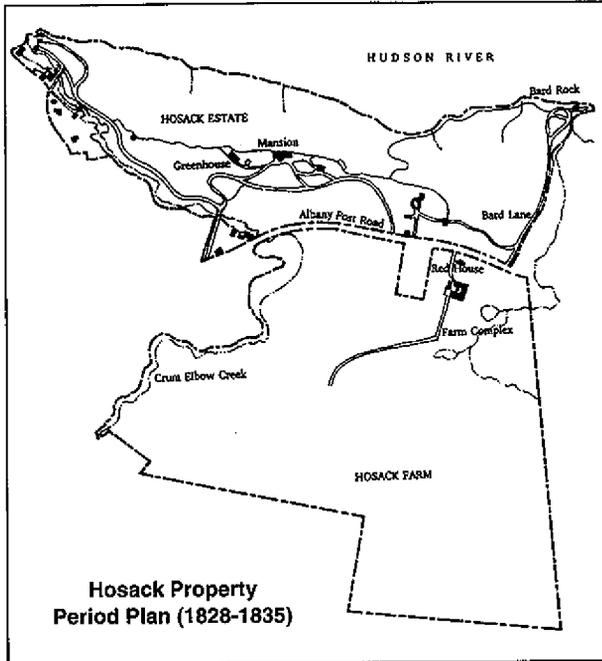
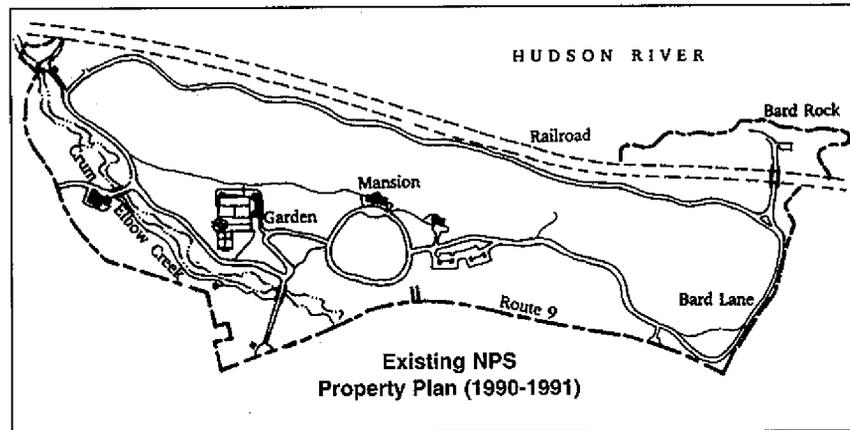


Figure 54. Prior to the CLR for Vanderbilt Mansion National Historic Site, the significance of the property was primarily associated with the Vanderbilt family. Research revealed the significance of an earlier landscape design by Andre Parmentier. The period plans illustrate the integrity of landscape characteristics and features introduced by Parmentier. Vanderbilt Mansion National Historic Site. (NPS, 1992)



## Biotic Cultural Resources

Plant and animal communities associated with human settlement and use are considered biotic cultural resources. Within a cultural landscape, biotic cultural resources are recognized either as a system (such as a forest or wetland) or as individual features (such as a solitary plant that functions as a specimen, or aggregations of plants, such as an orchard or woodlot) that contribute to a landscape's significance. Biotic

cultural resources are living materials that have a cycle of growth, change, and eventual death. The degree to which change contributes to or compromises the historic character of a cultural landscape, and what natural cycles influence the ecological processes within the landscape, must be understood.

In a cultural landscape, vegetation often requires constant management and intervention to retain the overall structure and appearance of the landscape. (See Figure 55.) Understanding the significance of vegetation



*Figure 55. Historic view of Lake Crescent Lodge (top) shows vegetation when the landscape was first cleared and planted (note the small fir tree on the right). The contemporary view (bottom) of the same landscape shows mature vegetation. Treatment of the landscape focused on rehabilitation and selective thinning to reestablish the open character of the site. Olympic National Park. (NPS, c. 1917 and 1985)*

in a cultural landscape is essential to prescribing treatment for maintaining and perpetuating it; whether the vegetation is associated with a significant event or individual, is an unusual or rare variety, or functions as part of a design or land use practice, will influence how it is managed and eventually replaced (such as exact genetic replacement, in-kind replacement with available nursery stock, substitution with compatible material). For example, the preservation of a single tree in a historic designed landscape may be critical to the integrity of the overall design. (See Figure 56.) In contrast, an entire woodland may have significance, so that preserving the ecological processes of the system rather than individual trees becomes paramount. (See Figure 57.) Determining a treatment strategy for the biotic cultural resources within a cultural landscape involves consultation with appropriate natural resource professionals.

(See *A Guide to Cultural Landscape Reports: Landscape Lines*, "Landscape Lines 12: Treatment of Plant Features," *A Guide to Cultural Landscape Reports: Appendices*, "Appendix G: Biotic Cultural Resources," and "Appendix I: Preservation Maintenance.")

### **Balancing Various Resource Values**

Cultural landscape treatment involves consideration of both natural and cultural resource values, and decisions about treatment and management often involve balancing various values. All resource values related to a particular landscape should be understood prior to defining specific treatment and management goals. The relative importance and relationship of all values are weighed to identify potential conflicts between preservation goals based on the significance of a cultural landscape and goals pertaining to other cultural or natural resources. (See Figures 58 and 59.)

Where conflicts exist, value judgements are made regarding what is preserved, compromised, or removed. An integrated approach involving the appropriate disciplines is needed to define the cultural and natural



*Figure 56. The Olmsted Elm is a significant individual specimen feature that contributes to the cultural landscape of Fairsted, Frederick Law Olmsted's home and studio. (Photograph courtesy of Frederick Law Olmsted National Historic Site, n.d.)*



*Figure 57. The woodland in Cades Cove Historic District is a significant plant system related to the agricultural use of the district. Great Smoky Mountains National Park. (Photo courtesy of Richard Westmacott, 1993.)*

Figure 58. Natural resource management of the meadows at Paradise in Mount Rainier National Park emphasizes preservation of the high alpine ecosystem, which allows the landscape to change over long periods of climate change and landscape dynamics. The cultural landscape values of the meadows relate to the open character of the meadows and the spectacular wildflower displays that historically inspired people to visit Paradise. Historically, trees were cut to maintain this open character. Today park staff is monitoring the rate of succession and infill by trees to evaluate the degree and rate of change in an effort to balance resource values. Mount Rainier National Park. (NPS, 1990)

resource values in the landscape and reconcile any conflicts. Examples of conflict resolution include: providing a mechanism for allowing vine cover on a historic structure without causing damage to the structure; maintaining the agricultural use of a landscape while minimizing the negative environmental impact associated with that use; and not introducing exotic plants that can be invasive and affect areas outside a cultural landscape. In certain cases, one resource value will take precedence over another. For example, an endangered species habitat will take precedence over the cultural landscape values. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix F: Preservation Tech Notes.")





*Figure 59. Farming is a significant, ongoing land use at Ebey's Landing National Historical Reserve. Management of the reserve involves minimizing the potential negative impacts associated with agriculture. Ebey's Landing National Historical Reserve. (NPS, 1983)*

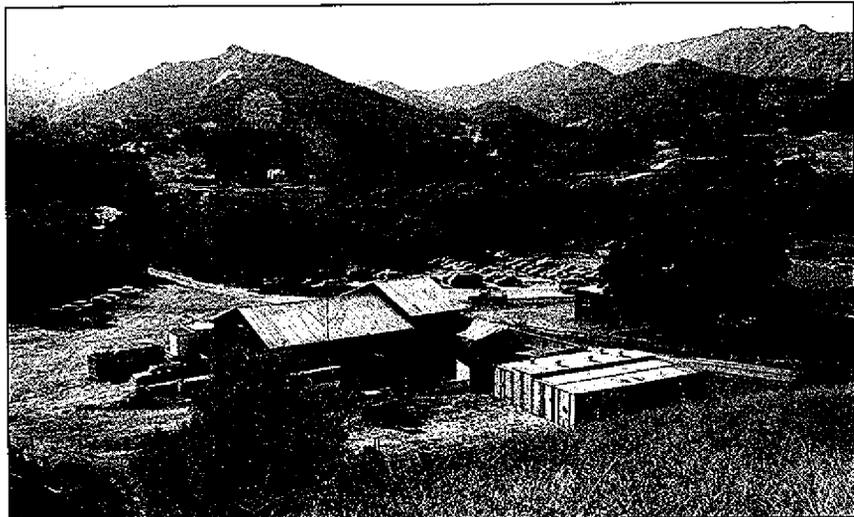
## Landscape Use and Ethnographic Value

Many cultural landscapes are significant because their historic land use and practices are based on traditional activities such as mining, fishing, agriculture, or community ceremony or celebration. These landscapes often reflect the beliefs, attitudes, traditions, and values of people both past and present. When land use is a primary reason for significance of a landscape, the objective of treatment is to balance perpetuation of use with retention of the tangible evidence that represents its history. (See Figures 60 through 63.)

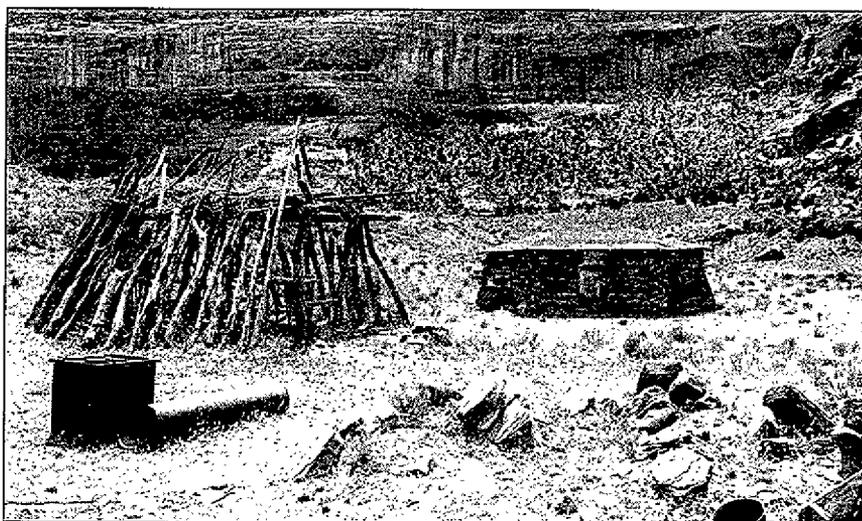
*Figure 60. The history of dairy and beef ranching within Point Reyes National Seashore began in 1834. Many of the historic ranches remain in operation today. Management must balance the preservation of existing historic features with new additions required to maintain a viable working ranch. Point Reyes National Seashore. (NPS, c. 1915)*



*Figure 61. The historic operational center of Paramount Ranch. This site has been modified numerous times to accommodate various needs and still functions as an active movie set. Management must address continual modification of the site for new movie sets. Santa Monica Mountains National Recreation Area. (NPS, 1992)*



Physical change is often essential to continuation of the historic land use. In such cases the treatment section of a CLR should provide guidance for perpetuating use while maintaining the general character and feeling of the landscape. It may be less critical to preserve individual features than to preserve the overall structure and character of the landscape. In an agricultural landscape, for example, perpetuation of a particular crop may not be as important as the general character, number, and configuration of field patterns.



*Figure 62. A typical Navajo homesite in Canyon de Chelly consisting of a hogan, ramada (shade structure), and fire pit. Navajo peoples have lived and farmed within the canyons of the park for centuries and continue this activity today. Management focuses on the perpetuation of this use and protection of the archeological resources in the canyon. Canyon de Chelly National Monument. (NPS, 1995)*



*Figure 63. Mission Concepcion is one of five missions along the San Antonio River. The Mission is still actively used by the local community and is owned by the Catholic Archdiocese of San Antonio. Treatment and management decisions are made by the park in association with the Archdiocese based on a cooperative agreement. San Antonio Missions National Historical Park. (NPS, 1992)*

Use of a cultural landscape takes many forms and includes ethnographic value when the use is associated with contemporary groups. Natural and cultural resources have ethnographic value when "associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their life ways." Therefore, a cultural landscape or feature within it "may acquire meaning according to the different cultural constructs of a particular group" (*Cultural Resources Management Guideline*, Release No.5, Chapter 10). Treatment decisions affecting landscapes with ethnographic value involve cultural anthropologists to ensure that all cultural values are considered.

### **Design Intent**

Recognition of the design intent associated with a cultural landscape is important in determining treatment of the landscape and the individual features within it. Design intent is defined as the creative objectives of a designer, architect, landscape architect, artist, individual, or group applied to the development of a cultural landscape. The concept of design intent generally is applied to historic designed landscapes; however, it is also applicable to historic vernacular landscapes, historic sites, and ethnographic landscapes. An understanding of design intent provides a context for evaluating change in the landscape (that is, what change was intended and planned for as part of the design and development of the site, and what change has altered the site relationships and intended character of the landscape). Defining design intent involves interpreting the written and graphic record or oral history for the landscape. Treatment decisions should factor in the intentions of the designer or individual during the historical period. Therefore, when applicable, the treatment section of a CLR interprets the design intent of the cultural landscape (defined in site history) and applies it to the proposed treatment and management decisions. (See Figures 64 through 67.)

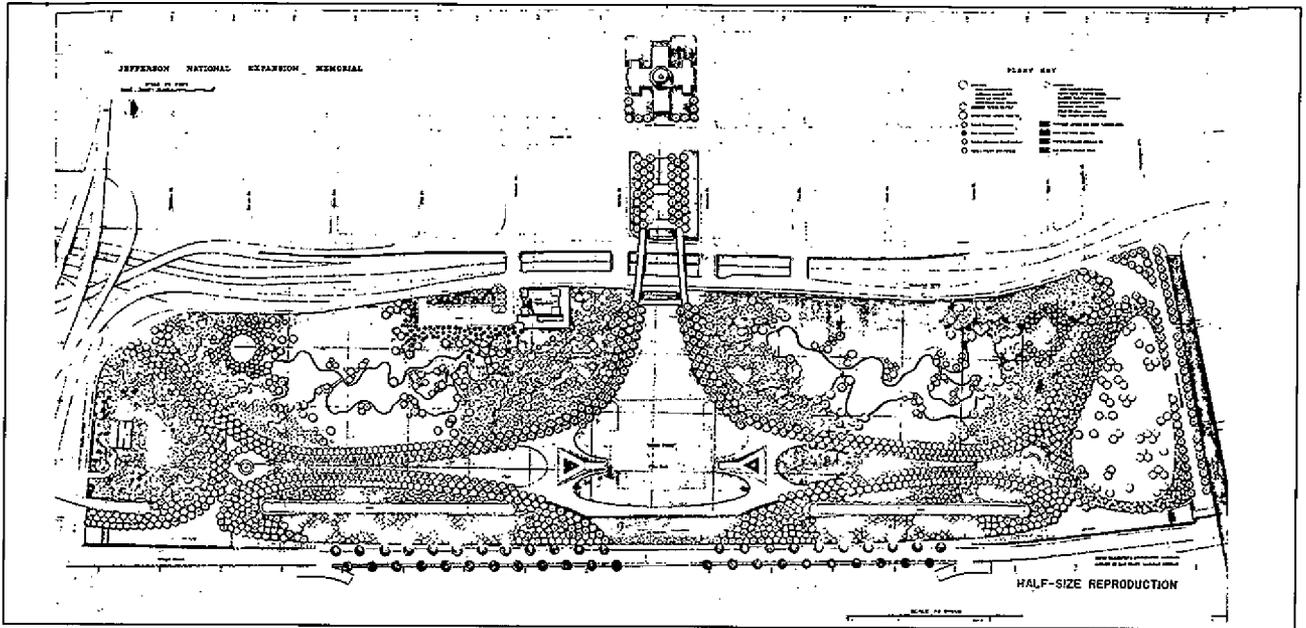


Figure 64. The above plan illustrates the final approved design of architect Eero Saarinen and landscape architect Daniel Urban Kiley for the Jefferson National Expansion Memorial. (The original design competition was awarded to Saarinen in 1948 and Kiley was hired in 1957 as landscape architect for the project.) Jefferson National Expansion Memorial. (NPS, 1966)

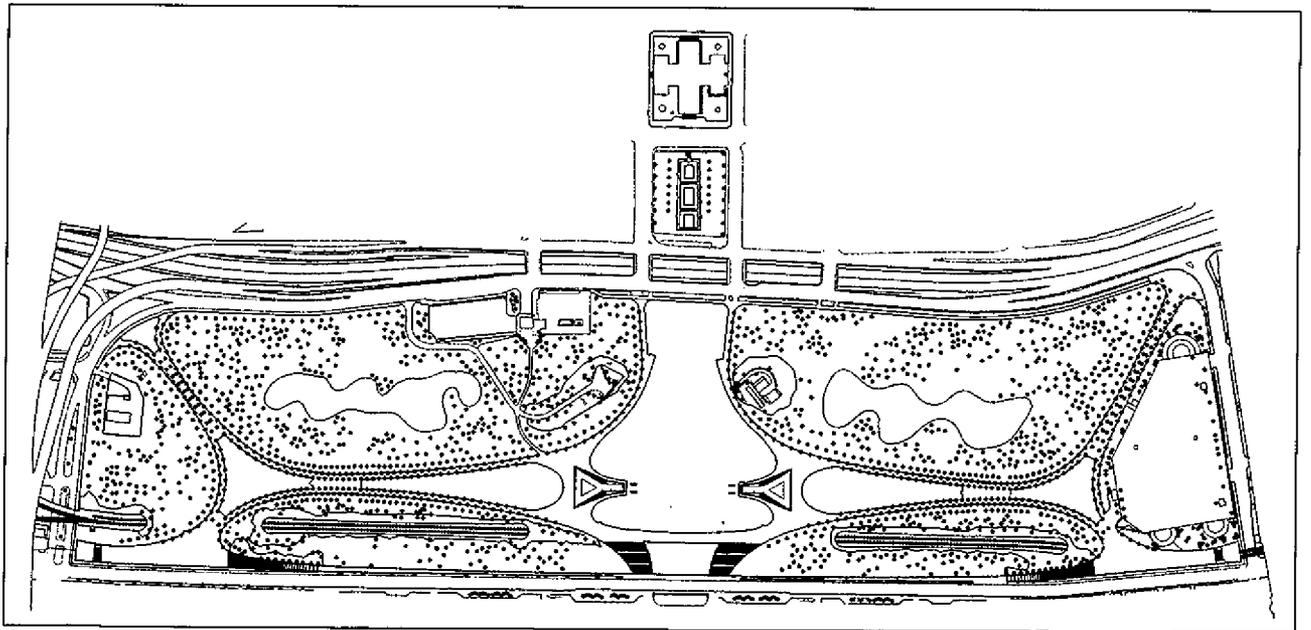


Figure 65. Construction of the park was not completed until 1986 and several changes were made to the original design. However, the existing conditions plan illustrates the close relationship of the park today to the original design intent. Jefferson National Expansion Memorial. (NPS, 1995)

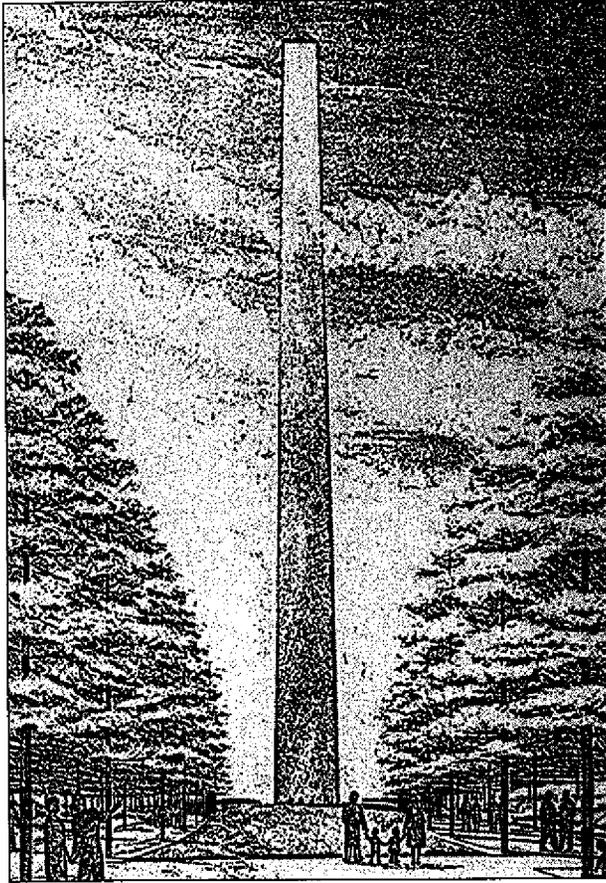


Figure 66. Sketch by landscape architect Daniel Urban Kiley illustrating the view toward the Arch at Jefferson National Expansion Memorial. To enframe the Arch, Kiley selected Tulip Poplar (*Liriodendron tulipifera*) based on its height and habit of growth. Jefferson National Expansion Memorial. (NPS, 1962)

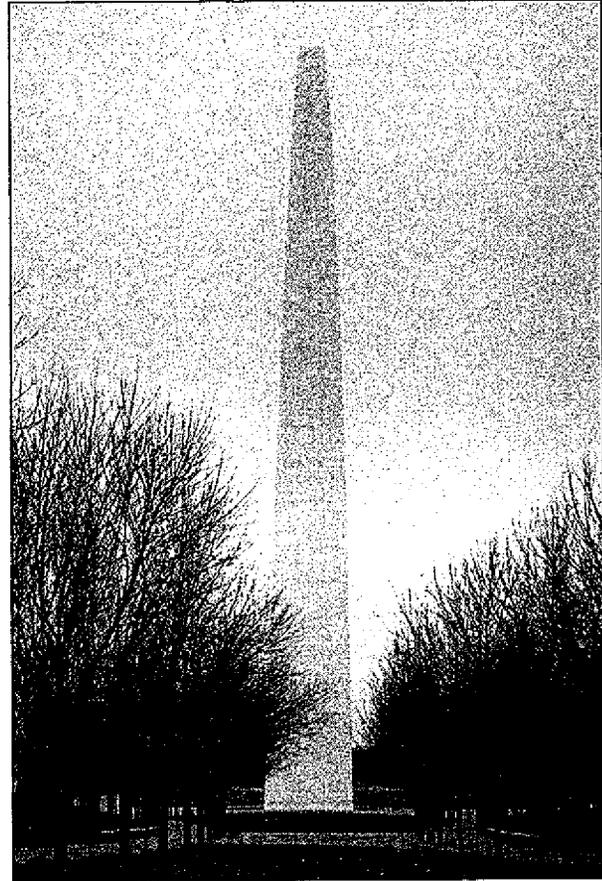


Figure 67. Existing view toward the Arch. The NPS substituted the Tulip Poplar (*Liriodendron tulipifera*) trees with Rosehill Ash (*Fraxinus americana*) trees. However, the design intent illustrated by Kiley's sketch is still achieved. Jefferson National Expansion Memorial. (NPS, 1995)

## Interpretation and Education

Interpretation and education are essential aspects of landscape management, providing visitors the opportunity to experience and understand a landscape as it existed historically and as it has evolved to the present. The techniques and methods of interpretation include self-guiding brochures, bike and auto routes, and visual simulations. (See Figures 68 and 69.) Selecting a method for interpreting the landscape depends on numerous factors, but mostly on the level of integrity of the landscape and its ability to convey its historic significance. Landscapes with little integrity require

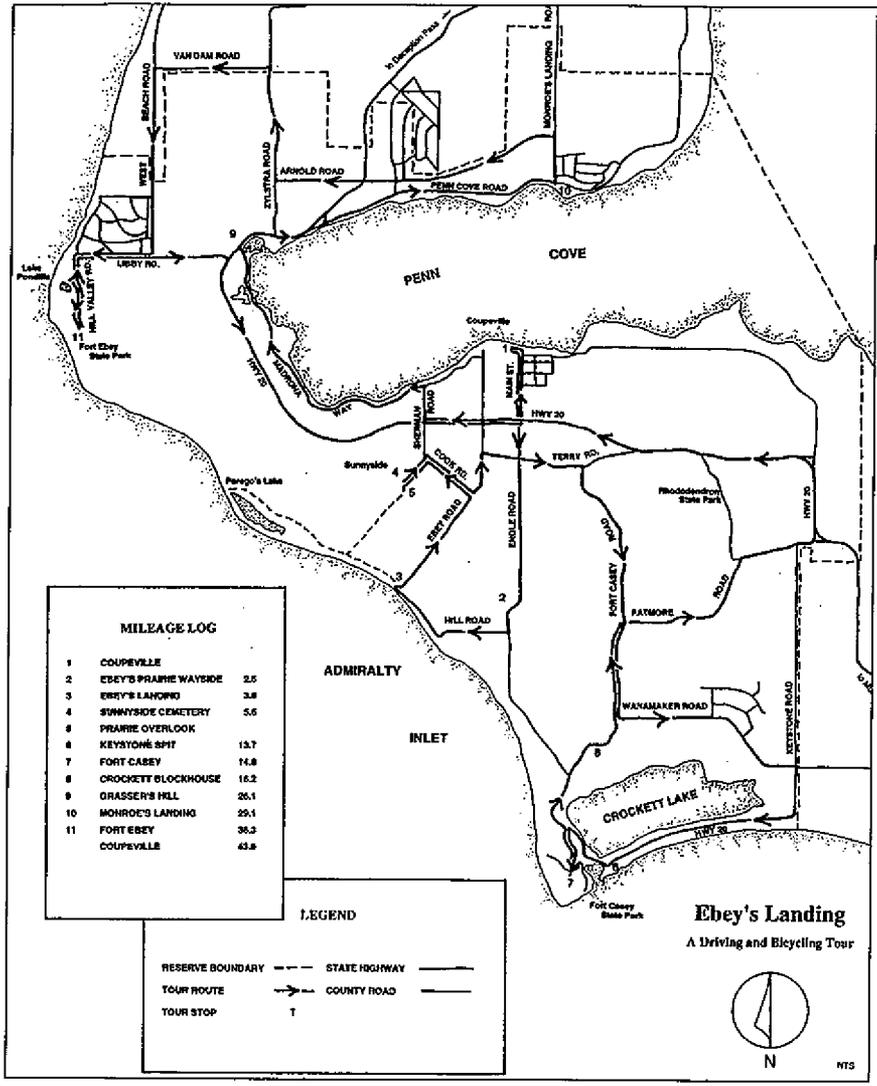
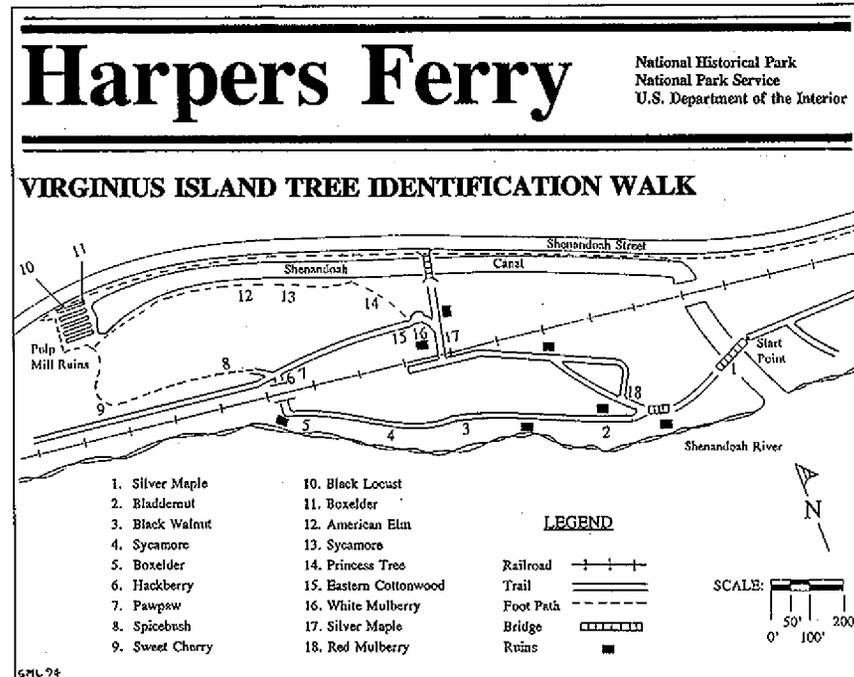


Figure 68. Driving and bicycling tour of Ebey's Landing National Historical Reserve. The tour illustrates the Reserve's scenery, introduces the recreational opportunities, and assists a visitor in learning about the agricultural history of the prairies and uplands. Ebey's Landing National Historical Reserve. (NPS, n.d.)

more interpretation to depict their historic character. In selecting an interpretive technique, the effect on the physical and visual character of the cultural landscape should be evaluated. Additionally, the scope and technique for interpreting a landscape with ethnographic significance should be determined in consultation with park-associated communities.

A CLR provides valuable information about the history and significance of a cultural landscape, information that can be incorporated into the interpretive program for a site. Conversely, the interpretation of a site can

Figure 69. Following the rehabilitation of Virginius Island, a 1/4 mile tree identification trail was developed to interpret the historical use and natural adaptation associated with trees on the island. Harpers Ferry National Historical Park. (NPS, 1994)



influence treatment recommendations, such as when nonextant features must be reestablished in order to accurately interpret a site. The landscape at the Frederick Law Olmsted National Historic Site, for example, was restored to its circa 1930 appearance. Restoration was selected as the treatment to enhance the interpretation of the property's relationship to Olmsted Sr. and the Olmsted Brothers' firm at the peak of its productivity.

### Maintenance and Sustainability

The majority of preservation work associated with cultural landscapes is carried out by hands-on field managers. All treatment decisions are made with a consideration and understanding of maintenance issues to ensure that the proposed treatment is accomplished and maintained over time. (See Figure 70.) There are various considerations for evaluating the sustainability of a proposed treatment, such as the following:

- Does the park have an existing maintenance capacity to support the treatment decisions, and if not, what changes are needed?

- Has the cost and feasibility of implementing and maintaining the treatment been adequately considered and discussed with management?
- Should priority be placed on preserving extant historic fabric over reconstruction of missing features?

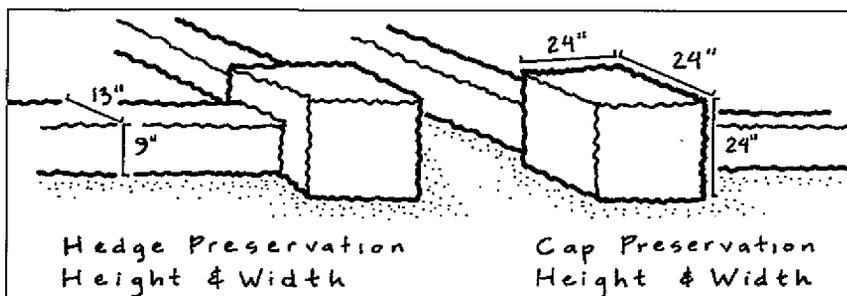
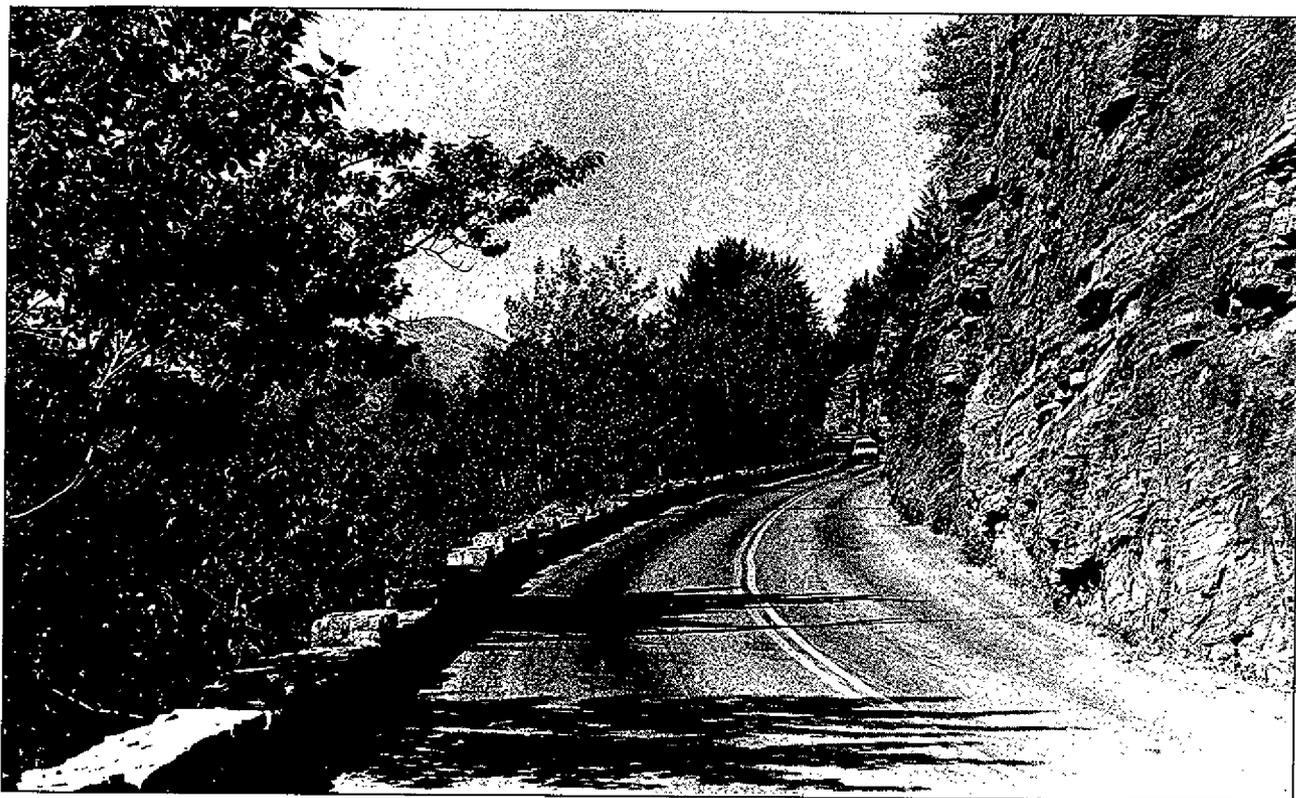


Figure 70. Specific pruning instructions for the boxwood hedge were developed as part of a landscape preservation maintenance guide for the park. Adams National Historic Site. (NPS, 1993)

Figure 71. Aerial view from the south of Linderwald, Martin Van Buren's retirement home. Based on a CLR for the property, it was determined that the area north (above) of the house, which is currently a woodlot, was an orchard during Van Buren's tenure. The treatment plan for the property may call for removal of the woodlot and reestablishment of the orchard. If so, consideration of this treatment needs to take into account the expertise and expense needed to maintain the orchard once it is reestablished. Martin Van Buren National Historic Site. (NPS, 1978)

For example, Part 1 of the CLR for the Martin Van Buren National Historic Site clearly defines the significance of the landscape as both the country seat of a past president and as a demonstration of the importance of the role of farming in Van Buren's views on American politics. Based on this association, Part 2 of the report may call for removal of an existing woodlot and reestablishment of an orchard. This treatment decision must address the maintenance involved in maintaining the orchard, the required training and skills, and how the parks's operating budget will be affected by the addition of the orchard. (See Figure 71.) (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix D: Preservation Briefs (no. 36)" and "Appendix I: Preservation Maintenance.")





## Health and Safety

Alterations to a cultural landscape are often required to meet contemporary health and safety codes and regulations. The alterations may affect the character of a landscape. When such changes are required, they are designed to minimize visual impacts, damage, or loss of historic features and qualities.

For example, stone guardrails along many park roads and parkways are significant historic features that contribute to the significance of the road as a cultural landscape. (See Figure 72.) Raising the height of guardrails meets the contemporary safety guidelines but significantly alters the physical materials and form of the walls, as well as the views, wayside developments, and scenic qualities inherent in the original design of the road. Therefore, alternatives must be considered that improve the safety of the roads and preserve the historic character.

*Figure 72. The guardrail that exists along Going-to-the-Sun Highway is a significant historic feature, and is a common element associated with historic roads in parks. However, proposals often call for replacing the walls to meet contemporary safety guidelines. Treatment of the walls needs to balance resource preservation with current health and safety issues. Glacier National Park. (NPS, 1995)*

## CLR PART 3: RECORD OF TREATMENT

Part 3 of a Cultural Landscape Report (CLR) provides an accurate account of the implemented treatment to be used for the historical record. The record of treatment describes the as-built physical work, including any changes between the proposed and actual treatments. The intent of Part 3 is to document treatment actions, not preservation maintenance. Treatment may be implemented over an extended time or in discrete phases. In the latter case, each action or phase should be documented subsequent to treatment.

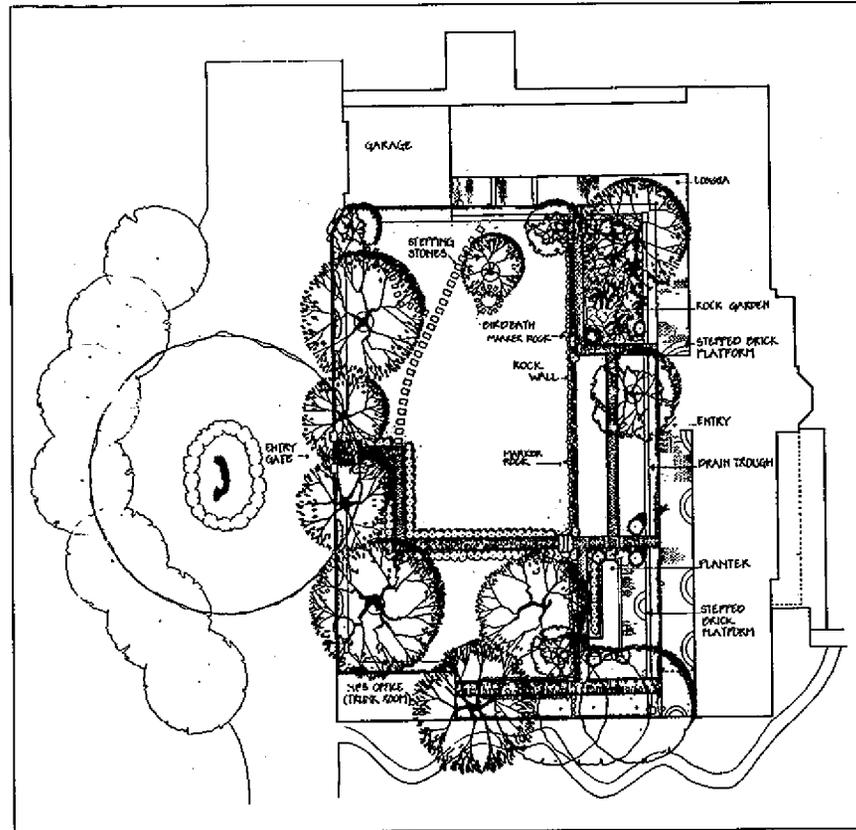
Part 3 is prepared by a historical landscape architect, project manager, contractor, or park staff. It summarizes the following:

- intent of the work
- way in which the work was approached and accomplished
- time required to do the work
- cost of the work

The record of treatment contains copies of field reports, condition assessments, and contract summaries. The record of treatment may be documented in a variety of formats, including plans, details, narrative descriptions, photographs, and video. As-built drawings may be included in the scope of work for developing the construction documents needed to implement a treatment. The documentation developed to review and approve actions related to treatment for compliance with Section 106 of the National Historic Preservation Act may be sufficient to record the treatment, especially if treatment is implemented over an extended time. (See Figure 73.)

In most cases, treatment is not implemented immediately following the preparation of Part 2. If a long time passes between the proposal and implementation, Part 3 also documents any changes that have occurred

Figure 73. A design proposal for restoration of the Tao House Courtyard was prepared as part of a CLR in 1986. Implementation of the design occurred over the next two years. The final construction drawings with all modifications, serve as the record of treatment. Eugene O'Neill National Historic Site. (NPS, 1995)



in the landscape prior to treatment. Based on a record of treatment's content and date of preparation, Part 3 is usually included as an appendix or addendum to a CLR. However, it has been identified as one of the three primary parts of a CLR to emphasize the importance of a factual account of all physical changes to a cultural landscape resulting from treatment. When completed, the documentation provided in Part 3 becomes valuable for future historic research on the property.

## APPENDICES, BIBLIOGRAPHY, AND INDEX

All CLR s include one or more appendices as appropriate, a bibliography, and an index. Appendices are added to a CLR for the purpose of including relevant information about a landscape or project-related documents when that information is not needed in the body of the report. This information may include supplemental drawings, illustrations, maps, photographs, technical information, or other support documentation. This additional background data is useful for managers and others using the document. Regarding the research phase of a project, for example, a summary of all repositories visited and the range and type of material obtained from these investigations must be provided. A CLR includes a comprehensive bibliography, identifying the sources used in preparing the document. Including an index in a CLR allows readers to more easily locate specific information in the report. If a CLR is prepared in separate volumes (related to the three parts of the document), each volume should contain this supplemental information.

## GLOSSARY

**T**erms are defined in the context of cultural resource management and in particular, cultural landscape management in the national park system. National Park Service usage does not always follow standard dictionary definitions.

### **Adjacent lands**

Lands that are significant to the physical, functional, or symbolic context of a cultural landscape, but are not owned by the National Park Service.

### **Analysis and evaluation**

The study of a cultural landscape in terms of its individual landscape characteristics and associated features, and the determination of the landscape's integrity and significance based on a comparison of its site history and existing conditions.

### **Anthropology**

The scientific study of the human condition, including cultural, biological, and physical adaptations over time and in various natural and social environments. Anthropology includes the specializations of archeology, cultural anthropology (including ethnography, ethnology, and applied anthropology), linguistics, and physical anthropology. An anthropologist is a scientist with advanced training in any of these subdisciplines. *See also* Archeology and Cultural anthropology.

### **Archeology**

The scientific study, interpretation, and reconstruction of past human cultures from an anthropological perspective based on the investigation of the surviving physical evidence of human activity and the reconstruction of related past environments. Historic archeology uses historic documents as additional sources of information. An archeologist is a scientist professionally trained to conduct such studies.

**Archeological resource**

Any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archeological research.

**Architectural history**

The study of architecture through written records and the examination of structures in order to determine their relationship to preceding, contemporary, and subsequent architecture and events. An architectural historian is a historian with advanced training in this specialty.

**Archival collection**

An accumulation of manuscripts, archival documents, or papers having a shared origin or provenance, or having been assembled around a common topic, format of record, or association (such as, presidential autographs). The term also refers to the total archival and manuscript holdings of a park.

**Archives**

The noncurrent records of an organization or institution preserved for their historic value. Official records of the National Park Service are managed according to the *Records Management Guideline, NPS-19* and National Archives and Records Administration standards and are outside the scope of this guideline. The term, archives, is often used to refer to the repository where archives and other historic documents are maintained. *See also* Historic document.

**Archivist**

A professional responsible for managing and providing access to archival and manuscript collections.

**Association**

The relationship between a historic event, activity, or person and a cultural landscape.

**Biotic cultural resources**

Plant and animal communities associated with human settlement and use, which may reflect social, functional, economic, ornamental, or traditional uses of the land. Within a cultural landscape, biotic cultural resources are recognized either as a system or as individual features that contribute to the significance of a landscape.

**Building**

An enclosed structure with walls and a roof, consciously created to serve some residential, industrial, commercial, agricultural, or other human use.

**Buildings and structures**

A type of landscape characteristic. The elements constructed primarily for sheltering any form of human activities are considered buildings. Elements constructed for functional purposes other than sheltering human activity are considered structures. Engineering systems are also structures, and mechanical engineering systems may be distinguished from structural engineering systems. Mechanical engineering systems conduct utilities within a landscape (power lines, hydrants, culverts). Structural engineering systems provide physical stabilization in the landscape (retaining walls, dikes, foundation). In certain instances the word "structure" is used generally to refer to buildings and structures as in the List of Classified Structures. *See also* Landscape characteristics.

**Character area**

An area defined by the physical qualities of a cultural landscape and the type and concentration of cultural resources.

### **Circulation**

A type of landscape characteristic. The spaces, features, and applied material finishes that constitute the systems of movement in a landscape. Examples of features associated with circulation include paths, sidewalks, roads, and canals. *See also* Landscape characteristics.

### **Cluster arrangement**

A type of landscape characteristic. The location and pattern of buildings and structures in the landscape and associated outdoor spaces. Examples of features associated with cluster arrangement include village centers, mining, agricultural, and residential complexes of buildings and structures and the associated spaces they define. *See also* Landscape characteristics.

### **Condition assessment**

A method for describing the current conditions of a cultural landscape measured against an applicable standard or guideline, whereby condition is usually expressed as a rating of good, fair, or poor.

### **Constructed water features**

A type of landscape characteristic. The built features and elements that use water for aesthetic or utilitarian functions in the landscape. Examples of features associated with constructed water features include fountains, canals, cascades, pools, and reservoirs. *See also* Landscape characteristics.

### **Cost estimates**

Standardized estimates for the general cost of specific materials and labor required for particular projects.

### **Cultural anthropology**

The scientific description and analysis of cultural systems, including systems of behavior (economic, religious, and social), beliefs (values, ideologies), and social arrangements. The field studies the lifeways of contemporary peoples but also deals with the recent past (ethnohistory)

and with humans in ecosystems. Cultural anthropologists are social scientists trained to conduct such research. Applied ethnographers specialize in project-related research, including program assessments and evaluations.

### **Cultural landscape**

A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein associated with a historic event, activity, or person, or that exhibits other cultural or aesthetic values. The four general kinds of cultural landscapes are ethnographic, historic designed, historic vernacular, and historic site.

### **Cultural Landscapes Inventory (CLI)**

A computerized, evaluated inventory of all cultural landscapes for which the National Park Service has or plans to acquire any legal interest. The CLI includes a description of the location, historical development, landscape characteristics and associated features, and management of cultural landscapes in the national park system.

### **Cultural Landscape Report (CLR)**

A report that serves as the primary guide to treatment and use of a cultural landscape, and that prescribes the treatment and management of the physical attributes and biotic systems of a landscape, and use when use contributes to historical significance.

### **Cultural practice**

A pattern of behavior associated with a particular way of life. Cultural practices are often associated with particular ecosystems, the use of natural resources, and the use or production of sites, structures, objects, and landscape features. Traditional forms of house building, subsistence activities, religious, family, and community ceremonials, and expressive activities, such as musical performance, craft production, and folklore, are examples of cultural practices.

### **Cultural resource**

A tangible entity or a cultural practice of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for National Park Service management purposes. *See also* Cultural system.

### **Cultural resource management**

The range of activities aimed at understanding, preserving, and providing for the enjoyment of cultural resources. It includes research related to cultural resources, planning for actions affecting them, and stewardship of them in the context of overall park operations. It also includes support for the appreciation and perpetuation of related cultural practices.

### **Cultural resource specialist**

A person professionally trained in one of the cultural resource fields. Included are anthropologists (applied cultural anthropologists, archeologists, ethnographers, and ethnohistorians), architectural historians, architectural conservators, archivists, curators, historians, historical architects, historical landscape architects, landscape historians, and object conservators.

### **Cultural system**

A group's interrelated set of learned behavioral, knowledge, and belief patterns in addition to social, economic, spiritual, and political arrangements for adapting to particular natural and social settings. Associated technology and expressive elements such as folklore and performing and graphic arts are included. Popular synonyms include lifeways, customs, and traditions. Cultural systems are parts of ecosystems.

**Cultural traditions**

A type of landscape characteristic. The practices that have influenced the development of the landscape in terms of land use, patterns of land division, building forms, stylistic preferences, and the use of materials. Examples of features associated with cultural traditions include land use practices, buildings, patterns of land division, and use of vegetation. *See also* Landscape characteristics.

**Culture**

A system of behaviors (economic, religious, and social), beliefs (values, ideologies), and social arrangements.

**Design**

The combination of elements that create the form, plan, space, structure, and style of a cultural landscape.

**Design intent**

The creative objectives of a designer, architect, landscape architect, engineer, or artist that were applied to the development of a cultural landscape.

**Documentation**

Drawings, photographs, writings, and other media that depict cultural and natural resources.

**Earthworks**

Linear or geometric landscape structures built for military, industrial, agricultural, ceremonial, or aesthetic purposes. They include fortifications, water impoundment and control structures, early field boundary ditches and berms, burial mounds, grass garden ramps, and raised beds.

**Ecosystem**

Interrelated living entities, including humans and their physical environment.

**Ethnic**

A group or category of people who share or believe they share similar characteristics based on ancestry, language, or religion.

**Ethnographic landscape**

Areas containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures, each with their own special local names. *See also* Cultural landscape.

**Ethnographic Landscape Study**

A limited field survey to identify and describe the names, locations, distributions, and meanings of ethnographic landscape features. It can be combined with traditional use studies or conducted as part of other cultural landscape studies. It follows or may be combined with the ethnographic overview and assessment when gaps in the available database indicate the need for detailed data on park ethnographic interviewing.

**Ethnographic resource**

A site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

**Ethnography**

Part of the discipline of cultural anthropology concerned with the systematic description and analysis of cultural systems or lifeways, such as hunting, agriculture, fishing, other food procurement strategies, family life festivals and other religious celebrations. Ethnographic studies of contemporary people and cultures rely heavily on participant observation as well as

interviews, oral histories, and review of relevant documents. Applied ethnography uses ethnographic data and concepts to identify contemporary issues and design feasible solutions.

**Ethnohistory**

Systematic description (ethnography) and analysis (ethnology) of changes in cultural systems through time, using data from oral histories and documentary materials. Anthropologists and historians conduct these studies.

**Ethnology**

Part of the discipline of anthropology concerned with the systematic and comparative analysis of cultures.

**Evaluation**

Process by which the significance of a cultural landscape is judged and eligibility for National Register of Historic Places is determined.

**Existing conditions**

The present physical state of a cultural landscape.

**Feature**

A prominent or distinctive quality or characteristic of a cultural landscape. In a cultural landscape, individual features are grouped under broader categories of landscape characteristics. For example, such features as ravines, valleys, wetlands, and cliffs are grouped under the landscape characteristic, natural systems and features.

**Feeling**

A cultural landscape's expression of the aesthetic or historic sense of a particular period.

**Field photography**

Photography, other than large-format photography (usually 35 mm), intended for producing documentation.

**Field records**

Notes of measurements taken, field photographs, and other recorded information intended for producing documentation.

**General Management Plan (GMP)**

A planning document that sets forth the basic management philosophy for a park and provides strategies for addressing issues and identifying management objectives over a 5- to 10-year period. Two types of strategies are presented in the GMP: those required to properly manage the park's resources, and those required to provide for appropriate visitor use and interpretation of the resources. Based on these strategies, programs, actions, and support facilities necessary for efficient park operation and visitor use are identified.

**Historian**

Specialist with advanced training in the research, interpretation, and writing of history.

**Historic American Buildings Survey (HABS)/****Historic American Engineering Record (HAER)**

Architectural and engineering documentation programs that produce a thorough archival record of buildings, engineering structures, and cultural landscapes significant in American history and the growth and development of the built environment.

**Historic character**

The sum of all visual aspects, features, materials, and spaces associated with a cultural landscape's history.

**Historic designed landscape**

A landscape significant as a design or work of art. Such a landscape was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner

or other amateur according to a recognized style or tradition. Historic designed landscapes have a historical association with a significant person, trend or movement in landscape gardening or architecture, or a significant relationship to the theory or practice of landscape architecture. *See also* Cultural landscape.

**Historic district**

A geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, landscapes, structures, or objects, united by past events or aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history.

**Historic document**

Any recorded information in any medium—paper, digital, magnetic tape, film, etc.—that has a direct, physical association with past human event, activity, observation, experience, or idea.

**Historic fabric**

*See* Material.

**Historic landscape**

A cultural landscape associated with events, persons, design styles, or ways of life that are significant in American history, landscape architecture, archeology, engineering, and culture. A landscape listed in or eligible for the National Register of Historic Places.

**Historic Resource Study (HRS)**

A study that provides a historical overview of a park and identifies and evaluates its cultural resources within historic contexts.

**Historic property**

(1) A district, site, structure, or landscape significant in American history, architecture, engineering, archeology, or culture. (2) An umbrella term for all entries in the National Register of Historic Places.

**Historic scene**

The overall appearance of all cultural resources and their surroundings as they were in the historic period. The cultural resources and their interrelationships that provide the context for understanding and interpreting the events, ideas, or persons associated with a park.

**Historic site**

The site of a significant event, prehistoric or historic occupation or activity, or structure or landscape (extant or vanished), where the site itself possesses historical, cultural, or archeological value apart from the value of any existing structure or landscape. *See also* Cultural landscape.

**Historic Structure Report (HSR)**

A report that serves as the primary guide to treatment and use of a historic structure and may also be used in managing a prehistoric structure.

**Historic vernacular landscape**

A landscape whose use, construction, or physical layout reflects endemic traditions, customs, beliefs, or values. The expression of cultural values, social behavior, and individual actions over time is manifested in physical features and materials and their interrelationships, including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. The physical, biological, and cultural features of the landscape reflect the customs and everyday lives of people. *See also* Cultural landscape.

**Historical archeologist**

A scientist with advanced training in historical archeology and in the use of historical documents to reconstruct the past. *See also* Anthropology.

**Historical archeology**

Subdiscipline of archeology concerned with the remains left by literate societies (in contrast to prehistoric archeology, although the distinction is not always clear-cut). In the United States, historical archeology generally deals with the evidences of Euro-American societies and of aboriginal societies after major cultural disruption or material change from Euro-American contact.

**Historical architect**

A specialist in the science and art of architecture with specialized advanced training in the principles, theories, concepts, methods, and techniques of preserving prehistoric and historic structures.

**Historical context**

An organizing structure created for planning purposes that groups information about historic properties based on common themes, time periods, and geographical areas.

**Historical integrity**

(1) The authenticity of a cultural landscape's historic identity, evidenced by the survival of physical characteristics that existed during its historic or prehistoric period. (2) The extent to which a cultural landscape retains its historic appearance.

**Historical landscape architect**

Specialist in the science and art of landscape architecture with advanced training in the principles, theories, concepts, methods, and techniques of preserving cultural landscapes.

**Historical significance**

The meaning or value ascribed to a structure, landscape, object, or site based on the National Register criteria for evaluation. It normally stems from a combination of association and integrity.

**History**

Study of the past through written records, oral history, and material culture. Evidence from these is compared, judged for veracity, placed in chronological or topical sequence, and interpreted in light of preceding, contemporary, and subsequent events.

**Identification**

Process through which cultural resources are made known.

**In-kind**

In the same manner or with something equal in substance having a similar or identical effect.

**Integrity**

See Historical integrity.

**Intensive survey**

A systematic, detailed examination of an area designed to gather information about historic properties sufficient to evaluate them against predetermined criteria of significance within specific historic contexts.

**Interpretation**

Communication of the historic and cultural values of a cultural landscape to a visitor through different techniques. Interpretation is an important part of the park management process.

**Inventory**

A list of cultural resources, usually of a given type and in a given area.

### **Landscape characteristics**

The tangible and intangible characteristics of a landscape that define and characterize the landscape and that, individually and collectively give a landscape character and aid in understanding its cultural value. The term is applied to either culturally derived and naturally occurring processes or to cultural and natural physical forms that have influenced the historical developments of a landscape or are the products of its development. Landscape characteristics include the following:

- Natural systems and features
- Spatial organization
- Land use
- Cultural traditions
- Cluster arrangement
- Circulation
- Topography
- Vegetation
- Buildings and structures
- Views and vistas
- Constructed water features
- Small-scale features
- Archeological sites

### **Landscape historian**

A historian concentrating on the study of landscapes through written records and field work in order to determine their relationship to preceding, contemporary, and subsequent landscape events.

**Land use**

A type of landscape characteristic. The principal activities in the landscape that have formed, shaped, or organized the landscape as a result of human interaction. Examples of features associated with land use include agricultural fields, pastures, playing fields, and quarries. *See also* Landscape characteristics.

**Large format photograph**

Photograph taken with a 4x5, 5x7, or 8x10 negative and means to correct perspective distortion.

**List of Classified Structures (LCS)**

A computerized, evaluated inventory of all historic and prehistoric structures having historical, architectural, or engineering significance for which the National Park Service has or plans to acquire any legal interest. Included in the LCS are structures that individually meet the criteria of the National Register or are contributing elements of sites and districts that meet the Register criteria, and structures—moved, reconstructed, and commemorative structures, and structures achieving significance within the last 50 years—that are managed as cultural resources because of decisions made in the planning process.

**Location**

The place where a cultural landscape was constructed or the place where the historic event(s) occurred.

**Management zone**

An area of a cultural landscape with specific objectives for treatment based on the integrity and significance of the property.

**Manuscript collection**

A group of textual, electronic, sound, or visual documents assembled most commonly for its historical or literary value.

**Material**

The physical elements that were combined or deposited to form a cultural landscape. Historic material or historic fabric is that from a historically significant period, as opposed to material used to maintain or restore a cultural landscape following its historic period(s).

**Measured drawings**

Drawings depicting existing conditions or other relevant features of historic structures, landscapes, or objects. Measured drawings are usually produced in ink on archival-quality material, such as polyester film.

**Narrative guidelines (treatment)**

Written recommendations for a preservation strategy and actions for treatment of a cultural landscape, including preservation, rehabilitation, restoration, and reconstruction.

**National Historic Landmark**

A district, site, building, structure, or object of national historical significance, designated by the Secretary of the Interior under authority of the Historic Sites Act of 1935 and entered in the National Register of Historic Places.

**National Register of Historic Places**

The comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state, and local significance in American history, architecture, archeology, engineering, and culture kept by the National Park Service under authority of the National Historic Preservation Act of 1966.

**Native American**

Pertaining to American Indian tribes or groups, Eskimos and Aleuts, and Native Hawaiians, Samoans, Chamorros, and Carolinians of the Pacific Islands. Groups recognized by the federal and state governments and named groups with long-term social and political identities who are defined by themselves and others as Indian are included.

### **Natural systems and features**

A type of landscape characteristic. The natural aspects that have influenced the development and physical form of the landscape. The following may be included:

- geomorphology: the large-scale patterns of land forms
- geology: the surficial characteristics of the earth
- hydrology: the system of surface and subsurface water
- ecology: the interrelationship among living organisms and their environment
- climate: temperature, wind velocity, and precipitation
- native vegetation: indigenous plant communities and indigenous aggregate and individual plant features

Examples of features associated with natural systems and features include ravines, valleys, watersheds, and wetlands. *See also* Landscape characteristics.

### **Period illustration**

A historic document that graphically depicts the appearance of a cultural landscape, or individual features, at a certain period through different mediums, such as line drawings, watercolors, and engravings or woodcuts.

### **Period of significance**

The span of time for which a cultural landscape attains historical significance and for which meets National Register criteria.

### **Period plan**

A to-scale drawing depicting a cultural landscape and the landscape characteristics and associated features present during a definable historic period.

**Prehistory**

The course of events in the period before recorded history.

**Preservation**

The act or process of applying measures to sustain the existing form, integrity, and material of a cultural landscape. Work may include preliminary measures to protect and stabilize the landscape, but generally focuses on the ongoing preservation maintenance and repair of historic materials and features rather than extensive replacement and new work. For historic structures, exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

**Preservation maintenance**

Action to mitigate wear and deterioration of a cultural landscape without altering its historic character by protecting its condition, repairing when its condition warrants with the least degree of intervention including limited replacement in-kind, replacing an entire feature in-kind when the level of deterioration or damage of materials precludes repair, and stabilization to protect damaged materials or features from additional damage. For archeological sites it includes work to moderate, prevent, or arrest erosion.

**Property type**

A grouping of individual properties based on a set of shared physical or associative characteristics.

**Protection**

Action to safeguard a cultural landscape by defending or guarding it from further deterioration, loss, or attack or shielding it from danger or injury. In the case of structures and landscapes, such action is generally of a temporary nature and anticipates future preservation treatment. In the case of archeological sites, the protective measure may be temporary or

permanent. Protection in its broadest sense also includes long-term efforts to deter or prevent vandalism, theft, arson, and other criminal acts against cultural resources.

### **Reconnaissance study**

A synthesis of cultural resource information describing the kinds of cultural resources in a study area and summarizing their significance. Sometimes called a cultural resource overview, it may include limited field investigations.

### **Reconstruction**

(1) The act or process of depicting, by means of new work, the form, features, and detailing of a nonsurviving cultural landscape, or any part thereof, for the purpose of replicating its appearance at a specific time and in its historic location. (2) The resulting cultural landscape, or part thereof.

### **Record of treatment**

A compilation of information documenting actual treatment, including accounting data, photographs, sketches, and narratives outlining the course of work, conditions encountered, and materials used.

### **Records**

Refers to all information fixed in a tangible form. Used by the National Archives and Records Administration to refer to official records (q.v.).

### **Rehabilitation**

The act or process of making possible an efficient compatible use for a cultural landscape through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural and architectural values.

### **Repair**

Action to correct deteriorated, damaged, or faulty materials or features of a cultural landscape.

**Repeat photography**

The act of photographing a cultural landscape or landscape feature in the same location and view as a historical photograph in order to document changes over a given period.

**Replacement in-kind**

See In-kind.

**Restoration**

(1) The act or process of accurately depicting the form, features, and character of a cultural landscape as it appeared at a particular period by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. (2) The resulting cultural landscape.

**Sample survey**

Survey of a representative sample of lands within a given area in order to generate or test predictions about the types and distributions of cultural resources in the entire area.

**Schematic drawings**

Drawings that graphically illustrate a cultural landscape and the location of landscape characteristics and associated features. They depict more detailed information than simple sketches and diagrams, but do not include precise dimensions.

**Section 106, or "106"**

Section 106 of the National Historic Preservation Act of 1966, which requires federal agencies to take into account the effects of their proposed undertakings on properties included or eligible for inclusion in the National Register of Historic Places, and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

**Setting**

The physical environment of a cultural landscape or the character of the place in which a property played its historical role.

**Significance**

See Historical significance.

**Site Development Plan (SDP)**

A planning document that amplifies development decisions made in the General Management Plan (GMP) for a given developed area or unit of a park. The SDP is the intermediate step between a GMP and comprehensive design drawing.

**Site research**

A review of historical information related to a cultural landscape used to develop a strategy for documenting existing conditions.

**Site survey**

Documentation of the existing conditions, including the landscape characteristics and associated features, of a cultural landscape ranging from general reconnaissance surveys to detailed condition assessments.

**Sketch plan**

A plan, generally not to exact scale although often drawn from measurements, in which the landscape characteristics and associated features of a cultural landscape are shown in proper relation and proportion to one another.

**Small-scale features**

A type of landscape characteristic. The elements providing detail and diversity for both functional needs and aesthetic concerns in the landscape. Examples of features associated with small-scale features include fences, benches, monuments, signs, and road markers. *See also* Landscape characteristics.

**Spatial organization**

A type of landscape characteristic. The three-dimensional organization of physical forms and visual associations in the landscape, including the articulation of ground, vertical, and overhead planes that define and create spaces. Examples of features associated with spatial organization include circulation systems, views and vistas, divisions of property, and topography. *See also* Landscape characteristics.

**Stabilization**

*See* Preservation maintenance.

**State Historic Preservation Officer (SHPO)**

An official within each state appointed by the governor to administer the state historic preservation program and carry out certain responsibilities relating to federal undertakings within the state.

**Statement of significance**

An explanation of how a cultural landscape, or part of a cultural landscape, meets the National Register criteria, drawing on facts about the history and the historic trends—local, state, national—that the property reflects.

**Structure**

A constructed work, usually immovable by nature or design, consciously created to serve some human activity. Examples are buildings of various kinds, monuments, dams, roads, railroad tracks, canals, millraces, bridges, tunnels, locomotives, nautical vessels, stockades, forts and associated earthworks, Indian mounds, ruins, fences, and outdoor sculpture. In the National Register program, “structure” is limited to functional constructions other than buildings.

**Subsistence**

The traditional use of natural plants and wild animals for personal or family consumption, for the making and selling of handicraft articles out of the nonedible by-products of fish and wildlife resources taken for personal or family use or consumption, and for customary trade. In Alaskan and Pacific parks, subsistence is the significant economic and cultural dependence on the harvest of wild natural resources by local rural residents through traditional hunting, fishing, and gathering activities. The legislation for some parks defines what constitutes subsistence there.

**Theme**

A trend or pattern in history or prehistory relating to a particular aspect of cultural development, such as dairy farming or silver mining.

**Topography**

A type of landscape characteristic. The three-dimensional configuration of the landscape surface characterized by features (such as slope and articulation,) and orientation (such as elevation and solar aspect). Examples of features associated with topography include earthworks, drainage ditches, knolls, and terraces. *See also* Landscape characteristics.

**Traditional**

Pertains to recognizable but not necessarily identical cultural patterns transmitted by a group across at least two successive generations. Also applies to sites, structures, objects, landscapes, and natural resources associated with those patterns. Popular synonyms include ancestral and customary.

**Traditional cultural property**

A property associated with cultural practices or beliefs of a living community that are rooted in that community's history or are important in maintaining its cultural identity. Traditional cultural properties are ethnographic resources eligible for listing in the National Register.

### **Traditional resource use**

Subsistence or other consumptive use, or ceremonial use, of natural resources. Ceremonial uses, involving particular places and plant and animal materials, may be private and individualized or restricted to designated groups. Use can be on-site and visible, inferred from effects, or off-site and referenced in traditional narratives. Traditional ceremonial use may also involve sites, structures, and objects.

### **Treatment plan**

A plan that graphically depicts a preservation strategy and actions for treatment of a cultural landscape including preservation, rehabilitation, restoration, and reconstruction.

### **Undertaking**

As referred to in Section 106 of the National Historic Preservation Act, any federal, federally assisted, federally licensed, or federally sanctioned project, activity, or program that can result in changes in the character or use of historic properties. Undertakings include new and continuing projects, programs, and activities that are directly undertaken by federal agencies, supported in whole or in part, directly or indirectly, by federal agencies, carried out pursuant to a federal lease, permit, license, approval, or other form of permission, or proposed by a federal agency for congressional authorization or appropriation. Undertakings may or may not be site-specific. (See 36 CFR 800.2[o] and Section 301[7] of the National Historic Preservation Act.)

### **Vegetation**

A type of landscape characteristic. The individual and aggregate plant features of deciduous and evergreen trees, shrubs, vines, ground covers and herbaceous plants, and plant communities, whether indigenous or introduced. Examples of features associated with vegetation include specimen trees, allees, woodlots, orchards, and perennial gardens. *See also* Landscape characteristics.

### **Views and vistas**

A type of landscape characteristic. The prospect created by a range of vision in the cultural landscape, conferred by the composition of other landscape characteristics. Views are the expansive or panoramic prospect of a broad range of vision, which may be naturally occurring or deliberately contrived. Vistas are the controlled prospect of a discrete, linear range of vision, which is deliberately contrived. *See also* Landscape characteristics

### **Workmanship**

(1) The physical evidence of the crafts of a particular culture or people. (2) The techniques and skills necessary to execute or construct a particular detail or feature.

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# INTRODUCTION

Cultural landscapes are an important cultural resource in the national park system. As recognition of their significance to the national heritage grows and as technology becomes available to aid in research, the need for information about how to conduct cultural landscape research becomes clear. In response to this need, the National Park Service (NPS) has published *A Guide to Cultural Landscape Reports: Landscape Lines*. This collection of documents gives detailed and up-to-date technical information on cultural landscape research topics and techniques that directly apply to the development of Cultural Landscape Reports (CLR).

The Landscape Lines collection has two companion documents:

- *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques* provides a general history of landscape research in the NPS; describes the relationship of the CLR to park planning, design, and resource management; and describes the content and format of a comprehensive CLR.
- *A Guide to Cultural Landscape Reports: Appendices* provide examples and general reference materials related to the information included in the guide.

*Landscape Lines* and *Process, Contents, and Techniques* are available for purchase as a set. Contact the Superintendent of Documents, Government Printing Office, Washington, DC, 20402-9325, Stock Number 0245-005-01187-1. The materials included in the *Appendices* are available from various sources. For information on how to obtain these materials, contact the Park Historic Structures and Cultural Landscapes Program, National Center for Cultural Resource Stewardship and Partnerships, 1849 C Street NW, Room NC360, Washington, DC, 20240.

The technical information in Landscape Lines is presented in three formats:

- general information highlighting the application of existing technology to cultural landscape research (for example, pollen analysis)
- comprehensive information on subjects for which limited reference material currently exists, especially as the subjects are applied to cultural landscape research (for example, treatment of biotic resources)
- procedural guidelines for subjects related to preparing a CLR (for example, graphic conventions)

Each of the documents contained in this first release were prepared with input from experts in each respective area. Landscape Lines is intended to be expanded and updated over time. Additional publications will be released as topics are refined and experts are available to develop content. The 14 documents contained in this first release include the following:

<b>Issue #</b>	<b>Title</b>	<b>Description</b>
1	Project Agreement	Describes how to prepare a project agreement, which identifies and describes the work to be performed as part of a CLR project.
2	Levels of Investigation	Defines and explains three levels of investigation (exhaustive, thorough, and limited) used in conducting research for a CLR.
3	Landscape Characteristics	Defines the classification system to be used to describe a cultural landscape's character and physical qualities.
4	Historic Plant Material Sources	Explains how to identify, document, and analyze vegetation and determine its relationship to the history of a cultural landscape.

5	Graphic Documentation	Describes methods, including line drawing and photography, for graphically documenting a cultural landscape.
6	Geophysical Survey Techniques	Describes survey techniques used to detect and locate archeological resources beneath the earth's surface.
7	Pollen, Phytolith, and Macroflora Analyses	Explains three archeological techniques used to investigate the prehistory and history of vegetation in a cultural landscape.
8	Tree Coring	Describes the technique of tree coring as a method for determining the age of a tree and understanding its physical history.
9	Surveys	Describes different types of surveys, including site, topographic, ground control, utility, cadastral, boundary, and hydrographic, that may be needed for a CLR project.
10	Geographic Information Systems	Explains the basic concepts of geographic information systems and how they can be used in cultural landscape research.
11	Global Positioning Systems	Describes global positioning systems as a surveying and mapping tool, identifies different types of GPS receivers and their uses, and gives how-to information about using GPS in cultural landscape research.
12	Treatment of Plant Features	Explains the process of investigating the historical significance of vegetation and determining appropriate treatment methodologies.
13	Accessibility	Describes concepts and legislation pertaining to accessibility, gives sources of information about the subject, and lists requirements for ramps, stairs, handrails, curbs, and other physical structures used by visitors to cultural landscapes.
14	Cataloging, Printing, and Distribution	Gives guidelines for preparing a CLR for printing and distribution.

## **Project Agreement**

### **INTRODUCTION**

A project agreement for a Cultural Landscape Report (CLR) establishes consensus from two or more individuals, offices, or organizations for project work to be completed. The term, project agreement, is used in this text to define the specific issues, tasks, management objectives, and anticipated products involved in a CLR project.

Note that for work involving individuals or offices within the National Park Service (NPS), the term "task directive" describes a project agreement. For contracts outside the NPS, a project agreement is often called a "scope of work."

### **CONTENT OF A PROJECT AGREEMENT**

A CLR project agreement is developed to meet management objectives and answer specific management questions. The project agreement addresses Part I of a CLR, titled "Site History, Existing Conditions, and Analysis and Evaluation," and Part 2, "Treatment." The project agreement may outline the scope of Part I, Part 2, or both parts. (See Figure 1.)

The scope of a project agreement is based on the management objectives, which may require information on site history, existing conditions, and the analysis and evaluation of a landscape (excluding treatment). If park management has adequate information from former research, management objectives for a CLR may be concerned only with treatment. This information is reflected in the project agreement.

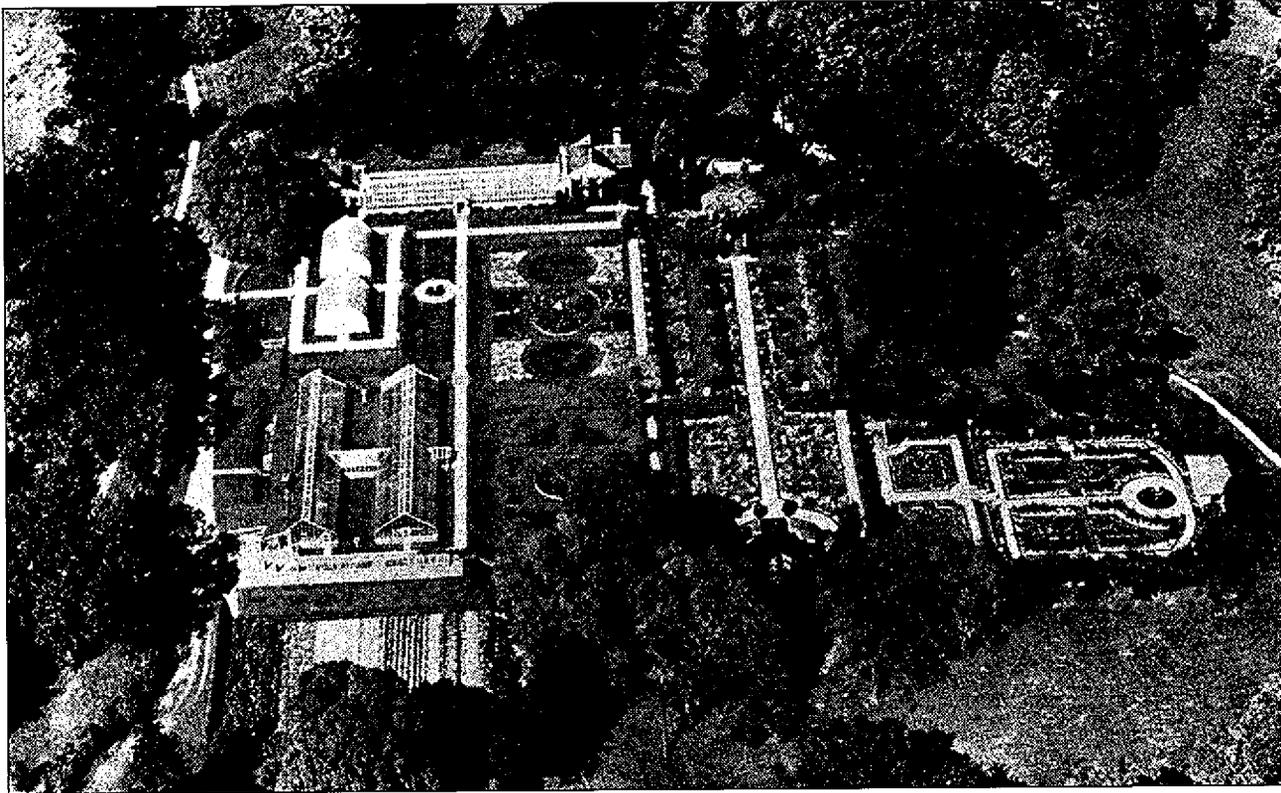


Figure 1. The project agreement for Volume 1 of the CLR for Vanderbilt Mansion involved the preparation of only Part I, titled "Site History, Existing Conditions, and Analysis and Evaluation." Vanderbilt Mansion National Historic Site. (NPS, c. 1930s)

Regardless of whether a CLR project agreement addresses Part I, Part 2, or both, all project agreements for a CLR should include the following:

- description of the study site, site boundaries, and site context
- description of the project's purpose and its relationship to management objectives
- description of the project scope, including level of investigation
- list and description of the tasks to be completed
- list identifying the office and staff responsibilities
- list and description of the interim and end products or deliverables

- schedule for completing individual tasks, products, and payments
- statement of the project budget

A project agreement also identifies constraints and special considerations, compliance requirements, information and data gathering needs, and coordination requirements, including the desired period for public comment if appropriate.

## PREPARATION OF A PROJECT AGREEMENT

A project agreement is the first step in clarifying management objectives and specific tasks for a CLR. Preparing an agreement involves conducting

preliminary research and compiling background information about the cultural landscape. This task may require a team of individuals with different backgrounds and expertise. A historical landscape architect usually leads the project team. The historical landscape architect receives support from park staff and other professionals in allied disciplines, such as history, historic architecture, natural resources, archeology, cultural anthropology, interpretation, and park maintenance.

The time required to prepare a project agreement varies from project to project. In some cases, a short site visit allows enough time to review park files, meet with park staff, and conduct preliminary site reconnaissance. Preparing a project agreement requires more time when the site is large and specific issues are complex, or the site has a national level of significance with numerous interest groups involved.

Preparing a CLR project agreement involves three primary steps: 1) project initiation, 2) preliminary research, and 3) site visit. These steps are described in the following sections.

### **Project Initiation**

To develop a CLR project agreement, park and technical staff meet to define the purpose, management objectives, and key issues to be addressed. Management's information needs and specific questions should be addressed. Information about the availability of historical materials, planning documents, base maps, and specific site data in park collections is collected during the meeting. Other pertinent repositories, contacts,

and public interest groups are also noted, along with information about current maintenance practices and park operations. Maintenance information may influence project logistics, such as scheduling, site access, and field inventory.

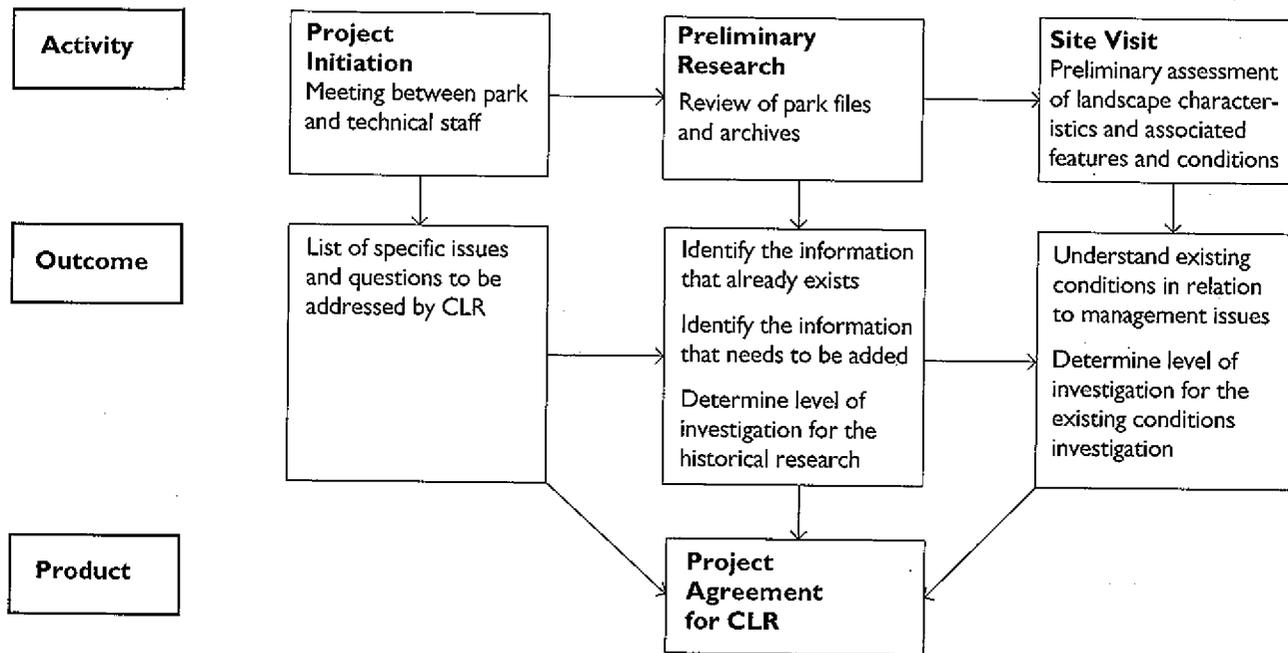
### **Preliminary Research**

The second step in developing a project agreement involves a preliminary review of historical materials related to the site. Extensive information may be found in park files and in a variety of cultural and natural resources databases, such as the Cultural Landscapes Inventory, the List of Classified Structures, the Cultural Sites Inventory, natural resource inventories, and geographical information system databases. When reviewing historic materials, it is necessary to determine whether additional research is required to fully address the management objectives for the project. This step is critical for providing fundamental background information and clarifying what is known about the landscape and what additional information is needed. It is important to recognize that this research is quantitative but not extensive; research is conducted to identify and evaluate the adequacy of primary and secondary sources and collections, and to gather preliminary site information, ensuring the project agreement's accuracy and completeness.

### **Site Visit**

The final step in preparing a project agreement is a site visit. The site visit provides a preliminary assessment of the landscape characteristics

## PROCESS FOR PREPARING A PROJECT AGREEMENT



and associated features, as well as the physical condition of the landscape. The site visit may take the form of a windshield survey or walk-through. It is preferable to be accompanied by someone who is knowledgeable about the site and the salient issues to be addressed in the CLR. The purpose of the visit is to understand management issues and existing conditions so that the project agreement can accurately reflect the required level of effort.

### SUMMARY

Although a project agreement directs and organizes the scope and content of a CLR, the agreement is not a static document. Because the research to prepare an agreement is preliminary, it is not uncommon that additional information or material becomes available during the course of a project, influencing or altering the original assumptions. In this case, it may be appropriate for park and technical staff to amend the original project agreement to respond to the new information. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix J: Project Agreements.")

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



U.S. Department of the Interior  
 National Park Service  
 Cultural Resources  
 Park Historic Structures & Cultural Landscapes

## **Levels of Investigation**

### **INTRODUCTION**

The Cultural Landscape Report (CLR) has a flexible format so that it can be used for various landscape types, address different management objectives, and guide treatment activities. While every CLR should be similar in format and content, not every CLR needs to contain the same level of information or have the same outline of contents. A project agreement defines the level of investigation for a CLR. (See *Landscape Lines 1: Project Agreement*.)

### **THREE LEVELS OF INVESTIGATION**

The level of investigation refers to the type and extent of information gathered and processed during three activities conducted for a CLR. The three activities are historical research, existing conditions investigation, and analysis and evaluation. The National Park Service (NPS) *Cultural Resources Management Guideline*, defines the level of investigation for these activities as exhaustive, thorough, and limited.

### **DETERMINING THE LEVEL OF INVESTIGATION**

Within a CLR, the level of investigation required for historical research, existing conditions investigation, and analysis and evaluation may be different. For example, the historical research piece of a CLR may warrant an exhaustive level of investigation because no previous research on the landscape exists. In contrast, the existing conditions investigation may require only a limited level of investigation because reliable information is available from another source, such as a recent, detailed site survey. (See Figure 1.)

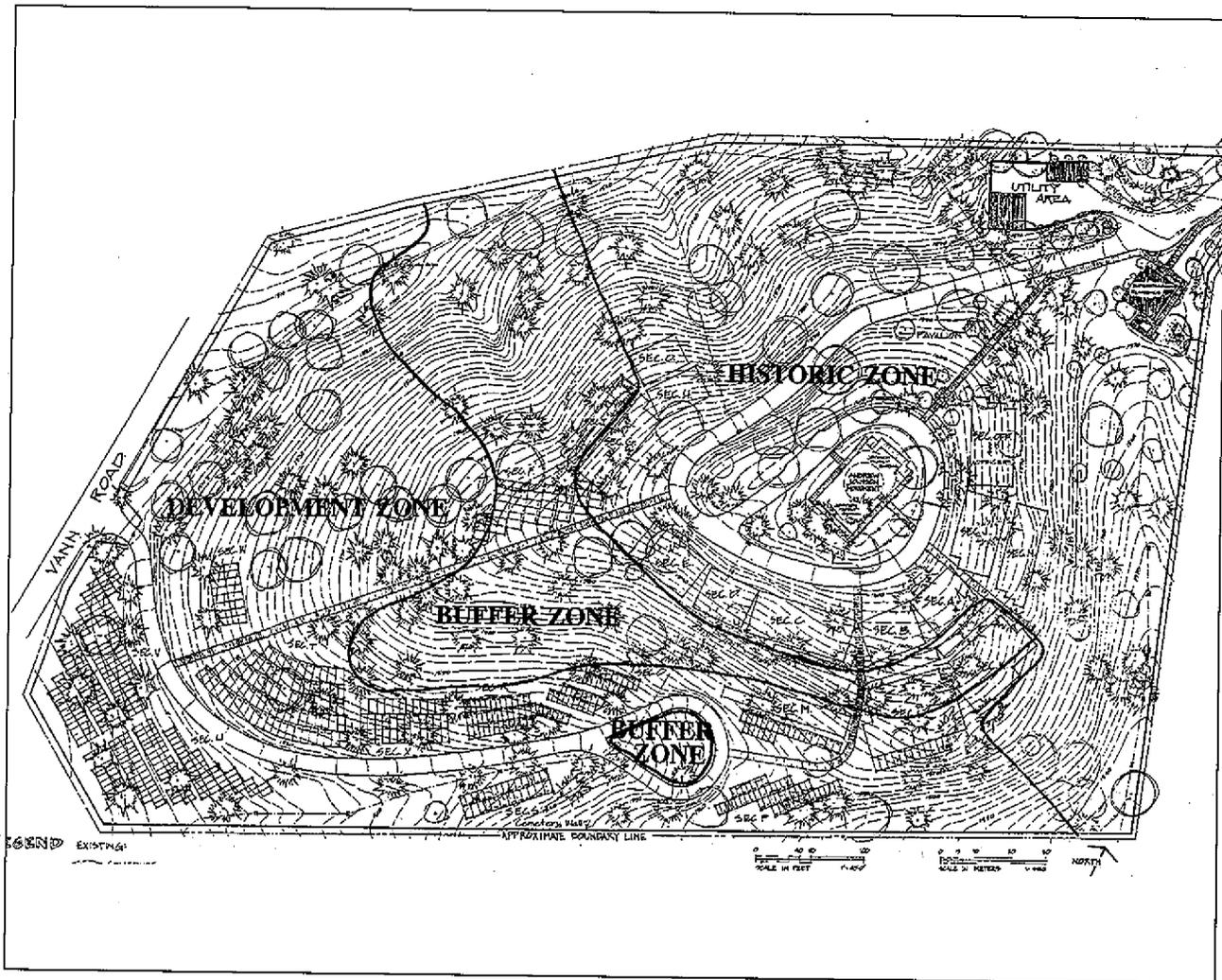


Figure 1. Management objectives for the Andrew Johnson National Cemetery CLR influenced the level of investigation for both the historical research and existing conditions investigation. A limited level of historical research and a thorough level of existing conditions investigation were required to create management zones, which indicated a historic zone, a buffer zone, and a development zone for new interments. Andrew Johnson National Cemetery. (NPS, 1988)

The level of investigation is influenced by several key factors:

- legislative mandate
- management objectives
- resource significance
- resource complexity
- proposed treatment
- operations and programs

### Legislative Mandate

The legislative mandate or enabling legislation for a park describes the primary resources to be managed. In some cases, the enabling legislation for a park is very general with regard to the management of specific cultural and natural resources. In other cases, there is a clear statement that the landscape should be managed as a cultural resource. For example, the enabling legislation for Weir Farm National

Historic Site in Connecticut states that the site is established for the purpose of "...maintaining the integrity of a setting that inspired artistic expression and encourages public enjoyment...." If preservation of a cultural landscape is identified in legislation, it may warrant an exhaustive level of research and documentation. However, if the legislative mandate does not give specific direction for preserving a cultural landscape, this does not imply that an exhaustive level of investigation is unwarranted; rather, it means the process of defining the objectives and level of investigation is not directed by legislative mandate.

### Management Objectives

A clear understanding of a CLR's management objectives is critical to defining the appropriate level of investigation for historical research, existing conditions investigation, and analysis and evaluation. When information is already available on the site history, management objectives may require only a limited level of historical research. When current site data does not exist, an exhaustive level of existing conditions investigation may be required. Other management objectives for a CLR may include the following:

- determination of historic significance according to National Register criteria for eligibility
- information gathering for resource management in the absence of a proposed treatment (such as preservation)
- information gathering for park interpretation of the resource

It is critical that the level of investigation of historical research, existing conditions investigation, and analysis and evaluation matches the complexity of the management issues.

### Resource Significance

Resource significance is a factor that influences the level of investigation. There are four levels of resource significance.

- **International:** cultural landscapes that qualify as World Heritage Sites based on their universal significance.
- **National:** cultural landscapes that qualify as National Historic Landmarks are listed in the National Register as nationally significant, or are determined to be nationally significant by an act of Congress.
- **State:** cultural landscapes that qualify for the National Register and are determined to be significant at the state level.
- **Local:** cultural landscapes that qualify for the National Register and are determined to be significant at the local level.

Cultural landscapes that are nationally significant, such as the Blue Ridge Parkway or the grounds of the White House and President's Park, may warrant an exhaustive level of investigation because of their value to the nation and to ensure that management protects these values. Cultural landscapes that are significant at the state or local level, such as a backcountry homestead in Colorado, a settlement community in Wisconsin, or a sheep ranch in eastern Oregon, may not require an exhaustive level of investigation because they are not unique and are more representative of a type of historic property.

## Resource Complexity

The physical scale and complexity, as well as the historic complexity of a landscape, may necessitate additional time and effort in preparing Part I of a CLR, titled "Site History, Existing Conditions, and Analysis and Evaluation." Although complexity does not affect the type of information gathered in preparing a CLR, it influences the effort required to review all the research materials of landscapes with extensive site histories or to document landscapes that are large, have complex spatial relationships, or have a high density of features.

## Proposed Treatment

Treatment for a cultural landscape is often decided through the park planning process. Treatment may or may not be decided before a CLR is prepared. If a proposed treatment has been decided, a CLR documents implementation of the treatment. If treatment has not been decided through the planning process, but management objectives require a CLR to recommend a treatment, a CLR augments, or is combined with a Site Development Plan to determine a preferred treatment and physical design. This is outlined in the CLR project agreement along with specific questions to be answered. (See *Landscape Lines 1: Project Agreement*.)

The following two examples show how the type of proposed treatment can influence a CLR's level of investigation.

**Example 1:** If rehabilitation is the proposed treatment for a cultural landscape and the end product of a CLR is a new site plan or design

illustrating the location, extent, and character of new development, then a thorough or exhaustive level of investigation is required.

Take, for example, the rehabilitation of a historic cattle ranch landscape to accommodate a new visitor center with parking and interpretive facilities. Here, historical research must be sufficient to allow for a very comprehensive review and assessment of research materials.

Existing conditions investigation and documentation must clearly illustrate the existing landscape, portray the landscape characteristics and associated features, and identify the conditions within which the rehabilitation can occur. The analysis and evaluation must consolidate and compare data from various sources (programs and professional disciplines) and from different perspectives to evaluate the impact of treatment activities on specific features within the landscape and identify the best option.

**Example 2:** If preservation is the proposed treatment for a cultural landscape and the end product of a CLR is a list of acceptable plants, then a limited level of investigation may be sufficient.

Take, for example, the replacement of plants around a new visitor center (which is also a historic building) with historically accurate plants. Historical research may include a review of primary historical records, such as drawings or historic photographs, for the purposes of identifying former plant materials. A review of written documents may reveal the historic design intent, function, or character of former

plants, assisting in the selection of new plantings. An exhaustive review of all historic records related to the landscape is not appropriate. Similarly, existing conditions investigation and documentation may be limited to the examination of extant plant materials in the vicinity of the visitor center to identify extant historic plant species and document their condition and character.

The proposed treatment for a landscape defines the level of physical intervention of subsequent treatment activities. The level of intervention increases from preservation, through rehabilitation, to restoration, to reconstruction. It is critical that the level of investigation for historical research, existing conditions investigation, and analysis and evaluation adequately matches the type of information required for the proposed treatment. (See Figure 2.)

### **Operational and Program Factors**

Operational factors, such as time, budget, and staff, and program factors, such as the relationship of the CLR to other projects, can influence the level of investigation. Although operational and program factors have low priority in determining the level of investigation, they often have a profound impact on a project. For instance, funding may determine the amount of time and the staff available for a project, set travel limits on the number of repositories a researcher can visit, and necessitate scheduling the completion of a CLR so that it is available for other planning and construction projects.

## **LEVELS OF INVESTIGATION**

### **Historical Research**

The purpose of historical research is to develop a historic context that defines the significance of a landscape. Historical research is used to compose a site history, which describes and illustrates the appearance of a cultural landscape through each relevant historic period.

#### *Exhaustive Historical Research*

Exhaustive historical research uses all primary sources of known or presumed relevance, including the following:

- historic publications, unpublished manuscripts, and historic correspondence
- all pertinent historic graphic records, such as drawings, plans, and photographic materials
- interviews are conducted with knowledgeable persons, regardless of their location

Secondary sources are also reviewed, such as studies, reports, and topical publications. All gathered information is compiled and then documented chronologically in an illustrated narrative.

#### *Thorough Historical Research*

Thorough historical research uses selected documentation of known and presumed relevance. This includes primary and secondary sources that are available without extensive travel and interviews with knowledgeable people who are readily available. The findings are presented in an illustrated narrative.

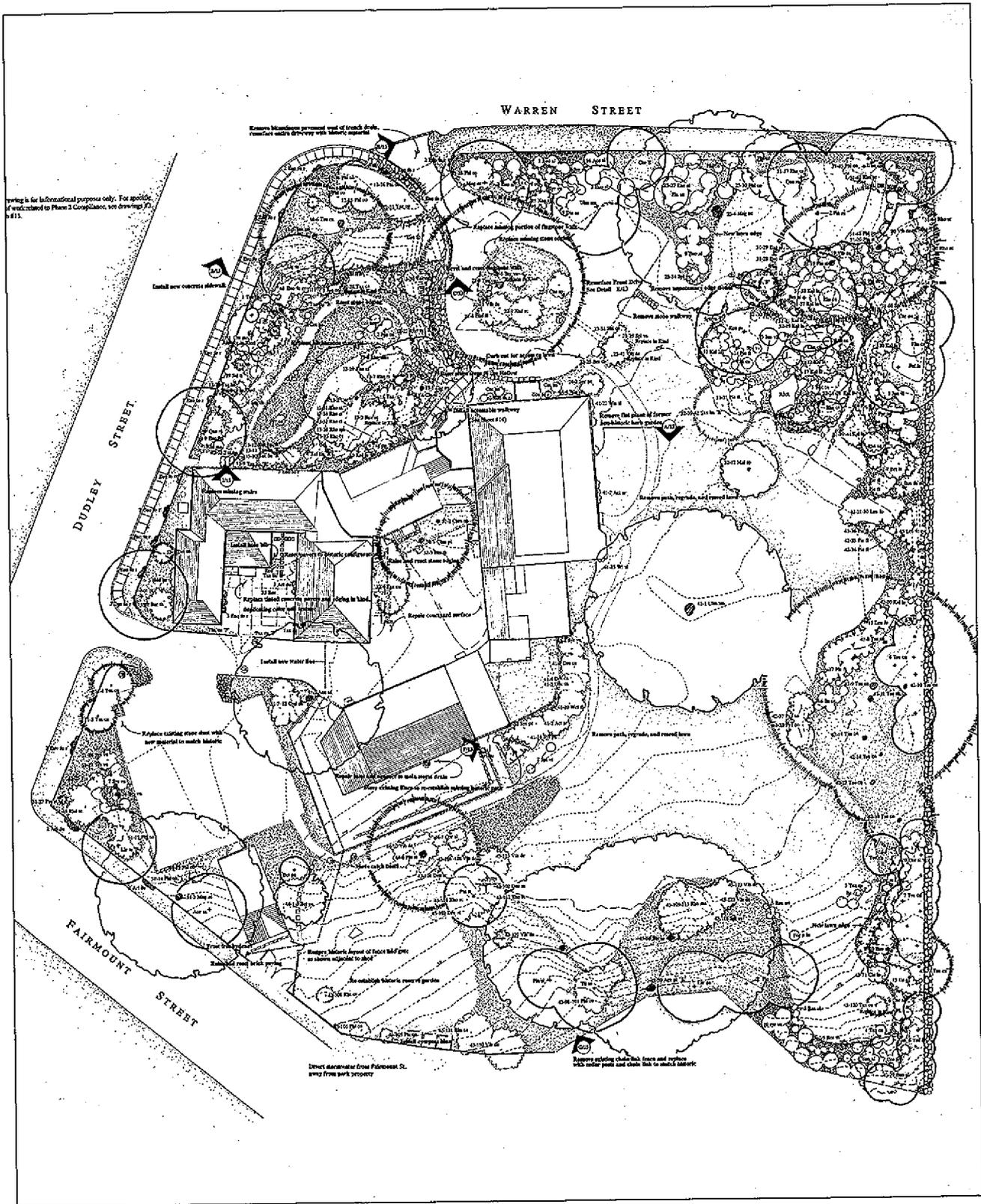


Figure 2. A proposed treatment can influence a CLR's level of investigation for both historical research and existing conditions investigation. The above plan shows a proposed restoration treatment developed as a result of an exhaustive level of historical research and existing conditions investigation. Frederick Law Olmsted National Historic Site. (NPS, 1995)

### *Limited Historical Research*

Limited historical research uses available, selected, and published secondary sources and primary sources, if known. Research may be limited to sources readily accessible within or near a park. Brief interviews are conducted (often by telephone) to answer specific questions. The findings are presented in an illustrated narrative.

### **Existing Conditions Investigation**

Documentation of existing conditions requires a site investigation involving two general activities: site research and a site survey. The purpose of this work is to describe and illustrate the current appearance and condition of a landscape, including all landscape characteristics and associated features. The documentation resulting from a site investigation includes an existing conditions plan, narrative text, and black and white photographs.

### *Exhaustive Existing Conditions Investigation*

An exhaustive existing conditions investigation involves site research, including the collection and review of all available site data from existing sources, including the following:

- natural and cultural resource databases (such as the List of Classified Structures and Cultural Landscapes Inventory)
- park maintenance records
- utility records, zoning, and other political or legal information
- special studies (such as archeological investigations and ethnographic overviews)
- building inventories

- Vegetation Management Plans
- National Register nominations
- Historic Resource Studies
- planning documents (such as the General Management Plan, Statement for Management, Interpretive Prospectus, or Resource Management Plan).
- maps, plans, photographs, etc.

Information on site access, accessibility, land use, visitor services, park operations, and interpretive programs is also reviewed. Other site-related documents from external sources are also examined, including soil surveys, aerial photographs, and United States Geological Survey (USGS) maps.

The site survey involves the extensive identification and recording of existing landscape characteristics and associated features. Their location, appearance, and physical condition are documented in the field using black and white photographs, color slides, sketches, and written observations.

Additional site survey techniques may be used to identify and describe the appearance and condition of landscape characteristics and associated features in the field. These techniques include:

- tree coring to determine the age of historic trees
- aerial photography to identify and record broad patterns of landscape characteristics (such as natural systems and features, circulation, land use, and spatial organization) and associated features

- topographic and hydrographic surveys to obtain accurate location and elevation data for a base map
- archeological techniques, including geophysical surveys and soil analyses to locate and analyze buried ruins and cultural artifacts
- computer technologies to collect and process field survey information, such as the global positioning system datalogger as an inventory tool and geographic information survey as a system for mapping, analyzing, and managing site data

All findings are presented in an existing conditions plan, narrative text, and black and white photographs.

### ***Thorough Existing Conditions Investigation***

The availability of recent and reliable site data may make it possible to conduct a thorough, rather than an exhaustive, existing conditions investigation. A thorough investigation differs from an exhaustive investigation in the following ways:

- more existing site data may be used, but less new data will be generated from the site survey
- fewer specialized technologies or techniques will be used in the site survey
- technical and park staff expertise will be used rather than experts from other disciplines
- less labor-intensive techniques will be used to collect site data

A thorough level of investigation may obtain topographic information from an aerial photograph using photogrammetry, whereas an exhaustive level of investigation may use a refined

topographic survey with a close contour interval and include the canopy size and d.b.h. (diameter at breast height) of mature trees.

The findings of a thorough existing conditions investigation are presented in an existing conditions plan, narrative text, and black and white photographs. (See Figure 3.)

### ***Limited Existing Conditions Investigation***

A limited existing conditions investigation may use available site data and generate less new data through the field survey than the thorough or exhaustive investigations. A limited existing conditions investigation may focus on just one discrete area of a landscape, use only park and technical staff expertise, and use only the sources of site data available in park files.

In a limited investigation, the site survey may be performed from a less intimate vantage point (such as a motorized vehicle) and only discrete areas may be surveyed and documented on foot. A limited investigation may use existing USGS topographic information or a previous topographic survey rather than contract for a topographic survey on the ground or through photogrammetry. The findings are presented in an existing conditions plan, narrative text, and black and white photographs.

### **Analysis and Evaluation**

Analysis and evaluation involves comparing the findings of historical research with the findings of the existing conditions investigation. The purpose of the comparison is twofold:

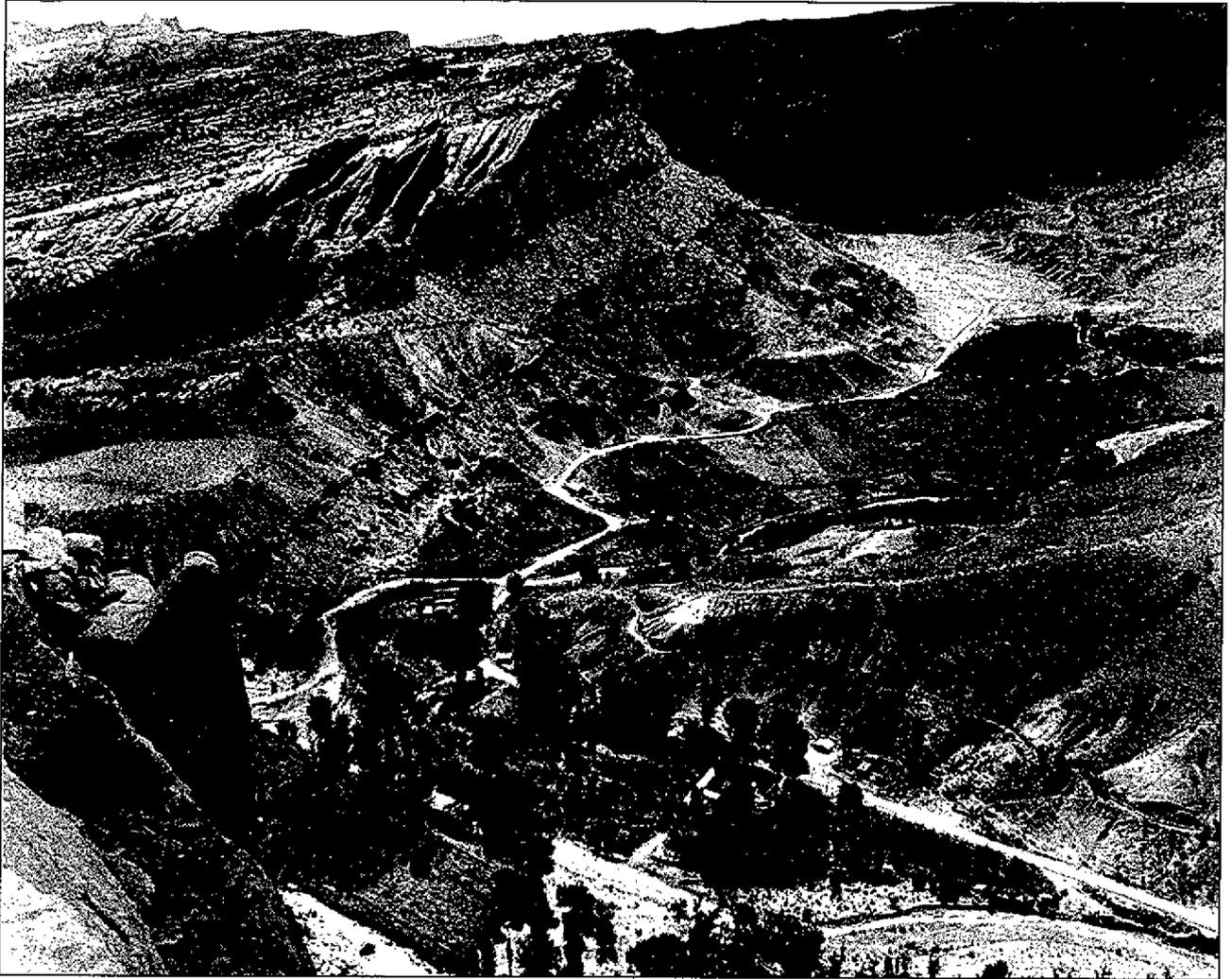


Figure 3. The Fruita Rural Historic District CLR had a thorough level of investigation for both historical research and existing conditions investigation. Capitol Reef National Park. (NPS, c. 1930)

- to determine the landscape characteristics and associated features of a landscape from each significant historic period
- to understand how the landscape characteristics and associated features contribute to and convey the significance of the landscape (based on National Register criteria)

An analysis and evaluation shows how a landscape has changed over time. The analysis and evaluation may also include a statement of

significance for the landscape and identify landscape character areas and management zones. The findings of analysis and evaluation are documented in a narrative illustrated with graphics, such as plans, sketches, and photographs.

#### ***Exhaustive Analysis and Evaluation***

An exhaustive analysis and evaluation uses all historic and contemporary site data from historical research and existing conditions investigation. It

may include park operational data, maintenance records, and detailed condition assessments of landscape characteristics and associated features. The analysis and evaluation may involve the collaboration of experts from other disciplines as well as representatives from the public. The gathered information can be used to deal with various issues, such as multiple periods of significance or areas of the landscape that may receive secondary treatments within the primary treatment plan. The findings are documented in a narrative illustrated with graphics, such as plans, sketches, and photographs.

#### ***Thorough Analysis and Evaluation***

A thorough analysis and evaluation uses relevant findings from historical research and existing conditions investigation. It may involve only park and technical staff expertise and may deal with less complex management issues than an exhaustive analysis. The findings are documented in a narrative illustrated with graphics, such as plans, sketches, and photographs.

#### ***Limited Analysis and Evaluation***

A limited analysis and evaluation uses findings from historical research and existing conditions investigation that are relevant to specific

management concerns. It involves only the resources and staff expertise readily available and deals with less complex management issues than a thorough analysis. The findings are documented in a narrative illustrated with graphics, such as plans, sketches, and photographs.

### **SUMMARY**

The level of investigation is influenced by a number of factors. Ultimately, the level of historical research, existing conditions investigation, and analysis and evaluation, should match the level of decision making to be directed by a CLR. If the proposed level of intervention in a landscape is high, the level of investigation should be thorough or exhaustive. If funding and staffing issues limit the level of investigation for a CLR, the resultant level of decision making should be limited.

### **REFERENCE**

National Park Service. 1997. *Cultural Resource Management Guideline*, NPS 28, no. 5. Washington, DC: USDI, NPS.

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



**U.S. Department of the Interior**  
**National Park Service**  
**Cultural Resources**  
**Park Historic Structures & Cultural Landscapes**

## *Landscape Characteristics*

### INTRODUCTION

As the field of cultural landscape preservation has evolved, a method has been developed to describe the tangible and intangible characteristics of a historically significant landscape. Individually and collectively, the characteristics give a landscape character and aid in understanding its cultural value.

Various classification systems and terms have been used to describe the cultural and natural processes and physical forms that define the appearance of a landscape. The classification systems have originated from several sources within the National Park Service (NPS) for various preservation purposes (such as inventory, documentation, and treatment) and have addressed various cultural landscape types (such as designed and vernacular). Different titles have been given to the classification systems, such as "landscape components," "landscape features," "landscape characteristics," and "character-defining features." Each classification system contains a list of the cultural and natural processes and the physical aspects of a landscape.

In addition to providing methods for describing a landscape's character and physical qualities, the classification systems have introduced new terminology to the cultural landscape preservation field. This has resulted in some confusion about terms with similar, yet slightly different meanings.

The intent of this text is to provide a recommended classification system for describing the character of cultural landscapes in the national park system for use in research, inventory, documentation, analysis and evaluation, and treatment. This classification system is recommended to provide consistency in the terminology used in the NPS Park Cultural Landscape Program, and specifically in the Cultural Landscapes Inventory

(CLI) and Cultural Landscape Report (CLR). The classification system outlined should provide a means for documenting all the cultural and natural processes and physical forms that may exist in a given landscape. The system is flexible and must be applied to each landscape according to the type of landscape and the nature of its historical development. Not all landscapes will have the same physical character.

The recommended classification system presented in this text builds upon, and has many similarities with, earlier efforts. It addresses the diversity and scope of cultural landscapes in the national park system. To give this recommended system context in the cultural landscape preservation field, the text first presents an overview of the classification systems developed to date by the NPS, along with the terminology associated with the systems. The similarities and differences between the systems and the terminology used are described. Finally, based on the recommended classification system and terminology, the application and use of landscape characteristics and associated features in a CLR are described.

## CLASSIFICATION SYSTEMS AND TERMINOLOGY USED IN THE FIELD

A review of the classification systems and their associated terminology indicates many commonalities. The recommended classification system presented in this text builds upon the following studies and publications:

- In 1984, *Cultural Landscapes: Rural Historic Districts in the National Park System*, provided the first classification system. It identified "landscape components" that can be used to identify, evaluate, nominate (to the National Register), and manage rural historic districts.
- In 1987, *National Register Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes*, presented a detailed list of "landscape features," which focused on describing designed landscapes for nomination to the National Register. The list of features was provided for consideration in describing designed landscapes, but it was not intended to be a comprehensive classification system.
- In 1990, *National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes* coined the term "landscape characteristics" as the title for the classification system outlined in the publication. *Bulletin 30* was largely a revision of the 1984 study, *Cultural Landscapes: Rural Historic Districts in the National Park System*. The classification system of landscape characteristics was similar to the original list of "landscape components" in the 1984 study. However, *Bulletin 30* gave an expanded explanation of how various landscape characteristics could be meaningful in understanding the cultural development of rural landscapes, and it provided guidelines for their documentation.
- In 1996, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* identified "organizational elements" and "character-defining features" as a classification system for the treatment of cultural

## CHRONOLOGY OF CLASSIFICATION SYSTEMS

**1984**

### **Landscape Components**

Overall Patterns of Spatial Organization  
 Land Use: Categories and Activities  
 Response to Natural Features  
 Circulation Networks  
 Boundary Demarcations  
 Vegetation Related to Land Use  
 Cluster Arrangement  
 Structure: Type, Function, Materials, Construction  
 Small-Scale Elements  
 Historical Views and Other Perceptual Qualities

Source: *Cultural Landscapes: Rural Historic Districts in the National Park System.*

**1987**

### **Landscape Features**

Spatial Relationships and Orientations  
 Land Uses  
 Natural Features  
 Circulation Systems  
 Landscape Dividers  
 Topography and Grading  
 Vegetation  
 Buildings, Structures, and Lighting  
 Drainage and Engineering Structures  
 Site Furnishings and Small-Scale Elements  
 Water Bodies, Sculpture, and Signs  
 Views and Vistas

Source: *National Register Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes.*

**1990**

### **Landscape Characteristics**

Processes  
 Patterns of Spatial Organization  
 Land Uses and Activities  
 Response to the Natural Environment  
 Cultural Traditions  
  
Components  
 Circulation Networks  
 Boundary Demarcations  
 Vegetation Related to Land Use  
 Buildings, Structures, and Objects  
 Clusters  
 Archeological Sites  
 Small-Scale Elements

Source: *National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes.*

**1996**

### **Organizational Elements and Character-Defining Features**

#### Organizational Elements

Spatial Organization  
 Land Patterns

#### Character-Defining Features

Topography  
 Vegetation  
 Circulation  
 Water Features  
 Structures, Site Furnishings, and Objects

Source: *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.*

**1997**

### **Landscape Characteristics**

Natural Systems and Features	Vegetation
Spatial Organization	Buildings and Structures
Land Use	Views and Vistas
Cultural Traditions	Constructed Water Features
Cluster Arrangements	Small-Scale Features
Circulation	Circulation
Topography	Archeological Sites

Source: *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques and Cultural Landscapes Inventory Professional Procedures Guide.*

landscapes. (The term, character-defining feature, dates from the 1978 publication of *The Secretary of the Interior's Standards for Historic Preservation Projects with Guidelines for Applying the Standards*, where the term was used to describe architectural qualities contributing to the character of historic buildings).

In referencing the publications prepared by the National Register, it needs to be noted that the National Register allows a considerable degree of latitude in the way survey information is presented and organized in nominations. The classification systems outlined in the bulletins were presented to facilitate the evaluation process, but did not require that information about cultural landscapes be organized as such.

There is some overlap in the definitions of terms associated with the classification systems, partly because the terms originated at different times by different sources, and for discrete uses. For instance, the term "landscape characteristic" was conceived primarily to apply the National Register criteria to cultural landscapes so they could be evaluated and nominated as sites or districts to the National Register. The term "character-defining feature" was conceived to guide the appropriate treatment and management of historic structures (and later of cultural landscapes), so that features conveying historic character would be retained by treatment activities. The term "contributing or noncontributing feature" was conceived as a specific, quantifiable item that could be identified in the

field for the purpose of the CLI and National Register evaluation. In all these efforts, the evolution of terms was influenced by the type(s) of cultural landscape being addressed, along with the range of physical conditions to which the terms apply. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins (nos. 18 and 30)," and "Appendix H: Treatment Policy, Guidelines, and Standards.")

## Landscape Characteristics

"Landscape characteristics" is the recommended term associated with the classification system in this text. It refers to the processes and physical forms that characterize the appearance of a landscape and aid in understanding its cultural value. The following general points apply to landscape characteristics and their use in CLRs:

- Landscape characteristic is defined as the tangible and intangible characteristics of a landscape that individually and collectively give a landscape character and aid in understanding its cultural value.
- Landscape characteristic is applied to either culturally derived and naturally occurring processes or to cultural and natural physical forms that have influenced the historical development of a landscape or are the products of its development. The appearance of a cultural landscape, both historically and currently, is a unique web of landscape characteristics that are the tangible evidence of the historic and current uses of the land.

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## TERMINOLOGY USED IN CULTURAL LANDSCAPE PRESERVATION

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### **Character-Defining Feature**

"A prominent or distinctive aspect, quality, or characteristic of a historic property that contributes significantly to its physical character. Structures, objects, vegetation, spatial relationships, views, furnishings, decorative details, and materials may be such features."

—*Cultural Resource Management Guideline, Release No. 5 (1997)* and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (1996)*

### **Contributing Feature**

"A biotic or abiotic feature associated with a landscape characteristic that contributes to the significance of the cultural landscape."

—*Cultural Landscapes Inventory Professional Procedures Guide (1998)*

### **Contributing Resource**

"A building, site, structure, or object that adds to the historic significance of a property. A contributing building, site, structure, or object adds to the historic associations, historical architectural qualities, or archaeological values for which a property is significant because of the following: it was present during the period of significance; it relates to the documented significance of the property; it possesses historic integrity or is capable of revealing information about the period; or it independently meets the National Register criteria."

—*National Register Bulletin 16A: How to Complete the National Register Registration Form (1991)*

### **Landscape Characteristic**

"The tangible evidence of the activities and habits of the people who occupied, developed, used, and shaped the land to serve human needs. The beliefs, attitudes, traditions, and values of the people and processes that have been instrumental in shaping the land, and the processes are evident as physical components on the land."

—*National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes (1990)*

### **Landscape Feature**

"The smallest physical unit that contributes to the significance of a landscape that can be managed as an individual element."

—*Cultural Landscapes Inventory Professional Procedures Guide (1998)*

### **Landscape Unit**

"A discrete portion of the landscape which can be further subdivided into individual features. The landscape unit may contribute to the significance of a National Register property, such as a farmstead in a rural historic district. In some cases the landscape unit may be individually eligible for listing in the National Register of Historic Places, such as a rose garden in a large urban park."

—*The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (1996)*

### **Non-Contributing Feature**

"A biotic or abiotic feature associated with a landscape characteristic that does not contribute to the significance of the cultural landscape."

—*Cultural Landscapes Inventory Professional Procedures Guide (1998)*

### **Non-Contributing Resource**

"A non-contributing building, site, structure, or object that does not add to the historic architectural qualities, historic associations, or archaeological values for which a property is significant, because: it was not present during the period of significance or does not relate to the documented period of significance of the property; due to alterations, disturbances, additions or other changes, it no longer possesses historic integrity or is capable of yielding important information about the period; or it does not independently meet the National Register criteria."

—*National Register Bulletin 16A: How to Complete the National Register Registration Form (1991)*

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- Landscape characteristics are categories under which individual features can be grouped. For example, the landscape characteristic “natural systems and features” may include such individual features as a ravine, valley, wetland, or cliff. The landscape characteristic “topography” may include such features as an earthwork, drainage ditch, or hill. The landscape characteristic “vegetation” may include such individual features as a specimen tree, woodlot, or perennial bed.
- Many landscape characteristics are common among cultural landscapes; however, not all categories of landscape characteristics occur in every landscape. Determining which landscape characteristics exist or did exist within the unique development of each landscape must be made, and only the landscape characteristics that exist or have existed in a particular landscape are identified in CLR.
- Landscape characteristics are valuable in understanding the evolution of a landscape’s appearance over time. They may not have retained integrity (that is, existed in a relatively unchanged state since the established period(s) of significance), and therefore may or may not contribute to the significance of a landscape. Some landscape characteristics may be completely lost, some may be recent additions. Understanding what remains and what was lost can influence the treatment of the landscape.
- Landscape characteristics exist primarily within the boundaries of a cultural landscape; however, it is important to identify the natural, cultural, and political context for every

landscape. The context provides an understanding of the relationship between the landscape characteristics and the broader environment within which they exist. The natural context includes the naturally occurring physical forms that have influenced the landscape’s development, such as dominant landforms, watersheds, native vegetation, water bodies, and wetlands. The cultural and political contexts include land use, zoning, legal restrictions, transportation, utilities, population, and political jurisdiction (state, county, city, village, or town).

## RECOMMENDED LANDSCAPE CHARACTERISTICS

This section recommends a classification system of landscape characteristics. The list of landscape characteristics does not necessarily apply to all cultural landscapes, but rather provides a basis from which the relevant characteristics for a landscape can be identified.

Landscape characteristics must be uniquely identified for each cultural landscape according to the type of landscape and the nature of its historical development. In addition, it is also important to recognize that the list of characteristics is not mutually exclusive. For example, vegetation, buildings and structures, and views and vistas often assist in defining the spatial organization of a landscape. Determining the relationship among the landscape characteristics identified for a property is important in understanding the history of a landscape and how it should be treated.

## Natural Systems and Features

Natural systems and features are the natural aspects that have influenced the development and physical form of a landscape. The following may be included:

- geomorphology: the large-scale patterns of land forms
- geology: the surficial characteristics of the earth
- hydrology: the system of surface and subsurface water
- ecology: the interrelationship among living organisms and their environment
- climate: temperature, wind velocity, and precipitation
- native vegetation: indigenous plant communities and indigenous aggregate and individual plant features

Examples of features associated with natural systems and features include ravines, valleys, watersheds, wetlands, and rock outcrops. (See Figure 1.)

## Spatial Organization

Spatial organization is the three-dimensional organization of physical forms and visual associations in a landscape, including the articulation of ground, vertical, and overhead planes that define and create spaces. Examples of features associated with spatial organization include circulation systems, views and vistas, divisions of property, and topography. (See Figure 2.)

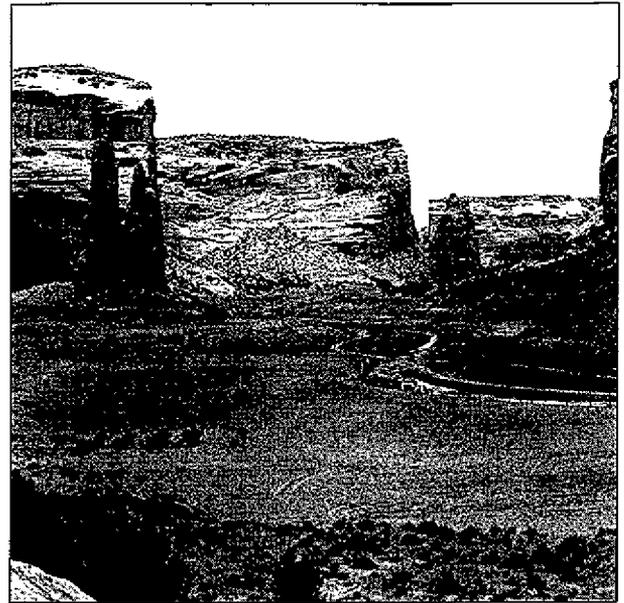


Figure 1. View of natural systems and features. Canyon de Chelly National Monument. (NPS, 1988)



Figure 2. Land use and spatial organization are made visible in part by field and crop patterns. Ebey's Landing National Historical Reserve. (NPS, 1983)



Figure 3. Cluster arrangements are visible in this aerial view of outbuildings in this cattle ranch landscape. Grant-Kohrs Ranch National Historic Site. (NPS, 1970)



Figure 4. Circulation is a prominent landscape characteristic of this Civilian Conservation Corps development. Scotts Bluff National Monument. (NPS, 1995)

## Land Use

Land use describes the principal activities in a landscape that form, shape, and organize the landscape as a result of human interaction. Examples of features associated with land use include agricultural fields, pastures, playing fields, and quarries. (See Figure 2.)

## Cultural Traditions

Cultural traditions are the practices that influence the development of a landscape in terms of land use, patterns of land division, building forms, stylistic preferences, and the use of materials. Examples of features associated with cultural traditions include land use practices, methods of construction, buildings, patterns of land division, and use of vegetation.

## Cluster Arrangement

Cluster arrangement is the location and pattern of buildings and structures in a landscape and associated outdoor spaces. Examples of features associated with a cluster arrangement include village centers and complexes, mining, agricultural, and residential buildings and structures and the associated spaces they define. (See Figure 3.)

## Circulation

Circulation includes the spaces, features, and applied material finishes that constitute the systems of movement in a landscape. Examples of features associated with circulation include paths, sidewalks, roads, and canals. (See Figure 4.)

## Topography

Topography is the three-dimensional configuration of a landscape surface characterized by features (such as slope and articulation) and orientation (such as elevation and solar aspect). Examples of features associated with topography include earthworks, drainage ditches, knolls, and terraces. (See Figure 5.)

## Vegetation

Vegetation includes the deciduous and evergreen trees, shrubs, vines, ground covers and herbaceous plants, and plant communities, whether indigenous or introduced in a landscape. Examples of features associated with vegetation include specimen trees, allees, woodlots, orchards, and perennial gardens. (See Figure 6.)

## Buildings and Structures

Buildings are elements constructed primarily for sheltering any form of human activity in a landscape. Structures are elements constructed for functional purposes other than sheltering human activity in a landscape. Engineering systems are also structures. Mechanical engineering systems may be distinguished from structural engineering systems as follows:

- Mechanical engineering systems conduct utilities within the landscape, such as power lines, hydrants, and culverts.
- Structural engineering systems provide physical stabilization in the landscape, such as retaining walls, dikes, and foundations.

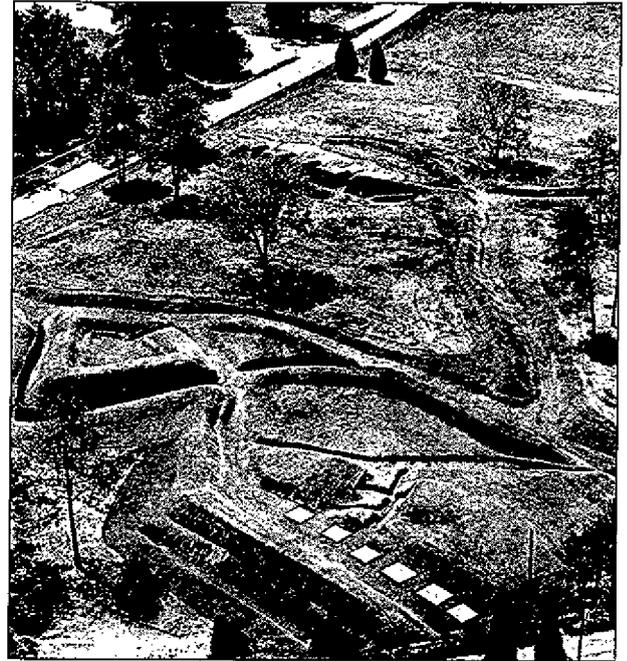


Figure 5. The reconstructed earthworks that form the Grand French Battery complex of Yorktown Battlefield are a feature of topography. Colonial National Historical Park. (NPS, n.d.)



Figure 6. Vegetation includes specimen plant features, such as the nineteenth century Saucer Magnolia in the background, and aggregations of plants, such as the Boxwood hedge outlining the pathways. Hampton National Historic Site. (NPS, n.d.)



Figure 7. Lover's Lane Footbridge is a feature associated with the landscape characteristics, buildings and structures, and circulation at the Presidio. Golden Gate National Recreation Area. (NPS, 1993)

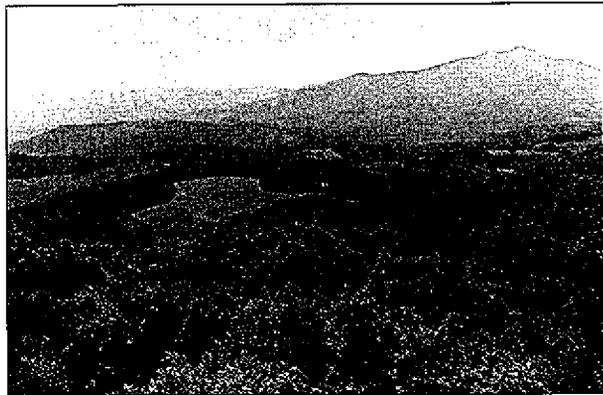


Figure 8. Views are a significant landscape characteristic of the Blue Ridge Parkway. This is the view from Flat Top Mountain toward Grandfather Mountain. Blue Ridge Parkway. (NPS, c. 1940s)

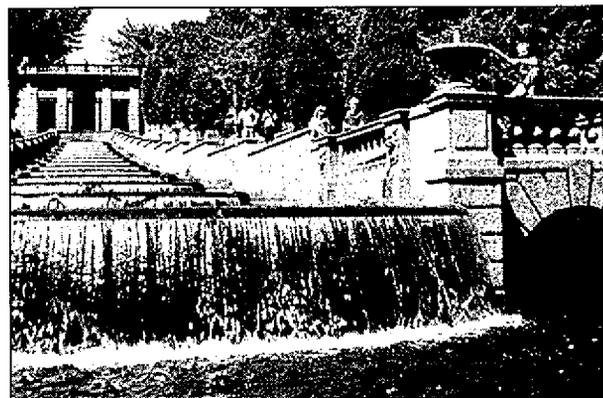


Figure 9. Constructed water features, such as this water cascade, are a landscape characteristic of the historic designed landscape of Meridian Hill Park. Rock Creek Park. (NPS, n.d.)

Examples of features associated with buildings include houses, barns, stables, schools, and factories. Examples of features associated with structures include bridges, windmills, gazebos, silos, and dams. (See Figure 7.)

## Views and Vistas

Views and vistas are the prospect created by a range of vision in a landscape, conferred by the composition of other landscape characteristics and associated features. (See Figure 8.) Views and vistas are distinguished as follows:

- Views are the expansive or panoramic prospect of a broad range of vision, which may be naturally occurring or deliberately contrived.
- Vistas are the controlled prospect of a discrete, linear range of vision, which is deliberately contrived.

## Constructed Water Features

Constructed water features are the built features and elements that use water for aesthetic or utilitarian functions in a landscape. Examples of features associated with constructed water features include fountains, canals, cascades, pools, and reservoirs. (See Figure 9.)

## Small-Scale Features

Small-scale features are the elements providing detail and diversity for both functional needs and aesthetic concerns in a landscape. Examples of small-scale features include fences, benches, monuments, signs, and road markers. (See Figure 10.)

## Archeological Sites

Archeological sites are the ruins, traces, or deposited artifacts in a landscape, evidenced by the presence of either surface or subsurface features. Examples of features associated with archeological resources include road traces, structural ruins, irrigation system ruins, and reforested fields.

## USE OF LANDSCAPE CHARACTERISTICS IN CULTURAL LANDSCAPE REPORTS

Landscape characteristics are a useful framework for preparing CLR reports because they provide a system for: 1) gathering, organizing, and understanding information about the site history and existing conditions of a cultural landscape, and 2) documenting the changing appearance of a landscape over time. Landscape characteristics can be used in all sections of a CLR, including the following:

- Site History
- Existing Conditions
- Analysis and Evaluation
- Treatment
- Record of Treatment

The organization of landscape characteristics throughout the sections of a CLR should be considered. A hierarchical or nested arrangement may be useful for organizing and emphasizing the interrelationships of landscape characteristics. The manner in which they are presented in a CLR may not be the order in which landscape characteristics are recognized and



*Figure 10. The gatepost of the Presidio Boulevard Gate is a small-scale feature of the Presidio landscape. Golden Gate National Recreation Area. (NPS, 1993)*

identified in the field. For example, it may be necessary to identify which landscape characteristics give structure to spatial organization, such as vegetation and topography, before spatial organization can be recognized and identified as a landscape characteristic.

## Site History

The site history describes the landscape through every relevant historic period until the present. Landscape characteristics are used as a system for organizing the documentation describing the chronological development of the landscape and recording the physical changes, events, and persons integral to the evolution. The appearance

of landscape characteristics over time is communicated graphically in a CLR through a series of period plans, in a narrative format, and in historical photographs and other documents.

## Existing Conditions

The existing conditions identify and describe the landscape characteristics that define the existing appearance and character of a landscape. Landscape characteristics are identified and documented during field surveys and through the use of site investigation techniques, such as tree coring, archeology, and aerial photograph analysis. Landscape characteristics are geographically located and their physical condition is assessed. Existing landscape characteristics are graphically documented in an existing conditions plan and in the narrative text of a CLR. Landscape characteristics are also documented in black and white photographs and color slides.

## Analysis and Evaluation

The analysis and evaluation compares the findings of the site history with the existing conditions to identify the landscape characteristics that retain integrity and contribute to the significance of a landscape. (Landscape characteristics that have existed since an established historic period are determined to retain integrity.) If not already determined, the analysis and evaluation section states the significance of the landscape (according to National Register criteria A-D), and the historic period(s) of significance.

## Treatment

Treatment prescribes how the landscape should be treated and managed, based on its significance, existing conditions, and use. Although the treatment of cultural landscapes is directed by policy, guidelines, and standards, knowledge of landscape characteristics as they existed over time influences the selection of a primary treatment and development of a treatment plan for the entire landscape. The extent of written evidence of the historic appearance of landscape characteristics is considered during treatment planning, and the physical condition of characteristics influences specific treatment. A treatment plan may be described in a CLR using narrative guidelines, a schematic drawing, or a detailed plan.

## Record of Treatment

The record of treatment is an appendix or addendum to a CLR that describes treatment activities in the landscape as implemented. Landscape characteristics may be used to organize the continued documentation of a landscape during the physical changes involved in implementing the treatment plan. A record of how treatment activities affected landscape characteristics is presented in a narrative description of construction work, "as-built" construction drawings, and photographs. These records become primary sources of the continued evolution of landscape characteristics and add to the archived historic records of a landscape.

In each section of a CLR, landscape characteristics provide a valuable framework for understanding and organizing the chronological development of a landscape, describing the existing conditions,

and outlining a treatment plan. Each landscape characteristic represents a broad category of processes or physical forms that interrelate and can be used to illustrate patterns through time.

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**Park Historic Structures & Cultural Landscapes**

## Historic Plant Material Sources

### INTRODUCTION

In a cultural landscape, a common landscape characteristic is the vegetation that is either associated with the historical development of the landscape or resulted from cultural activities on the land. Vegetation that can be linked to an established period of significance and that has remained relatively unchanged over time adds to the overall significance of the landscape. The features associated with vegetation include individual plants and aggregations of plants and plant communities. (See Figure 1.)

Identifying, documenting, and analyzing vegetation is a prerequisite to preparing a Cultural Landscape Report (CLR). Knowledge of the vegetation allows a site history to be developed, the existing conditions of a landscape to be understood, and a treatment plan to be developed. Plants are identified through a site survey or plant inventory and historic photographs of plants in the landscape. (See Figure 2.) Archeological techniques, such as pollen, phytolith, and macroflora analyses, may be used to identify nonexistent plants that were integral to cultural activities in the landscape. Plant identification data may already be available as a result of a plant inventory conducted prior to a CLR. Historical research on cultivated plants may be necessary to accurately identify and date a particular plant. For example, a historic nursery catalog may contain a description of a plant variety or cultivar and a date of introduction into cultivation. In other cases it may be necessary to use horticulture or botany experts to identify particular plants.

To determine the significance of vegetation to the history of a landscape, other site investigation techniques can be used. Tree coring is a technique used to identify the age of trees to determine whether they date from a historic period. Historical and contemporary field and aerial photographs may be analyzed to understand how vegetation has



Figure 1. This Ginkgo tree was planted in the early nineteenth century and is an individual plant feature. Vanderbilt Mansion National Historic Site. (NPS, 1995)

changed. Existing conditions investigation data is integrated with historical research data to thoroughly understand the significance and integrity of the vegetation in a landscape.

Intrinsic to the dynamic quality of cultural landscapes is the concept that plants which once existed have died and those that still remain will eventually die. Therefore, in selecting a landscape treatment or describing treatment guidelines in a CLR, it is important to consider the replacement of significant plant material, including the method of replacement and plant availability. The following section addresses in-kind replacement of historic plant material and highlights sources of both historic plant material and historic plant expertise.

## IN-KIND REPLACEMENTS OF HISTORIC PLANTS

Depending on a plant's significance in a cultural landscape, it may be replaced with the following:

- Exact genetic clone of the original. This is appropriate for rare plant varieties having a significant association with an individual or event. (See Figures 3 and 4.)
- Exact taxonomic replacement. This is appropriate for plants with a significant cultural use or function in a landscape.
- Comparable substitute for the plant's form and character. This is appropriate to address known diseases or environmental changes in a landscape. (See Figure 5.)



Figure 2. Plant identification is a prerequisite to an analysis and evaluation of vegetation for a CLR and can be performed during a plant inventory. Longfellow National Historic Site. (NPS, 1993)

In-kind replacements of historic plants vary in availability within the nursery trade, from relatively common to rare. Availability depends in part on the particular species of plant being replaced; that is, whether the desired replacement is a straight species or a lower taxon, such as a cultivar (a cultivated variety or a naturally occurring variety). Straight species are identified only by a generic and specific binomial Latin name, whereas man-made cultivars are typically identified by the genus or species name followed by an English name in single quotation marks. Naturally occurring varieties are identified by the species name followed by a Latin name with no quotation marks.



Figure 3. These historic apple trees are associated with Presidents John Adams and John Quincy Adams. Therefore, in-kind, genetic replacement of these old varieties is an appropriate treatment. Adams National Historic Site. (NPS, 1995)

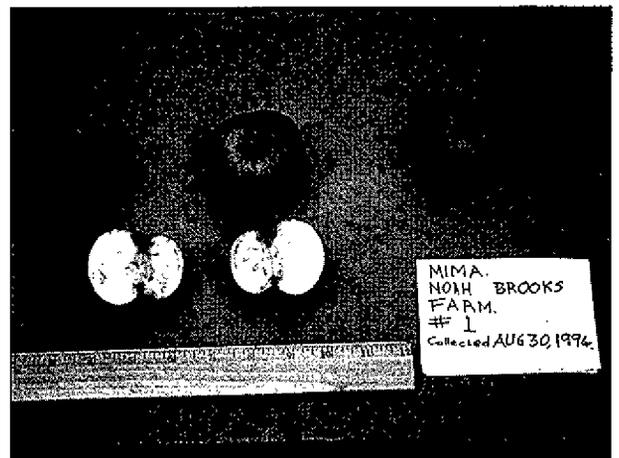


Figure 4. Apple fruit from old varieties of apple trees. Minuteman National Historic Site. (NPS, 1994)

## Cultivars

Many cultivated varieties of plants created historically by plant breeders have been rendered extinct either through hybridization (to create "improved" cultivars), or lack of perpetuation through vegetative propagation. Some cultivated plant varieties are highly ephemeral, existing in the nursery trade for several years or a decade and then being



*Figure 5. Due to the devastating effects of Dutch Elm Disease, the American Elm is often not replaced in-kind, but instead with a disease resistant cultivar, such as Princeton, or Liberty Bell. The young tree in the foreground is a Liberty Elm cultivar, which replaces a missing American Elm. A mature straight species American Elm can be seen to the left in the background. Longfellow National Historic Site. (NPS, 1989)*

superseded by another cultivar. Cultivars have come and gone like fashionable styles throughout the last several centuries of intensive ornamental plant breeding and nursery production. To some extent, the first plant species to be introduced into the United States or collected for cultivation have had the most cultivars created over time. Particularly popular and common genera or species of garden plants are most likely to have been "improved" horticulturally over time, and many cultivars have been created from them.

Cultivars are typically variants on the species of flower and fruit characteristics, plant size, form, and disease resistance. Many cultivars no longer exist,

while others are only found in cultivation in a few historic gardens. Some historic ornamental plant cultivars and species can be found in botanical gardens and cultural landscapes, while others are preserved as germplasm in seed banks. Of great concern to ecologists and plant experts is the reduction in plant genetic diversity that results from the extinction of cultivars, varieties, and species. Genetic diversity is viewed favorably in the health of ecosystems, promoting stability and the ability to resist natural and cultural disturbance. In edible plant breeding, thousands of varieties have been lost during the twentieth century in the standardization of crop plants, particularly for their suitability to mechanized production and for increased crop yield.

## **Straight Species**

Straight species of plants (nonhybridized plants) may be among the more difficult to find commercially. This is due to the emphasis on plant breeding in commercial horticulture to improve the visual characteristics of ornamental plants for sale. A nonhybridized American Ash (*Fraxinus americana*), for example, may not be available from tree nurseries, though numerous cultivars of the species can be found.

Depending on the relative cultural value or importance of a plant and its significance in a cultural landscape, the in-kind replacement of a particular straight species of plant may or may not be important. For straight species of plants that are native to the United States, native plant nurseries may be the best source. For rare and endangered native species, the Center for Plant Conservation (CPC) is a potential source of plant propagules. The CPC is a consortium of 25 United States botanical gardens and arboreta, which conserve listed rare and endangered native plant species. The CPC at Missouri Botanical Garden can be contacted at the following address:

**Center for Plant Conservation**  
**Missouri Botanical Garden**  
P.O. Box 299  
St. Louis, MO 63166  
343-577-9450

## **PLANT SOURCES AND PLANT EXPERTISE**

The following list gives sources of both historic plant material and historic plant expertise. Scott Kunst, a landscape historian, is an expert on historic ornamental plant materials. Kunst has compiled a comprehensive list of commercial sources for historic ornamental plants throughout the United States. To obtain the complete *Source List for Historic Seeds and Plants*, contact Scott Kunst at:

### **Old House Gardens**

536 Third Street  
Ann Arbor, MI 48103-4957  
313-995-1486

The following is an abbreviated list of commercial sources of historic plant material that Kunst recommends. (The focus of the list is on garden ornamentals and not on plants used in kitchen gardens, orchards, or agriculture.)

### **Flower and Herb Exchange**

3076 North Winn  
Decorah, IA 52101  
319-382-5990

### **Old Sturbridge Village**

1 Sturbridge Village Road  
Sturbridge, MA 01566  
508-347-3362

### **Perennial Pleasures**

2 Brickhouse Road  
E. Hardwick, VT 05836  
802-472-5104

### Select Seeds

180 Stickney Road  
Union, CT 06076  
203-684-9310

### Thomas Jefferson Center for Historic Plants—Monticello

P.O. Box 316  
Charlottesville, VA 22902  
804-984-9816

If a particularly important or culturally valuable historic plant species or cultivar is difficult to identify, the services of a historic plant expert may be necessary. Historic plant experts exist within horticultural and historical societies, botanical gardens and arboreta, research institutions, herbaria, commercial horticulture, and the cultural landscape preservation field. In the National Park Service (NPS), the Olmsted Center for Landscape Preservation may have the botanical or horticultural expertise to identify historic ornamental plant species and cultivars. For more information, contact:

### Olmsted Center for Landscape Preservation

99 Warren Street  
Brookline, MA 02146  
617-566-1689

Straight species of historic plants may be the easiest to identify, while the most hybridized plants (in which the species lineage is so complex that the cultivar name is given immediately following the genus name) may be the most difficult. However, in

some cases old cultivars can be identified using "origination lists" and "cumulative checklists." These lists describe the names, appearances, and commercial dates of old cultivars, and they typically contain all known cultivars of a plant species along with dates of introduction (or registration) and brief descriptions.

To replace a plant with a particular cultivar, it may be necessary to search specialized nurseries, collectors, botanical gardens, and other cultural landscapes. It is advisable to examine nursery plants to determine whether the historic cultivar is what the label claims it to be. Some cultivars have been inadvertently substituted over time and others are simply misidentified. A bibliography of origination lists and cumulative checklists of ornamental plants is included at the end of the text. The reference section is largely derived from an article by Scott Kunst and Arthur Tucker that appeared in the *APT Bulletin*, vol. xxi, no. 2, in "1989: Where Have All the Flowers Gone?"

*The Sourcebook of Cultivar Names*, an expanded list of cultivars and pertinent information, has been compiled by Scott Kunst. The Sourcebook can be obtained through Arnoldia of the Arnold Arboretum, at the following address:

### Arnoldia

#### Arnold Arboretum

125 Arborway  
Jamaica Plain, MA 02130  
617-524-1718

The following is a list of sources of further expertise and information on historical plants:

**Alliance for Historic  
Landscape Preservation**  
82 Wall Street, # 1105  
New York, NY 10005

**American Association of  
Botanical Gardens and Arboreta**  
786 Church Road  
Wayne, PA 19087  
610-688-1120

**American Daffodil Society**  
**Mary Lou Gripshover**  
1686 Grey Fox  
Milford, OH 45150

**Garden Conservancy**  
P.O. Box 219  
Cold Spring, NY 10516  
914-265-2029

**Heritage Rose Group**  
**Miriam Wilkins**  
925 Galvin Drive  
El Cerrito, CA 94530  
510-526-6960

**Historic Iris Preservation Society**  
**Ada Godfrey**  
9 Bradford Street  
Foxborough, MA 02035  
508-543-2711

**National Council for the Conservation of  
Plants and Gardens**

**The Pines—Wisley Garden**  
Woking, Surrey, GU23 6QB  
United Kingdom  
44-0483-211-465

**New England Garden Society**  
300 Massachusetts Avenue  
Boston, MA 02155  
617-536-9280

**Southern Garden History Society**  
Drawer F, Salem Station  
Winston-Salem, NC 27108

**Wakefield and North of  
England Tulip Society**  
70 Wrethorpe Lane  
Wrethorpe, Wakefield  
West Yorkshire, WF2 0PT  
United Kingdom

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## *Graphic Documentation*

### INTRODUCTION

Line drawing, photography, and videography are techniques for graphically documenting cultural landscapes. Line drawings, such as measured plans, sections, and elevations, and black and white photographs are the types of graphics used in a Cultural Landscape Report (CLR) to accurately record the appearance of a landscape at a particular time. Other graphics, such as diagrams, sketches, perspectives, maps and charts—reproduced from contemporary or historic materials—may also be used in a CLR. Additional forms of graphic documentation, such as color slides and video, are also valuable tools for recording the landscape and may be used to supplement other documentation.

Throughout a CLR, different formats and various scales of graphics are used to supplement narrative descriptions and documentation of the landscape. In the site history, period plans are used to illustrate landscape change through every relevant historic period. (See Figure 1.) These graphics are created by analyzing historic materials or reproduced from existing historical documents. In the existing conditions, an existing conditions plan is generated based on site research and investigations. This drawing, in addition to photographs, provides a contemporary record of a landscape's appearance and the condition of landscape characteristics and associated features. In the analysis and evaluation, elevations, plans, and schematic diagrams are used to show the relationship between historical research and the findings of existing conditions investigations. In the treatment section, a diagram, schematic, or detailed treatment plan illustrates a proposed treatment as it relates to a whole site, character areas, or management zones.

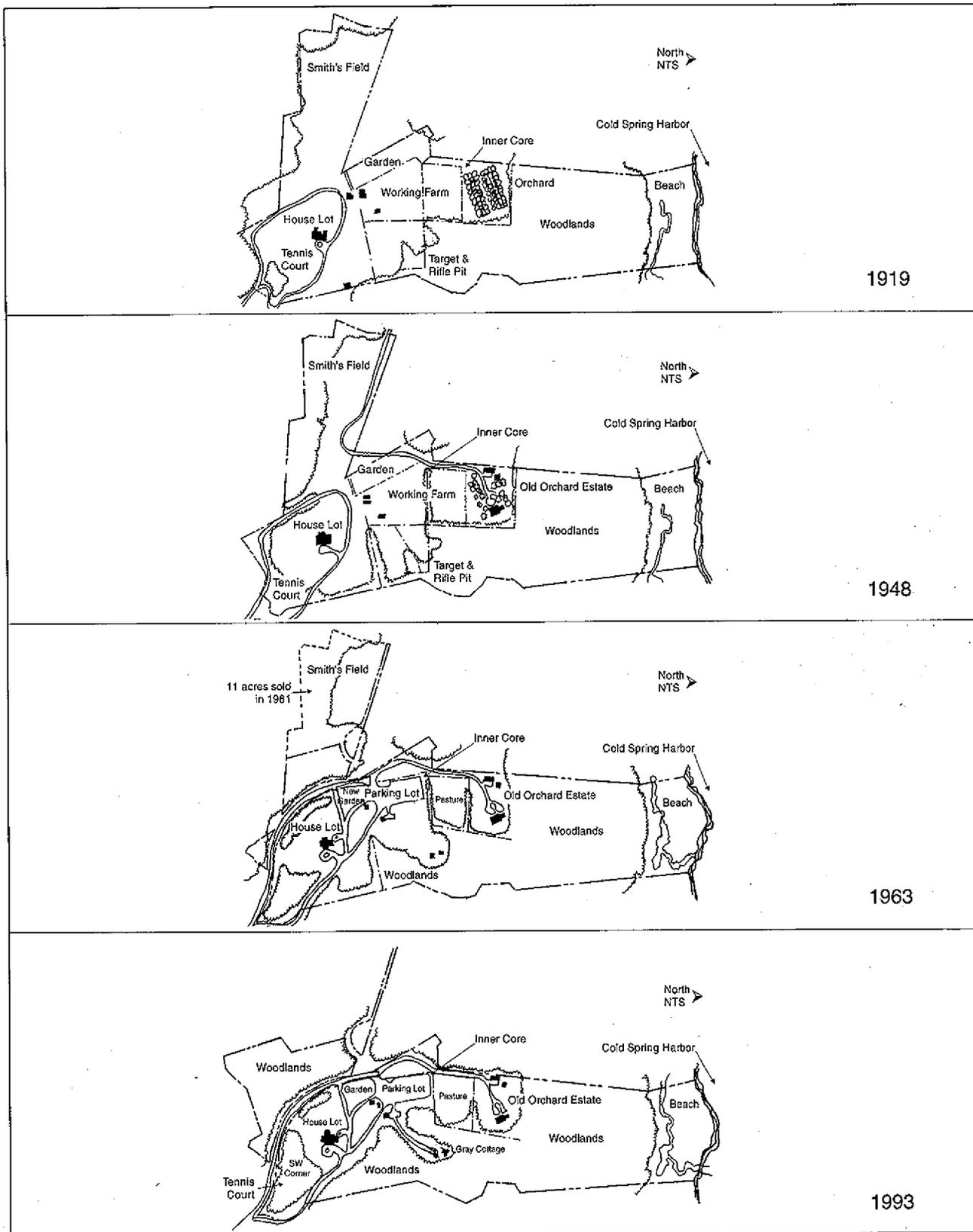


Figure 1. Diagrams are useful for quickly conveying certain types of information. These serial diagrams convey changes in spatial organization from 1919 through 1993. Sagamore Hill National Historic Site. (NPS, 1993)

## LINE DRAWING DOCUMENTATION

Line drawings, particularly measured plan drawings, are a primary graphic technique used to accurately record the appearance of a landscape at a particular time. Line drawings may be hand-drawn or computer-generated, and in all cases must be accurate, clear, consistent in style, reproducible, and durable.

### Accuracy

The purpose of line drawings is to objectively record in a durable medium the appearance of a landscape, and the landscape characteristics and associated features. It is important that line drawings accurately depict cultural landscapes because each graphic will become a historical record and a primary source of information. Accuracy is not, however, absolute; some inaccuracy results from graphically representing three-dimensional spaces. Although line drawings should be as accurate as possible, their accuracy is influenced by the following:

- management objectives for the CLR
- level of investigation required by the project agreement
- proposed treatment of the landscape
- accuracy of available site data, field surveys, and other sources used to prepare the line drawings

Depending on management objectives, park and technical staff should define the acceptable degree of accuracy in line drawings in the project agreement for a CLR.

### Clarity

The clarity of a graphic refers to its legibility; that is, how easy it is to see the information presented in the graphic. All plans representing an entire landscape should have the same scale and use the same base map or base plan layer for clarity. (See Figure 2.) For example, a period plan and an existing conditions plan drawing should be generated from the same base plan and at the same scale to allow direct comparison. If a plan represents only an area of a landscape (such as landscape character areas or management zones), it should be clearly referenced to a base map of the entire landscape to indicate its specific location. A diagram key may appear on the drawing to indicate the location of the area represented by the larger plan.

Plans belonging to a series should have the same sheet size, title block, orientation, and scale. To determine the sheet size for a plan, consider the following:

- management objectives for the CLR
- the size and character of the landscape
- the final page size of the plan reproduced in the formatted CLR

For documentation and analysis purposes, a landscape may need to be represented at multiple scales. The following table suggests scales for various uses.

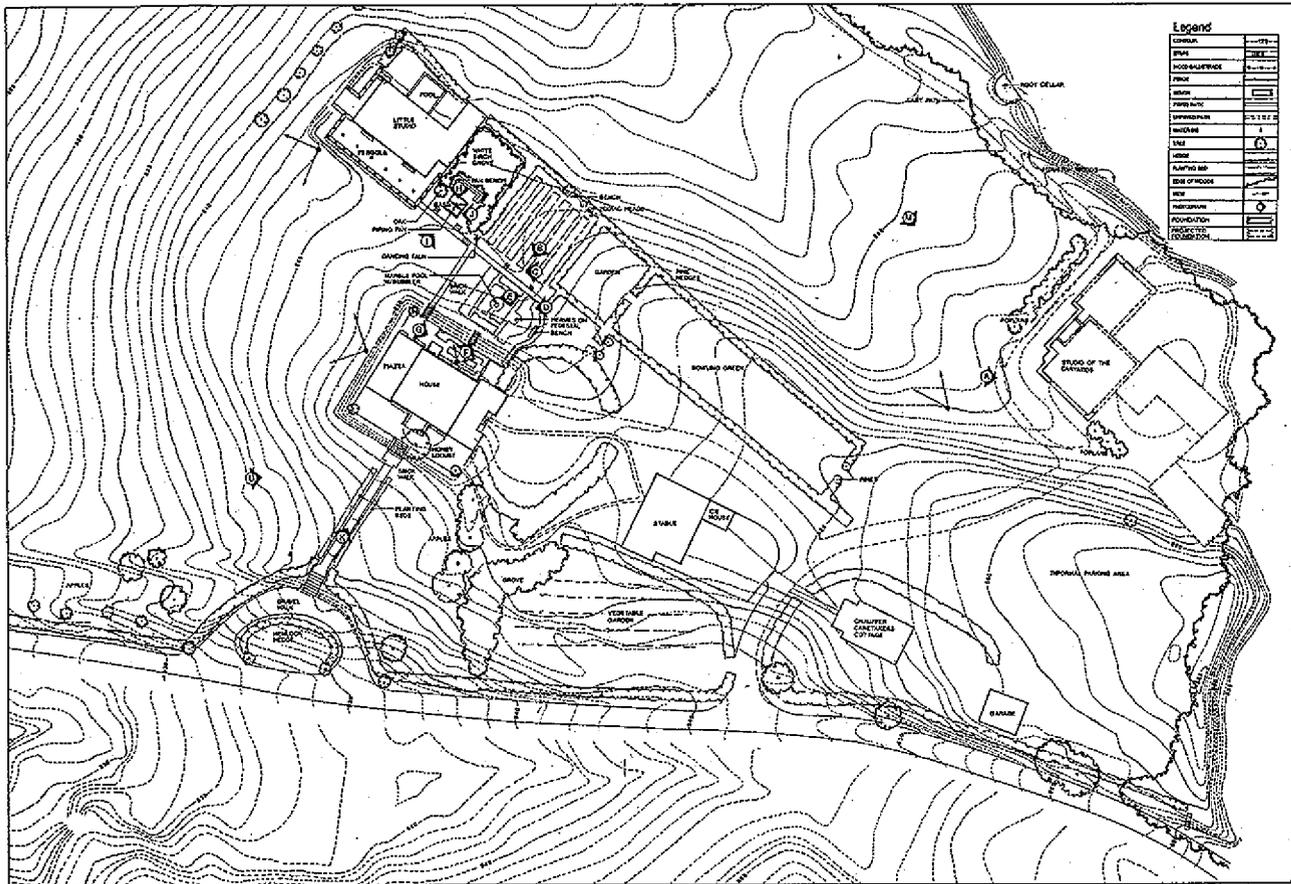


Figure 2. This 1926 period plan is one of a set of five. The plan has clarity and consistency with the other plans so direct comparisons can be made. Saint-Gaudens National Historic Site. (NPS, 1993)

SCALES	USE
1" = 200'	Landscape plans depicting an entire landscape
1" = 400', 1" = 500', or 1" = 1,000'	Large landscapes
A series of 1" = 200' plans with match-lines show connectivity between plans	If a landscape is too large to be represented on one sheet using a 1" = 200' scale
1" = 100' and 1" = 50'	Small landscapes
1" = 20'	Tree and shrub identification and small landscapes (about two acres).
1" = 10' or 1/4" = 1'	Planting plans and construction drawings

Current National Park Service (NPS) policy regarding the use of metric or English scales is given by *Preparation of Design and Construction Drawings, NPS-10*. It requires only that metric and English scale conversions are indicated on a cover sheet to a set of drawings. Either metric or English scales can be used for individual drawings, but only one scale convention should be used throughout a CLR.

Contours should appear on all plans. A contour interval that clearly depicts the landscape topography and serves the CLR's management objectives should be used. The desired contour interval may vary in different areas of the landscape, depending

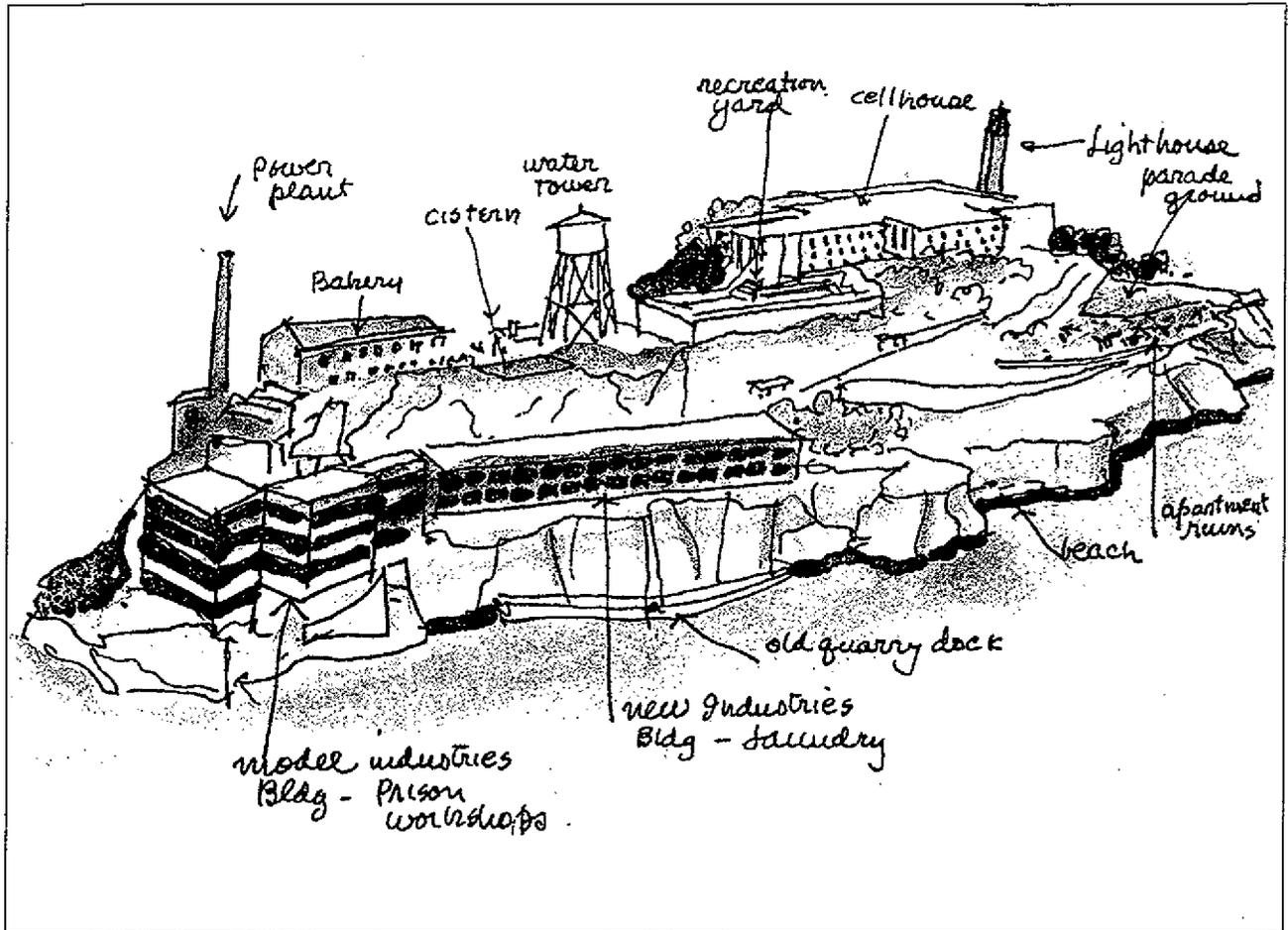


Figure 3. Loose sketches are useful for quickly recording field observations or conceptual ideas. This perspective sketch of Alcatraz Island conveys a concept plan for the future use of this historic site. Golden Gate National Recreation Area. (Sketch by Lawrence Halprin, NPS, 1988)

on the range of topographic relief, the complexity of landscape characteristics and associated features, or specific management objectives in different areas. The contour interval used on line drawings may be increased or decreased in particular areas of the landscape as long as the change makes the plan more readable or enhances the information. (See *Landscape Lines 9: Surveys*.) For information on contracting computer-generated topographic plans from aerial photographs, see the section titled "Photogrammetry," later in this document.

## Consistency

Numerous references exist for landscape architectural graphic standards, many of which are identified in the reference section of this text. Preferably, one graphic standard should be used throughout a CLR, but it may be necessary to use more than one standard where omissions exist. For example, *Preparation of Design and Construction Drawings, NPS-10* does not have a symbol for a property line. For consistency and clarity, all symbols should be identified in a legend on each drawing. The legend should show the symbol and define its meaning.

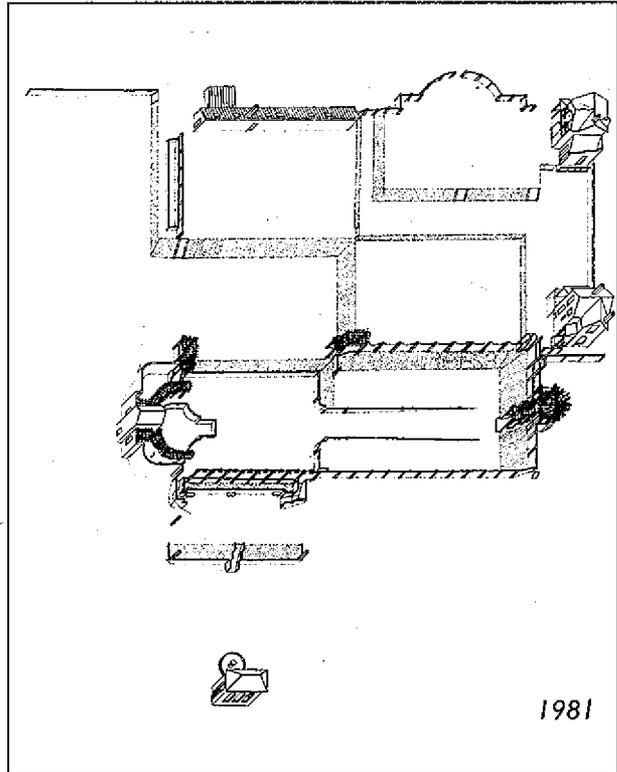
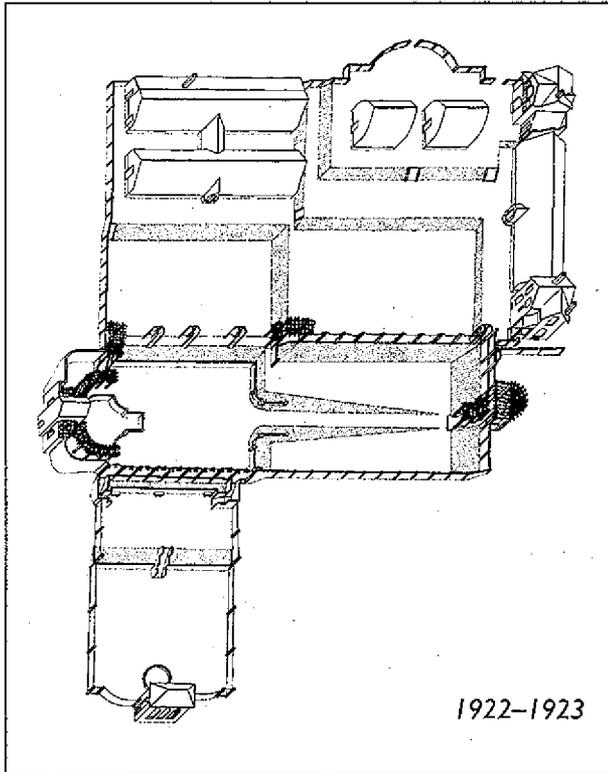
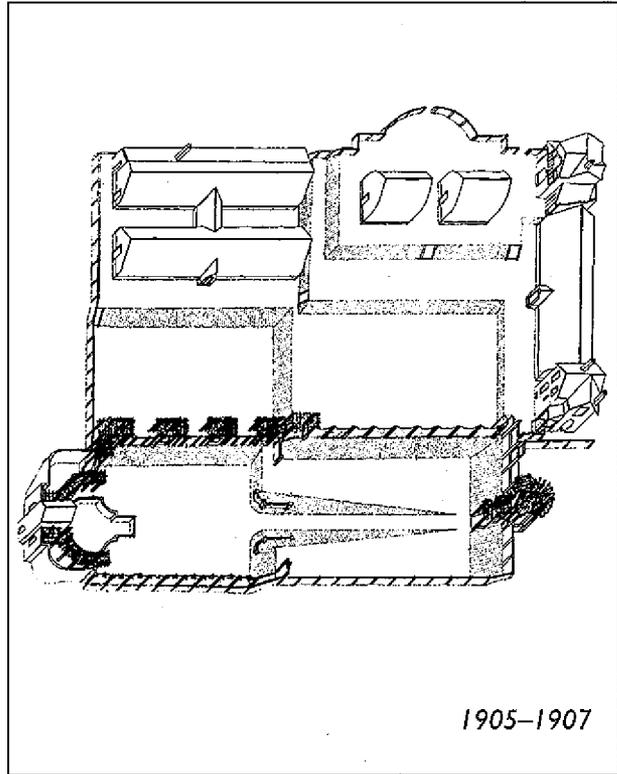
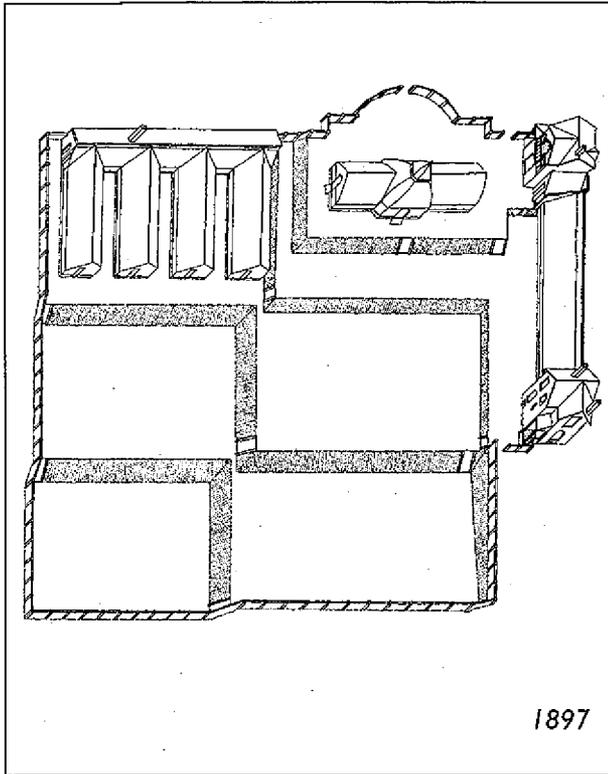


Figure 4. These serial axonometric perspective drawings were useful in documenting the evolution of the formal gardens from 1897 through 1981. Vanderbilt Mansion National Historic Site. (NPS, 1981)

The following list of standards and guidelines is arranged in descending order of comprehension and refinement:

- The American Institute of Architects' Architectural Graphic Standards and Guidelines
- Historic American Building Survey and Historic American Engineering Record Standards and Guidelines
- NPS Design and Construction Documents Guideline
- National Register Documentation Guidelines
- United States Geological Survey, Topographic Map Symbols

For computer aided design (CAD) drawings it may be necessary to use graphic standards established by an NPS Region or Support office. Regardless of the level of refinement, acceptable degree of accuracy, or graphic conventions used for line drawings, the style of each CLR drawing should be consistent. The following list gives the information required to appear on each plan. Examples are given in parenthesis.

- project title ("Cultural Landscape Report: Lower Town, Harper's Ferry National Historic Park")
- project location ("Harper's Ferry National Historical Park, West Virginia")
- drawing title ("Period Plan: 1815-1865")
- NPS drawing number: numbers are used and controlled by designated offices, and consist of the park code plus a number assigned by a NPS

Region or Support office (see *Drawing and Map Numbers Guideline, NPS 29*, revised edition)

- graphic bar scale and statement of scale
- north arrow oriented towards the top of the sheet
- date of drawing
- illustrator's name and title
- legend of symbols
- sources of information (metadata) used to prepare drawing ("Based on CLI field survey, 3/4/96, not a measured drawing")

Computer-generated drawings should include all the above information. If multiple layers are used (such as topography, boundaries, and structures), they should be individually classified within the drawings. Standards for graphic file formats may exist within an NPS Region or Support office, and these should be used when naming and saving computer-generated graphics files.

Geographic Information Systems (GIS) may be an alternative computer technology to computer graphic programs (such as CAD). For many years the quality of cartographic output available through GIS software could not equal that achieved with manual methods or computer graphic programs. But this is no longer the case. Numerous mapping tools are now available in most GIS packages, including desktop systems, which offer the added benefit of being easy enough to learn and use for novice GIS users. (See *Landscape Lines 10: Geographic Information Systems*.)

## Reproducibility

The preferred media for hand-generated drawings is waterproof black ink on 3mm or 4mm polyester film, such as mylar. Double-sided, rather than single-sided film, with texture on both sides of the sheet, may be useful for particular visual effects, such as shading on the back side. Pin-bar registered multiple sheets of film may be used to separate layers of information. Film sheets can be obtained in the following precut sizes: 18" x 24", 24" x 36", and 34" x 44".

When deciding what film sheet size to use, consider both the final image size of the reduced original in the CLR and the preferred scale of the plan. An early decision (preferably during the project agreement phase) should be made about whether 8½" x 11", or 11" x 17" pages of reduced drawings will be placed within the body of the CLR or whether full-sized drawings will be folded into a pocket at the back. The page size of graphic images depends on the scale or complexity of site information to be conveyed. Greater landscape scale and greater complexity of information (such as close contour intervals and dense or diverse plantings) limits the extent to which an image can be reduced and still be legible. Full-size, folded drawings have the disadvantage of being bulky at the back of the document and the possibility of being lost, but have the advantage of being useful for easy access and reference alongside the CLR text.

The printing cost of a CLR with a back pocket for folded plans tends to be more expensive than a CLR with reduced plans integrated within the body of the document. Pages that are 11" x 17" can be

folded to create a pull-out page with a larger image size than the 8½" x 11" page.

A graphic bar scale is required on any plan or section drawing so that the scale of the plan can be understood regardless of the percent reduction. The following guidelines apply to legibility of text for reduced plans.

- For a 34" x 44" original plan to be reduced to an 8½" x 11" page, the minimum font size on the original plan should be no less than 18 point (3/16" high).
- For an 18" x 24" or 24" x 36" original plan to be reduced to a 8½" x 11" page, the minimum font size on the original plan should be no less than 14 point (1/8" high).
- The minimum font size on any reduced plan (8½" x 11" or 11" x 17") should be no less than 9 point.

Computer drawing programs allow for excellent line quality at almost any scale on many types of paper (limited by the capability of the printer). The preferred paper for computer-generated, line drawing originals is acid-free bond paper. The legibility of the text needs to be considered when reducing computer-generated drawings. Consideration should be given to preparing two sets of computer-generated drawings: one for full-scale and one for reduced-scale production.

## Durability

Waterproof, black ink on polyester film is the most durable media for hand-generated drawings. Other media, such as graphite pencil or ink

pen on vellum, reproduce well, but are less durable. All graphic images used in a CLR—whether line drawings, diagrams, or charts—should be equally durable. The use of sticky-back or adhesive lettering is not recommended on hand-generated drawings; these media tend to bubble up or flake off over time. (Where sticky-backs are used, photomylar of the originals should be created to insure durability of text in archival conditions.) Drawing text is most durable as ink on film, hand lettered, or traced with a Leroy template.

In processing a camera-ready copy of a CLR, the United States Government Printing Office (GPO) or printer may photograph each page of the document to create proofs from which the document will be printed. Ideally, all line

drawings that are part of a CLR should be supplied to the printer as photometallic transfers or PMTs (a photographic reduction process). PMTs are highly durable and are produced on 8½" x 11" or 11" x 17" size paper. Copies of full-size line drawings can be supplied to the printer as original artwork with special instructions, such as location, position, and percent reduction.

Full-size drawings larger than 11" x 17", which are to be folded into a pocket at the back of the document, are directly photocopied onto acid-free bond paper by the printer. Blueprints, which are created through the diazo process, are not recommended for full-size drawings because they become unstable with prolonged light exposure.

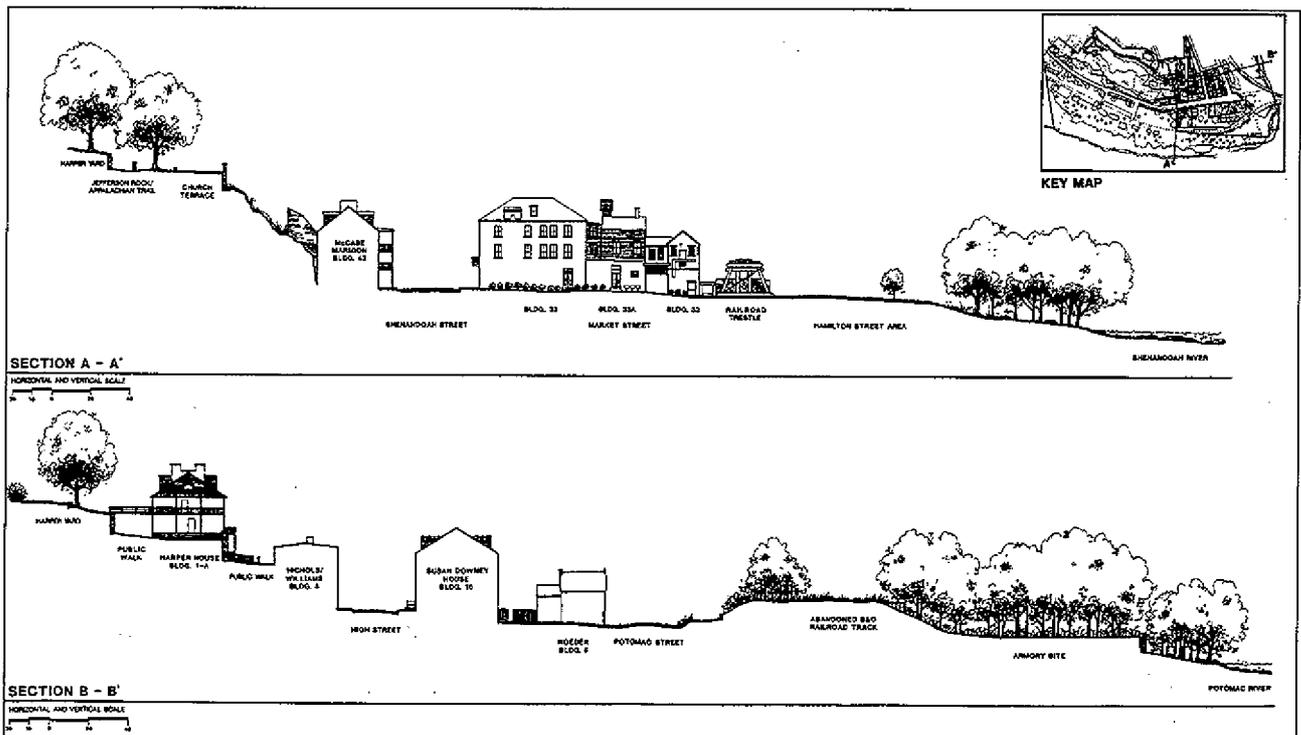


Figure 5. These section drawings show the existing topography, vegetation, circulation, and character of buildings and structures in Lower Town, Harpers Ferry National Historical Park. (NPS, 1991)

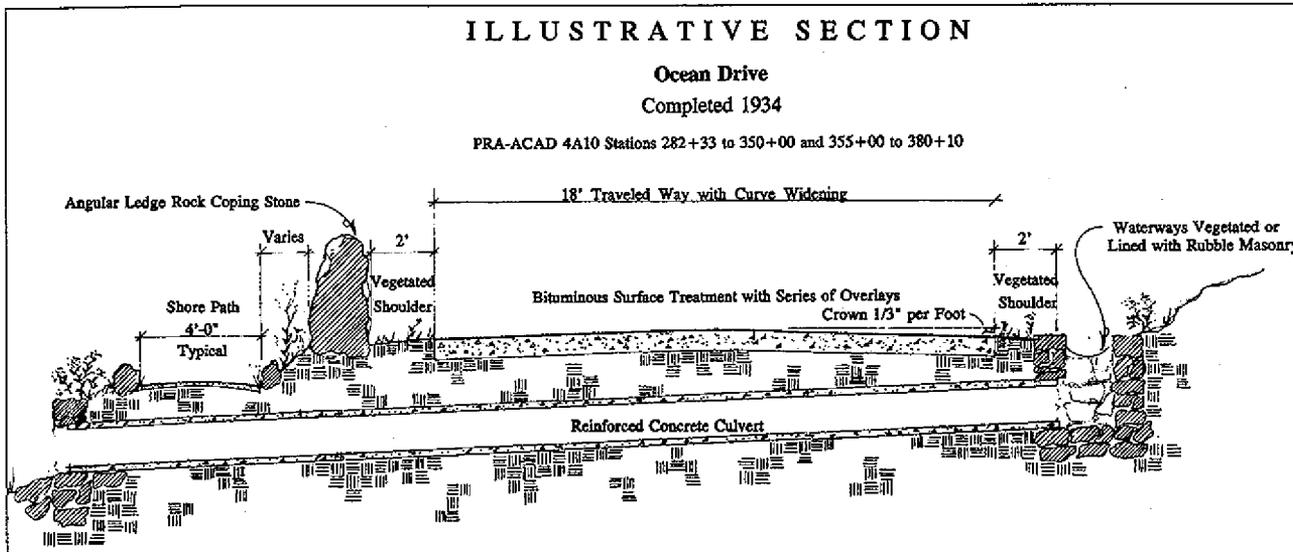


Figure 6. This illustrative section drawing of the historic roadbed at Ocean Drive illustrates a typical construction detail of the road in 1934. Arcadia National Park. (NPS, 1993)

Computer-generated drawings can be archived as electronic files on disks, compact disks (CDs) and tapes. Since the durability of these storage media has yet to be established, some archivists believe acid-free paper is still the most durable medium for storing information. Other archivists believe electronic files on disks, CDs, and tapes are durable for 100 years, under climate-controlled conditions.

Upon completing a CLR project, original line drawings, other graphic materials, including electronic files, and film negatives and positives, should be submitted to the park for inclusion in park archives. (See *Landscape Lines 14: Preparing, Cataloging, Printing, and Distribution.*)

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## PHOTOGRAPHIC DOCUMENTATION AND ANALYSIS

Contemporary and historical photographs and slides are used in preparing a CLR. Photographs are graphic documents used to:

- document a landscape at a particular time
- analyze and evaluate the chronological development of a landscape

The technical considerations for using photography for the above purposes are described in the following text.

### Photographic Documentation

Photography is a rapid technique for graphically documenting a cultural landscape. Black and white photographs are used to illustrate the appearance of a cultural landscape over time, to update the graphic documentation of a landscape, and to record treatment activities in the landscape.

Because photographs can capture fine textures and realistic contexts, photographs have an advantage over line drawings of conveying an experiential understanding of a landscape. However, photographs also have the potential to portray a landscape with greater subjectivity than line drawings. This subjectivity may be exploited to convey experiential qualities (such as those conferred by diurnal, seasonal, or climatic changes), to describe the articulation and quality of space (such as complexity, density, or vacancy) and to emphasize the current state of condition (from well maintained to derelict). Without a clear understanding of the primary intent of a photo-

graph, the subjectivity inherent in the process of making the photograph may lead to inaccurate, misleading, or unrepresentational photographs.

### *The Purpose*

The art and science of photography involves many variables, including cameras, lenses, filters, lighting, film, camera position, and the creativity of the photographer. For cultural landscape research, the purpose of photography is to objectively record, in a durable medium, the physical and visual qualities of a landscape. Photography should not try to evoke emotional reaction through special effects; this may lead to misinterpretation.

The value of photographic documentation depends largely on how well informed the photographer is about the subject and purpose of the project. Additionally, photographic documentation is made more meaningful if the photographer keeps an accurate record of subject, location, and vantage points. Photographs used in a CLR should have captions and both should be included in the park archives.

### *Durability*

Black and white photography (small, medium, or large format) is the most durable medium for photographic documentation in a CLR. Color film is less stable photochemically over time. Due to the visual limitation of black and white images, color slides are often taken to supplement the data provided by black and white photographs (Kodachrome is the most stable color film). Black and white infrared, and

color infrared films are very useful for analysis and evaluation because these films reveal information beyond the surficial appearance of landscape characteristics.

Color image processing has been advanced through photo-CD technology to allow color slides to be digitally incorporated into desktop publishing. Although not definite, color photographic images may be more durable as digital files on photo-CDs or disks than as color film negatives or positives. The color hard copy (paper printout) produced by color printers is currently not as durable as archival quality black and white photographs.

Archival quality photographic negatives are those that have undergone an extended washing process to completely remove processing chemicals. The addition of Selenium toner to the rinse solution allows complete removal of processing chemicals. Archival quality prints are also printed on fibrous contact paper rather than resin-coated paper. Giving negatives and prints archival quality increases developing and printing costs by about 25 percent. (See "Archiving Photographs" later in this section for more information on storage.)

## Forms of Photography

Landscape photography may be broadly divided into two categories: aerial and field (terrestrial). For both aerial and field photography, the orientation of the camera can be perpendicular or oblique.

Perpendicular orientation achieves orthographic elevation in field photography and plan shots in aerial photography. Perpendicular field photography is used to record structures, objects, and landscapes with axial arrangements of spaces or formal geometry (for example, bilateral or radial symmetry). (See Figure 7.)

Oblique orientation achieves perspective shots in both aerial and field photography. Oblique field photography and perpendicular aerial photography are most commonly used in the graphic documentation of cultural landscapes. (See Figures 8, 9, and 10.)

## Small, Medium and Large Format Cameras

Oblique and perpendicular field photography can be performed using small, medium, or large format cameras. Generally speaking, small format cameras use 35mm wide film, medium format cameras use 220-size (6cm x 7cm) or 120-size (6cm x 6cm, or 2 1/4" x 2 1/4") film, and large format cameras use 4" x 5," 5" x 7," and 8" x 10" size negatives. The cost of these various sizes of film is directly proportional to a unit price of film. A single 5" x 7" exposure of film within a large format camera is approximately equivalent in price to a 36 exposure roll of 35mm film.

Small format, 35mm cameras are the least expensive and most portable cameras to operate. They are particularly useful in capturing multiple black and white photographs and color slides of cultural landscapes for reference material. Once enlarged, 35mm negatives can become grainy, and as a consequence may have inadequate clarity for use in a publication.

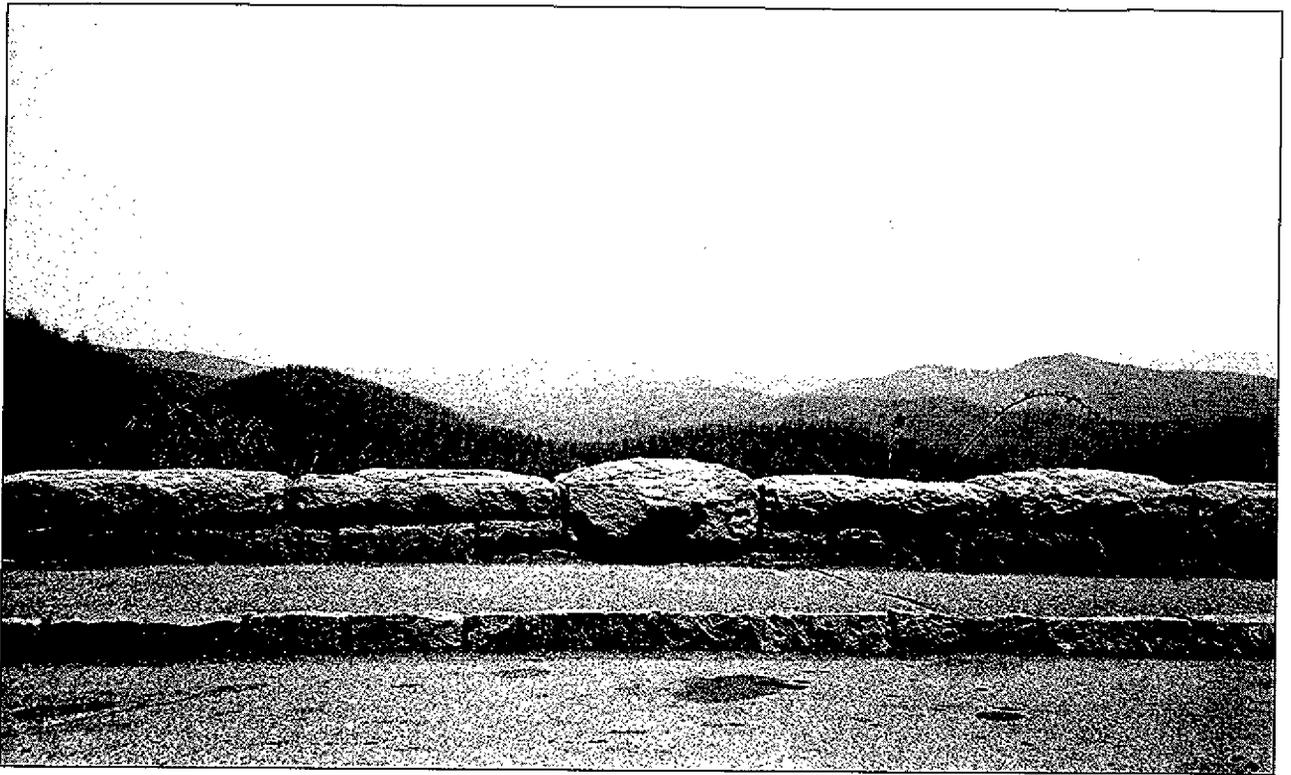


Figure 7. A perpendicular field photograph of a curb and retaining wall. Blue Ridge Parkway. (NPS, n.d.)



Figure 8. An oblique field photograph. Frederick Law Olmsted National Historic Site. (NPS, 1995)

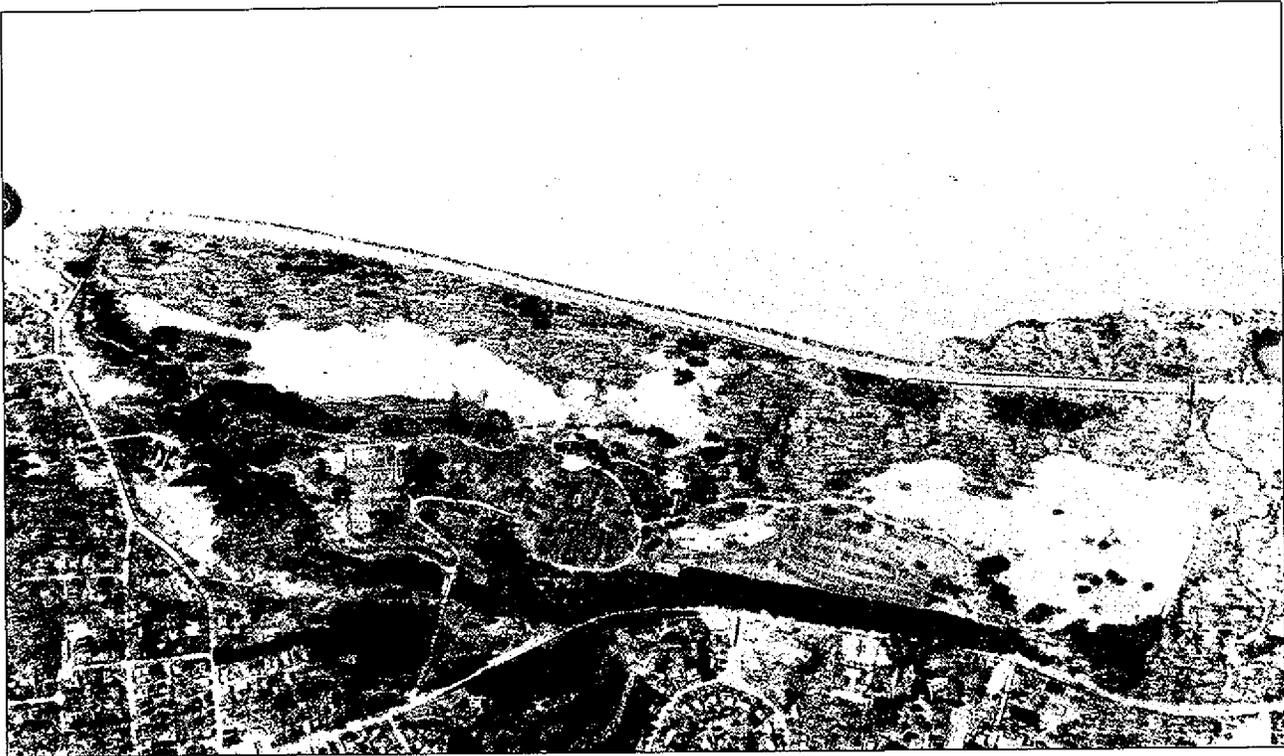


Figure 9. A perpendicular aerial photograph. Vanderbilt Mansion National Historic Site. (Photograph courtesy of Dutchess County Offices, 1990)

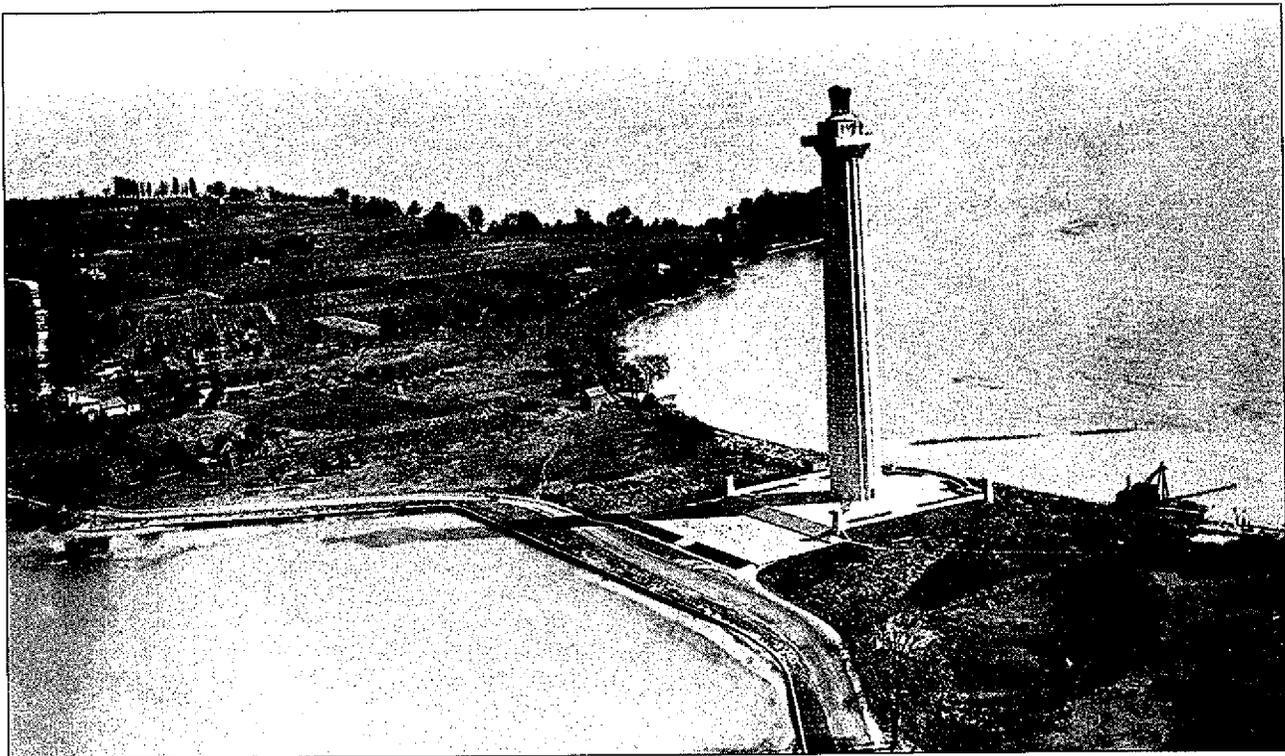


Figure 10. An oblique aerial photograph. Perry's Victory and International Peace Memorial. (NPS, c. 1925)

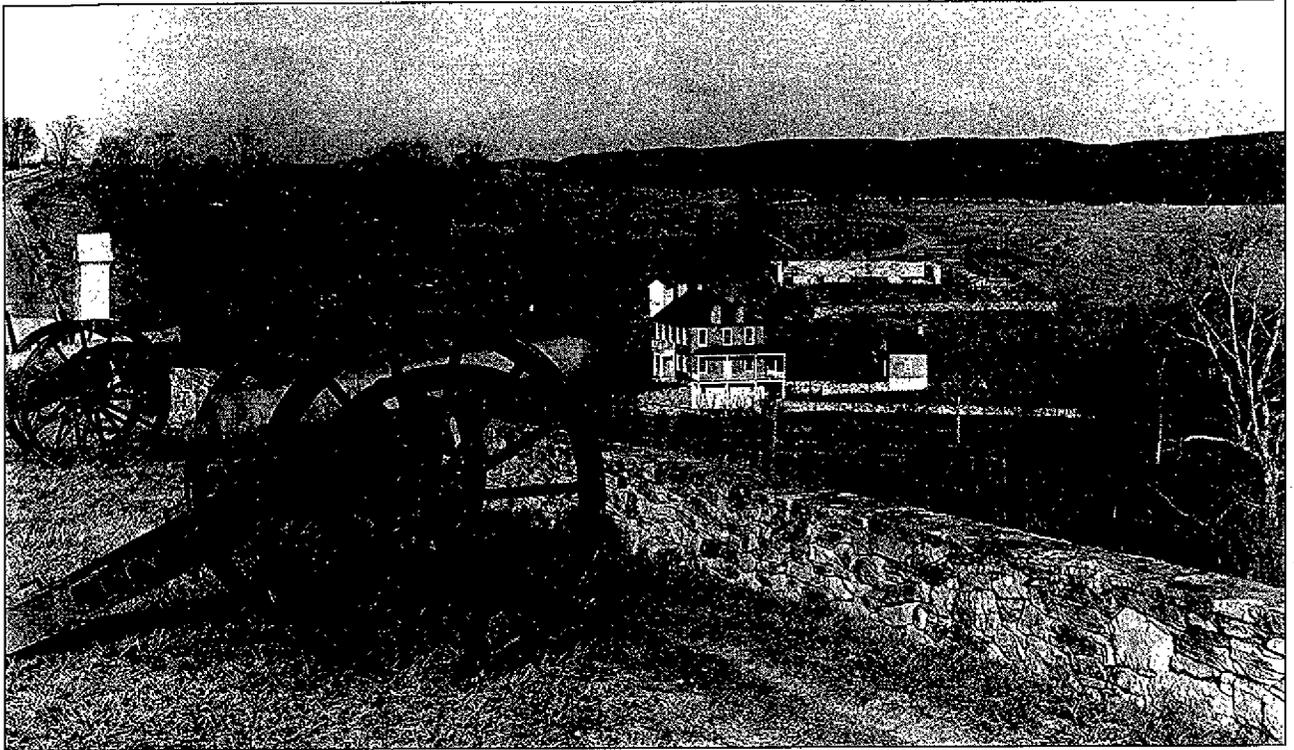


Figure 11. Large format photograph showing Sherrick Farm. Note the high resolution of detail in the photograph. Antietam National Battlefield. (Jack Boucher, HABS, NPS, 1992)

Medium format cameras have greater portability and are less expensive to use than large format cameras. They also provide a large negative (6cm x 7cm) that can be proportionately enlarged from a contact print directly to a 8" x 10" image without cropping.

Large format cameras record images in much greater detail and their photographs are well suited for publication because they can be enlarged without clarity degradation. (See Figures 11 and 12.) Large format cameras also allow for parallax adjustment because the lens can be tilted to correct for perspective. On the down side, large format cameras are bulky and heavy to transport and require considerable expertise to operate. In most cases, contracting

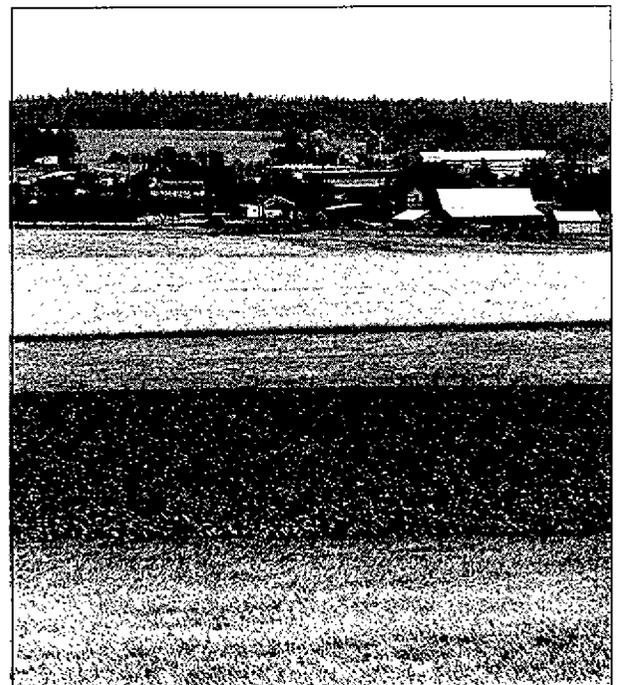


Figure 12. Small format photograph of Ebey's Landing National Historical Reserve. Note the lower resolution of detail in the photograph. (NPS, 1983)

the services of a professional photographer is recommended for large format photographic documentation.

## Digital Cameras

Digital cameras are a recent photographic technology. A digital camera can produce color and black and white digital images. One advantage to using a digital camera is that the photographs can be more easily integrated into desktop publishing. The images are screened (composed of dots, like a newsprint photograph) and can be transferred via cable from the camera to a computer. There is no need to scan the photographic image before moving it to the computer. Using image processing software, the photographic images can be manipulated and inserted into a document.

Digital cameras are compact and convenient to use, but they have the following disadvantages, which should be considered when preparing to use a digital camera for field survey:

- The photographic quality produced by a digital camera may be lower than a 35mm camera and the images may not be clear enough to convey details well.
- Some digital cameras may not accept as many lenses or filters as a 35mm camera.
- There is a limit to the number of photographs that can be stored in a digital camera before they must be downloaded to a computer. Typically, digital cameras can store 36 photographs at a lower level of resolution (that is, fewer dots per inch) or 18 photographs at a higher level of resolution (more dots per inch).

Digital images must be archived as electronic files on computer disks, photo-CDs, or tapes. The durability of these media is undetermined.

## Lenses, Filters, and Tripods

The standard lens on a 35mm camera is 50mm. The focal length (the magnification) of a 50mm lens is approximately the same as the human eye and is suitable for graphic documentation of cultural landscapes. In addition to the standard 50mm lens, wide-angle lenses, telephoto and zoom lenses, and filters can be used for specific purposes.

### *Wide-angle Lenses*

A wide-angle lens with a 24mm-35mm focal length is less magnifying than a 50mm lens and provides the photographer a broader view of the landscape from a given vantage point. Wide-angle lenses are particularly useful when space is limited and the photographer must position the camera close to the subject of the photograph. However, wide-angle lenses cause distortion, and the wider the angle the greater the distortion (straight lines tend to curve, and parallel lines converge). Perspective-correcting lenses (PC lenses), also called architectural lenses, can be used to remedy the parallax distortion of wide-angle lenses. PC lenses are moderate wide-angle lenses (28mm or 35mm) that shift side to side or up and down. Some perspective correcting lenses also tilt, like a large format camera. PC lenses are available for small and medium format cameras and should be used with a tripod for best results.

### *Telephoto and Zoom Lenses*

A moderate to long telephoto or zoom lens is useful for photographic documentation of landscapes when access near the subject is restricted or limited by physical obstacles. Telephoto lenses with a focal length between 100mm-400mm are more magnifying than a 50mm lens. Telephoto lenses have minimal distortion, yet their depth of field is small (that is, telephoto lenses tend to flatten the resultant image). Telephoto lenses also reduce light interception through the lens. To compensate for the lower light level, the f/stop may need to be manually adjusted (some cameras automatically make this adjustment). Zoom lenses are a common feature on 35mm cameras, and have focal length that can be adjusted from 20-60mm through 200-500mm. (The most common are 35-70mm and 70-200mm.) The versatility of zoom lenses makes them convenient for field photography.

### *Filters*

High quality filters improve black and white photographic documentation by enhancing details that may otherwise be undiscernible. One of the most useful filters for black and white photography is a medium yellow. This filter eliminates the presence of blue in natural light and enhances contrasting values of grey tones, black and white. Orange and deep yellow filters enhance contrast and differentiate textures even more. Green filters emphasize foliage, while a red filter dramatically enhances the contrast between dark and light areas. A polarizing filter reduces or eliminates refraction of light in situations of considerable glare, which may be

encountered in photographing water features on a sunny day, or shooting through the windows of a car or light aircraft. A polarizing filter increases contrast and can darken blue skies in black and white photography.

Filters are mounted over the camera lens, reducing light interception through the lens. Better quality filters cause less light reduction, but all filters require exposure compensation. Cameras with built-in light meters automatically make aperture adjustments for a filter. Cameras with hand-held light meters must be manually adjusted to compensate for light reduction. The "filter factor" (light reduction factor of a filter) is usually engraved on the metal filter ring. A filter factor of 2X (such as that of a medium yellow filter) means the f/stop must be increased by two stops, from f/8 to f/4 (that is, the aperture size and shutter speed are increased).

### *Tripods*

A tripod stabilizes the camera, allowing a sharper image to be captured. It also enables the photographer to create a variety of stable camera orientations and carefully plan the composition before taking the shot. Tripods are useful in the following situations:

- When photographing with a telephoto lens of focal length greater than 135mm. The tripod will reduce camera shake and produce a clearer photograph.
- To correct for image distortion from a tilting camera plane taking a perpendicular shot. A trapezoid is one result of a perpendicular shot of a structure taken with an upwardly tilting

camera (perspective correcting lenses, as formerly mentioned, make a similar adjustment).

- When photographing historic maps, photos, and other historic documents. The camera lens needs to be positioned parallel to the plane of the document to avoid image distortion. A light standard can also be used to position a camera lens in parallel alignment to a historic document (a magnifying lens should be used when photographing historic documents).

A tripod is essential to the technique of repeat field photography, where an earlier or historic photograph is re-shot from the same vantage point. (See "Repeat Photography" later in this section for further information on this analytical technique.)

## Further Considerations

Field photography should be timed with respect to the altitude (elevation above the horizon) and azimuth (cardinal position) of the sun to avoid deep, obscuring shadows. A light meter is essential for accurate exposures. Large format cameras require the use of a hand-held light meter. If the scale of the subject in the photograph is important, a scale-stick painted with alternating black and white foot increments may be positioned within the frame. A more refined method for scaling the subject of a photograph is to use a scaled grid situated in front of the camera lens. This is particularly useful for planar features (without using photogrammetry). Regardless of how much the image size of the photograph is subsequently enlarged or reduced, the scale of the subject can be calculated from the imposed

grid. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix C: National Register Bulletins.")

## Archiving Photographs

Photographs provide a record of a cultural landscape's appearance at a particular moment in time and they become primary sources for future reference and historical research. It is important, therefore, to ensure the longevity of photographs by archiving them properly.

All photographs printed in a CLR should be archived, but not all photographs taken during CLR preparation need to be archived. The expense of archival materials and equipment may preclude all photographs being archived, and it may not be necessary to archive the photographs taken as supplemental records. The decision to render certain film and prints archival quality can be made at the time of film processing. Contact sheets are a useful tool for reviewing all the photographs and selecting which ones to be developed as archival quality.

Special processing techniques are applied to photographs selected for archiving. The negatives and prints are washed for a longer period of time to ensure that the chemicals that develop and fix the image are completely removed so that the image does not continue to develop. Negatives and fiber-based contact prints (as opposed to resin-coated prints) are washed with hyporemove as one of the last steps in dark-room processing. Selenium toner is added to the hyporemove to increase archival stability.

Archival quality negatives and prints should be deposited with the park upon completion of a CLR. Negatives should be stored in archival plastic sleeves and clearly labeled with location name and the date shot. Field records are used to create a descriptive caption list, classified according to the numbers on the negatives. The caption list should be printed on acid-free bond paper and attached to the negative sleeve for storage. Large and medium format negative sleeves are large enough to be captioned directly on the sleeve. The Library of Congress' standards for archiving contact prints require prints to be inserted into photo mount cards, which are labeled and captioned. Each photo mount card is separated from its neighbor by a sheet of acid-free (neutral pH) bond paper. They are then housed in acid-free, lignin-free, high alpha cellulose folders stored horizontally inside map cases or flat file boxes. Vertical storage is not

recommended, as this may lead to curling. The archival storage containers are then kept in a climate-controlled environment.

## Aerial Photographs

Aerial photographs are used for graphic documentation and analysis and evaluation of cultural landscapes. (See Figure 13.) Aerial photography makes use of large lens cameras mounted on aircraft or orbiting satellites to shoot images of the earth surface. If aerial photography is used in the analysis and evaluation of a landscape, black and white and color infrared films may be used to elicit more information from the photograph. As a graphic documentation tool, aerial photographs provide objective records of the appearance of a landscape at a specific moment. Aerial photographs are particularly effective in documenting broad landscape patterns, such as land use, spacial organization, settlement, vegetation, and circulation networks.



*Figure 13. High-altitude, oblique aerial photograph of Fort Scott in the Presidio, indicating broad patterns of spatial organization, topography, land use, and vegetation. Golden Gate National Recreation Area. (NPS, 1993)*

The graphic record of aerial photographs may be important in the documentation of landscapes for which a topographic survey is not available. Graphic information from an aerial photograph may be transferred by hand to a plan drawing of the landscape or captured digitally by using computer aerial photogrammetry to produce a computer-generated plan. Relatively low altitude, aerial photographs can be flown and shot at a scale as detailed as 1 inch = 200 feet, depending upon the scale of the landscape and the type of information to be recorded. Clear skies are essential for shooting effective aerial photographs. Depending on documentation objectives, other factors may be important in scheduling aerial photography services, such as the amount of leaf coverage on vegetation and minimal shadow length. Exact location and timing may be important where an aerial photograph is taken as a repeat photograph; that is, to serve as a matched pair with a historic photograph for direct comparison of landscape characteristics and associated features.

See "Aerial Photography Analysis" later in this text for more information on aerial photography. For more information on computer-generated plans from aerial photographs, see "Computer Aerial Photogrammetry." For more information on taking a contemporary photograph to match a historic photograph for analysis and evaluation of landscape change, see "Repeat Photography."

## **Photogrammetry**

Photogrammetry combines perpendicular photography, either field or aerial, with geometry. Photogrammetry makes use of stereophotograph

pairs to create orthographically rectified, measured drawings (perpendicular to the plane of the subject). These drawings may be in the form of elevations (terrestrial) or plans (aerial).

Traditional drawings are created by hand-tracing the "optical model" produced by overlapping paired stereophotographs within a plotting instrument. These stereophotographs are developed from plate glass negatives and printed on resin-coated contact paper. The durability of fibrous contact paper is substituted for measurable accuracy (resin-coated contact paper is not subject to the stretching or distortion possible with fibrous paper). However, plate glass negatives, especially when prepared with extra washing, are the most durable photographic media. Photogrammetry can now be performed by computer technology using digitizing equipment and CAD. Photogrammetric stereophotographs can be archived as digital files on disks, photo-CDs, or tapes. The durability of these storage media is yet to be established.

### ***Computer Aerial Photogrammetry***

Perpendicular aerial photographs can be transformed into accurately georeferenced base maps using photogrammetry. A photogrammetric camera lens corrects radial distortion to produce an orthographically rectified photograph. Traditionally, photogrammetry involved tracing an ortho-rectified photograph to obtain a scaled drawing. Current photogrammetric technology consists of digitizing equipment and CAD software that turns photographic images into CAD drawings. (See Figure 14.)

In geographic regions with predominantly deciduous vegetation, the most revealing time of the year to perform aerial photogrammetry is during the dormant season. At this time more of the earth's surface is exposed due to the absence of vegetation canopies and a higher resolution is possible. Generally, the window of opportunity is from early December to early April, with mid-March often being the optimal time for clarity. In March, shadows are smaller and dead leaves are no longer clinging to trees. A quality photogrammetry product is also dependent on clear, sunny weather conditions.

### *Contracting Computer Aerial Photogrammetry Services*

Commercial photogrammetry services can be contracted. The end product is delivered in the form of a digital file on disk or as a hard copy on paper or other media. Preparing a project agreement (scope of work) for contracting aerial photogrammetry services to create a base map may require knowledge of the following:

- Location of base map. The location is preferably given by Universal Transverse Mercator (UTM) coordinates or latitude and longitude

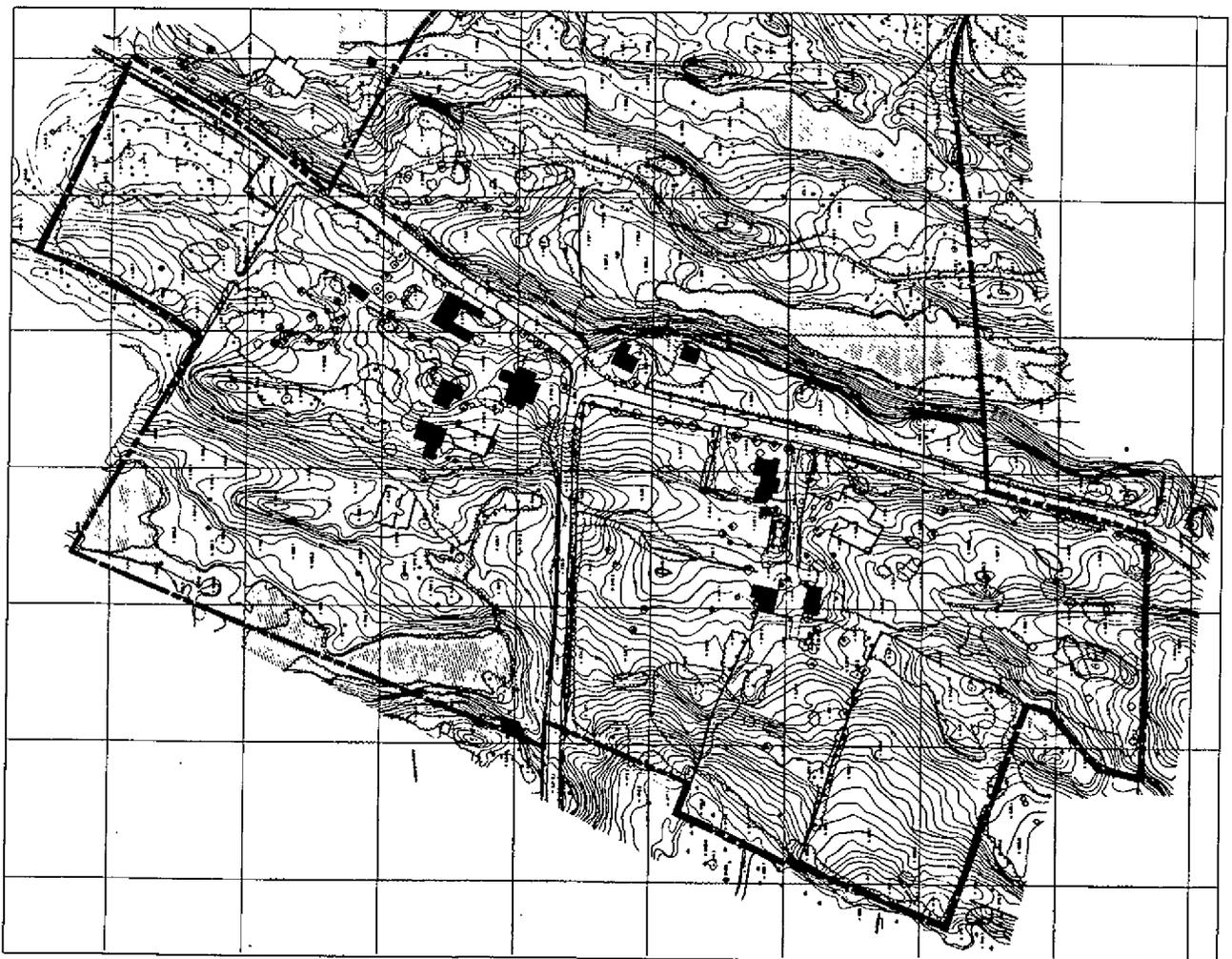


Figure 14. Topographic survey map generated by computer aerial photogrammetry. Weir Farm National Historic Site. (NPS, 1992)

coordinates with a vertical reference point (that is, a control point of known elevation). The requirement for a vertical reference point may not be necessary for aerial photography, but is essential to photogrammetry. Vertical reference points can be white crosses painted on the ground, utility poles, or even traffic arrows on roads of known elevation.

- Scale of base map. It may not be necessary to specify the scale of the aerial photograph for the base map, or the flight altitude to the contractor. The contractor should have the expertise to determine the most efficient method to produce a base map of the desired scale.
- Contour interval. This is determined according to the scale and extent of topographic relief of a landscape and the potential use of the information (for example, the management objectives of a CLR).
- Additional information to be mapped. Additional information required, such as property boundaries, structure footprints, roads, drives and footpaths, hydrologic features, vegetation types, trees over 6-inch caliper, and major shrubs may be indicated.
- Product format. The base map-product should be in hard copy form or as a digital file on CAD. If CAD is used, the contractor will need further information about the configuration of layers and layer classification (for example, vegetation, topography, hydrology, boundaries, and structures may be organized as different CAD layers). In either case, the degree of vertical and horizontal accuracy should be specified.

## Photographic Analysis and Evaluation

Photographs are used in cultural landscape research to analyze and evaluate a cultural landscape's chronological development and to graphically document its appearance. (See Figure 15.) In analysis and evaluation, photographs are used for comparison, to verify other data, to understand the influences that have shaped a landscape, and to measure the extent to which change has taken place. Other sources of data, such as historic records, maps, and other photographs, are used with contemporary or historic photographs to interpret the history of a landscape.

Both field and aerial photographs are useful in photographic analysis and evaluation. Contemporary aerial and field photographs can be shot from the same vantage point as a dated historic photograph, thereby serving as a matched pair of repeat photographs for direct comparison of changes since a known period.



*Figure 15. National Park Service staff person, Troy Siefert, examining an aerial photograph. (NPS, 1993)*

## Repeat Photography

Repeat photography is the technique of locating the site of a dated, historic photograph, reoccupying the original camera position, and shooting a contemporary photograph of the landscape, landscape characteristics and associated features from the same vantage point. Preferably, the photographer uses the same focal length camera lens and shoots the photo at the same time of day as the original photograph. This provides the best conditions for comparing the contemporary and historic photographs.

The pair of photographs is referred to as a matched pair of repeat photographs. Depending on the objectives of the analysis and evaluation, the time interval between matched photographs may be decades, seasons, or even seconds (as in the case of photographing landscape change during a volcanic eruption). Matched pairs of photographs are more directly comparable when the direction and length of shadows in each photograph is similar, though valid interpretations can be made from photographs that are matched less closely. (See Figures 16 and 17.)

Repeat photographs can be used to interpret the nature, rate, and direction of change in a cultural landscape, to evaluate the cause(s) of perceived change, and to establish new photographic records for future analysis of change.

### *Sources of Inaccuracy*

Old photographs can be misleading and should be used cautiously for analysis and evaluation. Photographs taken before the advent of pan-

chromatic film in the 1930s can be unrealistic in depicting the conditions of the time. Early films were not sensitive to red light and overly sensitive to blue light. As a result, red is not distinguished from black, and the sky in historic photographs may appear white, with the distant landscape appearing faint, or not being represented at all.

Historic photographs taken with artistic motives may also be misleading due to tricks in the use of perspective or depth of field, or the creative use of lighting. Historic photographs may also be unrepresentative of the typical condition of the time, which may have been the photographer's motive in taking the photograph. To counter the effects of inaccuracy due to the personal biases of photographers, it is best to use historic photographs from a variety of sources.

### *Performing the Technique*

Matched pairs of repeat photographs are most directly comparable if they are taken at the same time of year, at the same time of day, are the same size photograph, and encompass the same area. Matched photographs taken with the same focal length of lenses will encompass the same area with the same resolution. If a different focal length lens is used for the contemporary photograph, the photographs may be rendered similar by enlarging or reducing and cropping during the printing process.

To repeat a historic photograph, position the camera lens at the same location as the historic lens and aim the lens at the same subject. (See Figures

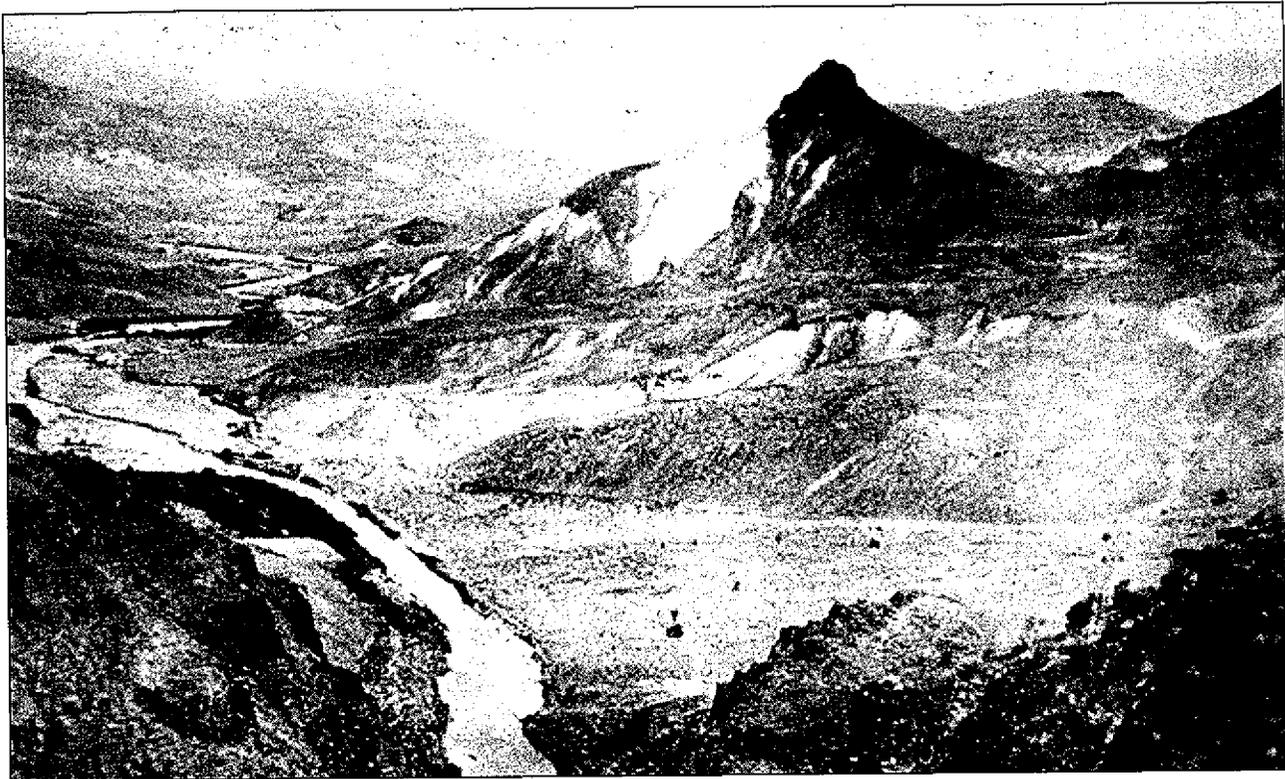


Figure 16. A nineteenth century photograph. John Day Fossil Beds National Monument. (NPS, 1893)



Figure 17. A repeat photograph of the landscape shown in Figure 16. John Day Fossil Beds National Monument. (NPS, 1992)



Figure 18. A photograph of the lower meadows of Vanderbilt Mansion National Historic Site. (NPS, c. 1950s)



Figure 19. A repeat photograph of the landscape in shown Figure 18. This later photograph indicates some encroachment of woody growth into the meadow. Vanderbilt Mansion National Historic Site. (NPS, 1991)

18 and 19.) Do not attempt to frame the new photograph to match the outline of the old; this will result in error in the position of the camera lens. The correct position and aim of the camera lens is found by using the parallax apparent in the historic photograph (that is, the apparent distortion due to the effect of perspective). A copy of the historic photograph must be taken into the field. The foreground features that exist in the center of the field of view of the historic photograph can be used to align the camera. Near and distant features in the center of the field of view are aligned through the camera as in the historic photograph. The photographer then moves the camera toward or away from the field of view, so that peripheral features are aligned and parallax is correct with their appearance in the historic photograph. If no foreground features exist or none are close enough to use the parallax method, the historic camera position must be found by comparing the ratios of horizontal and vertical distances in the historic photograph with the image through the camera lens. To make the comparison

more direct, a negative of the historic photograph may be placed beneath the mirror of a 35mm camera so that the historic image can be seen through the viewfinder.

If it is important to reproduce the historic conditions as closely as possible, astronomical tables can be used to estimate the altitude and azimuth of the sun in historic photographs. The altitude and azimuth of the sun affect the character of shadows and highlights in historic photographs. Therefore, when taking repeat photographs of structures, geologic formations, landscape architectural details, and topographic relief, it may be important to match the length and direction of shadows in the historic image. This may be unimportant for historic photographs taken on a cloudy day, or at noon on a sunny day.

It is useful to create a permanent record of the camera station for future repeat photograph analysis. The camera station is directly below

the camera lens and is determined by suspending a plumb bob beneath the camera tripod. Photographers use steel rods driven into the ground, or star-shaped drill holes in rocks to mark camera stations. A record of the camera station should be noted on the archival sleeve of the negatives of repeat photographs, along with captions. This should include the angle and inclination of the camera lens at the camera station.

### Aerial Photograph Analysis

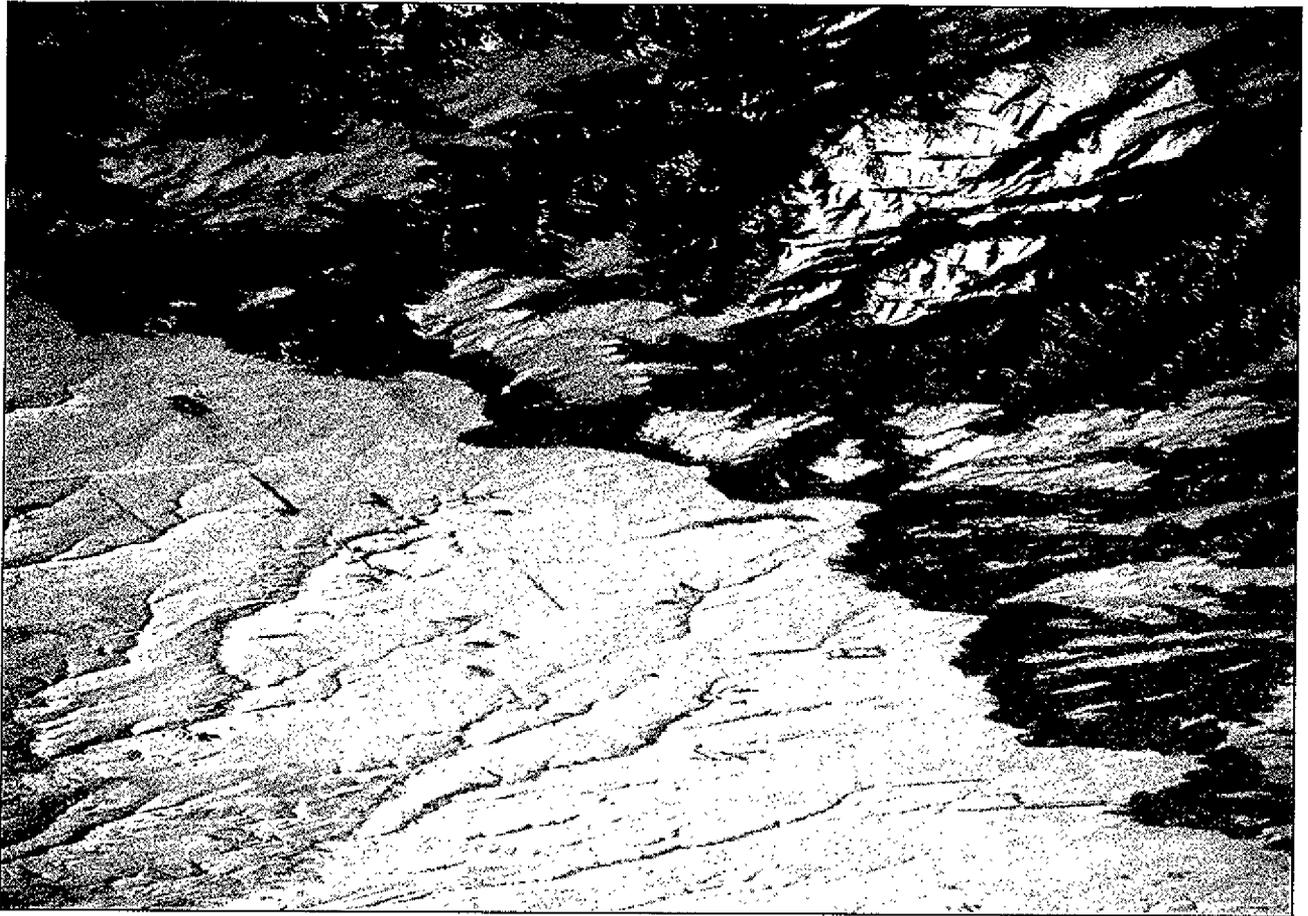
Aerial photograph analysis is a well-developed discipline. Experts can be found in the professions of landscape architecture, geography, forestry, anthropology, and archeology. Aerial photography has been used for observation of earth processes and environmental analysis for more than 60 years. It is a technologically advanced form of photography that uses large-lens cameras mounted on either low or high altitude aircraft or orbiting satellites to shoot images of the earth surface.

Aerial photography analysis is a form of remote sensing, examining earth features from a distant platform situated above a target area. Aerial photographs are also valuable research tools for providing a graphic record of the appearance of a cultural landscape during a particular period. In analysis and evaluation, aerial photographs from known, successive periods can be compared and interpreted to verify and expand on the historical record.

An expert in aerial photograph analysis can derive highly refined information on natural resources (such as soils, geology, geomorphology, hydrologic

patterns, climate, and vegetation), as well as cultural resources. (See Figure 20.) Current aerial photographs may be used to create a base map of existing conditions. (See Figures 21 and 22.) If an aerial photograph is used to create a base map, a lower altitude photograph (that is, larger scale, such as 1 inch = 200 feet) is usually flown. If aerial photographs are used to analyze changing physical conditions over time, higher altitude, archival photographs obtained from the United States Geological Survey Earth Resource Observation Systems (EROS) Data Center may be useful.

Computer aided technologies that build on traditional aerial photography include computer aerial photogrammetry and geographic information systems (GIS). Computer aerial photogrammetry represents the most current technology in deriving base maps from aerial photographs. (Refer to "Computer Aerial Photogrammetry" earlier in this text for more information). As a form of spatial data, aerial photographs are now implicitly related to the development of geographic information systems. GIS takes aerial photograph analysis to a new level of resolution in which aerial photographs are scanned into a computer and georeferenced with other layers of data sources, such as traditional cartographic maps, geology maps, soil surveys, and historic property maps. Direct comparison of multiple spatial data layers enables a more comprehensive understanding of the physical nature of cultural landscapes and the change that has occurred over time. (See *Landscape Lines 10: Geographic Information Systems*.)



*Figure 20. Aerial photograph of land near the Black Hills, South Dakota. Analysis of the photograph reveals information about drainage patterns, geology, geomorphology and climate. (NPS)*

Aerial photographs may reveal the dynamics of change in landscape characteristics, such as the manipulation of topography, change in hydrologic patterns, the introduction of a particular land use, the settlement and development of a landscape, and modifications to a historic designed landscape throughout the twentieth century. Aerial photographs can also reveal patterns of physical disturbance and evidence of former human occupation that may not be apparent in the field, such as road traces, tree locations, and field patterns. Information derived from the analysis and evaluation of historic aerial photographs may be transcribed on a base map

to create a sequence of period plans. (Refer to "Line Drawing Documentation" earlier in this text for guidelines on plan drawing.)

### **Obtaining Archival Aerial Photographs for Cultural Landscape Analysis and Evaluation**

The Earth Resources Observation Systems (EROS) Data Center in Sioux Falls, South Dakota, is the United States Geological Survey (USGS) archive center for federal agency aerial photographs. The photographs, dating from 1940, represent the collection of twenty federal agencies and programs.

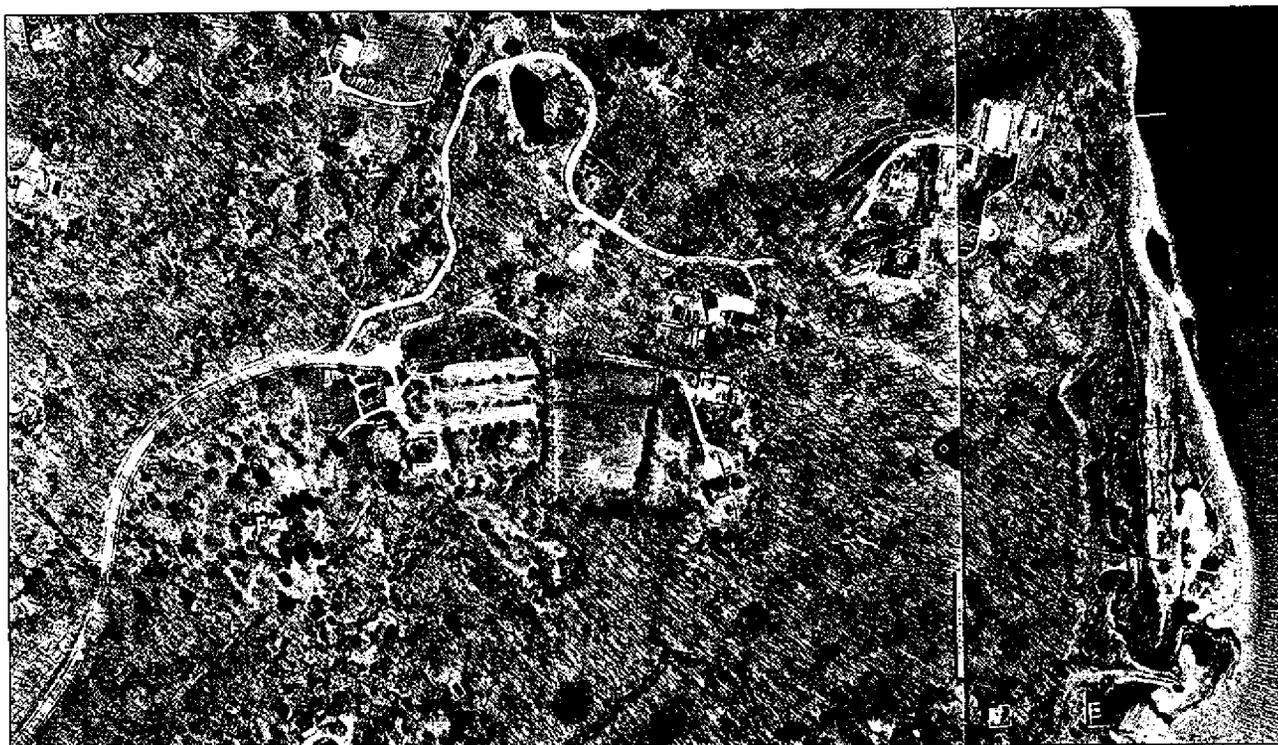


Figure 21. Aerial photograph documenting President Theodore Roosevelt's home in 1992 during leaf-off conditions. Sagamore Hill National Historic Site. (NPS, 1992)

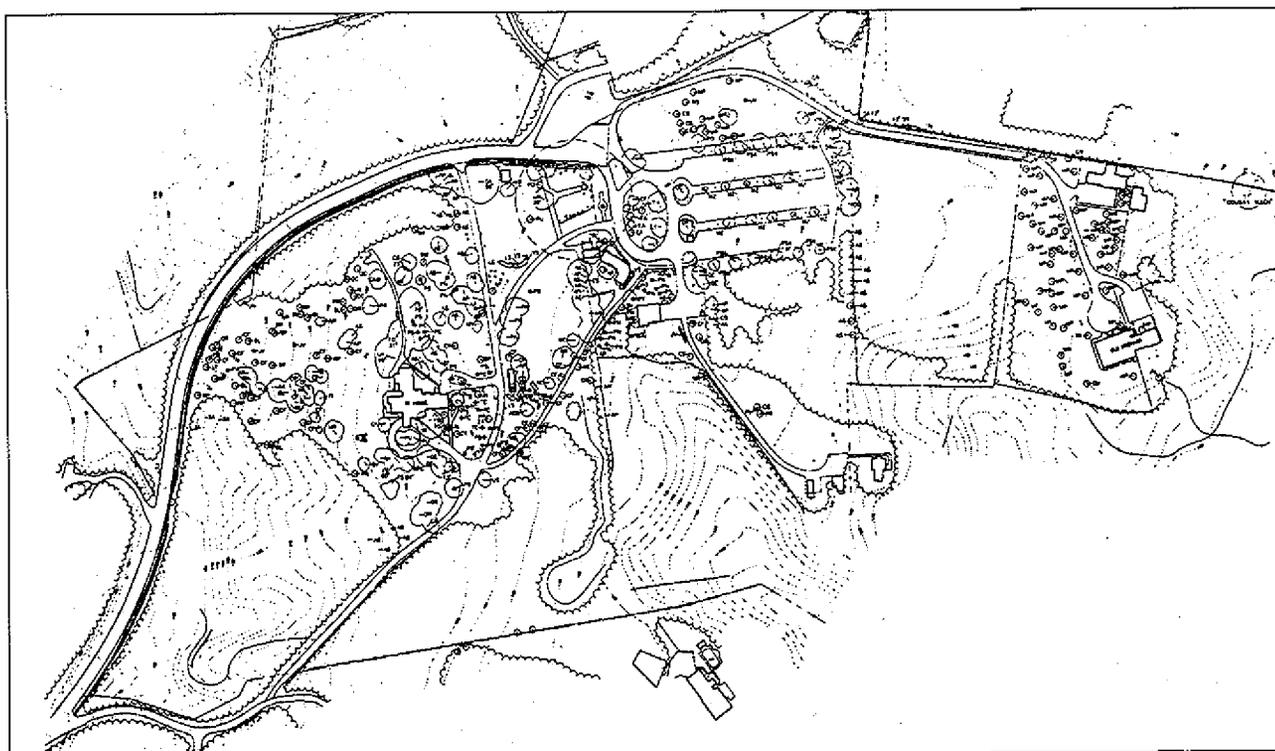


Figure 22. Existing conditions plan (1 inch = 200 feet scale) generated in AutoCAD using the 1992 aerial photograph of the property. Sagamore Hill National Historic Site. (NPS, 1993)

The photographs range in film type from color-infrared, black and white, and natural color, to black and white infrared. The federal government recently standardized aerial surveys to avoid repetition and achieve uniform quality and coverage. Before federal aerial surveys were standardized, photographs were shot in geographic locations where studies were being conducted. Photographs were taken from different altitudes using various types of film. As a result, coverage of the states is uneven among the older acquisitions in the collection.

The 1987-1991 National Aerial Photography Program (NAPP) produced cloud-free aerial photographs with color infrared film of the 48 contiguous states at a scale of 1:40,000 (1 inch = 0.6 miles). Each photograph shows an area of 5 x 5 miles. Black and white photographs, derived from the color-infrared film, can be ordered. Prior to the NAPP program, between 1981 and 1987, the National High Altitude Photography Program (NHAP) generated most aerial photographs for the USGS. The NHAP program shot black and white aerial photographs at a scale of 1:80,000 (1 inch = 1.26 miles), with each photograph showing an area of 11 x 11 miles. The NHAP program also shot color-infrared film with a scale of 1:58,000 (1 inch = 0.9 miles). Each photograph shows an area of 8 x 8 miles.

The EROS Data Center also receives, processes, and distributes data images from the National Atmospheric and Space Administration (NASA) Landsat satellites. These data include aerial photos in the scale range of 1:30,000 to 1:120,000. The

film coverage varies from color-infrared to black and white. These Landsat photographs can also be purchased from the center.

The availability of specific NAPP and NHAP photography can be determined using a microfiche-based indexing system keyed to areas of USGS 1:250,000-scale maps. Either microfiche or enlarged paper copies of the microfiche are available for the particular geographic area of interest.

## **Sources of Archival Aerial Photographs**

**Customer Services - NAPP**  
**USGS - EROS Data Center**  
Sioux Falls, SD 57198

**Aerial Photography Division (East)**  
**U.S. Department of Agriculture**  
45 French Broad Avenue  
Asheville, NC 28802

**Aerial Photography Division (West)**  
**U.S. Department of Agriculture**  
2505 Parley's Way  
Salt Lake City, UT 84102

**Aerial Photography Field Office**  
**Agricultural Stabilization and**  
**Conservation Service**  
**U.S. Department of Agriculture**  
2222 West 2300 South  
Salt Lake City, UT 84125

**Cartographic Archives Division**  
**National Archives**  
Washington, DC 20408

The National Archives contains federal aerial surveys conducted by the Agricultural Stabilization and Conservation Service, Soil Conservation Service, Forest Service, Geological Survey, and Bureau of Reclamation between 1935 and 1942. The guide, titled *Aerial Photographs in the National Archives* (Special List No. 25), 1973, is available from the National Archives.

### Contracting Aerial Photography Services

In preparing a project agreement (scope of work) for contracting aerial photography services, the following information may be required.

- Scale of aerial photograph. 1" = 200' is approximately the largest scale—the lowest altitude—that an aircraft can fly (due to aviation law). Although the level of resolution of the image is set by the scale at which the original photograph is taken, the scale of the image can be subsequently enlarged.
- Location of the aerial photograph. The location is most accurately denoted by UTM boundary coordinates. A contractor may accept boundaries drawn on a USGS 7.5 minute topographic quadrangle as an adequate guide to location.
- Lens size. The frame size of the photograph is determined by the camera lens size. Lens sizes in common use range from 6 to 12 inches, with 12 inches producing the larger frame. A 12-inch lens may be more appropriate for a large scale photograph.
- Type of film. Aerial photography film ranges from color-infrared, black and white, and natural color, to black and white-infrared.

Natural color photographs are grayer than natural color is ordinarily perceived. Color infrared and black and white infrared photos may be more revealing for environmental analyses than natural color. Infrared photographs may reveal different ecosystem or vegetation types more clearly than natural color photographs, and infrared can provide additional information on biomass production and ecosystem health.

- Type of shot—stereo or spot shot. If a relatively small landscape or area of a landscape can fit within a single aerial photograph frame, a spot shot may be most appropriate. However, for large landscapes, a series of photographs may be taken. A series of stereophotographs have the additional benefit of being useful for analysis purposes. Stereophotographs have 58-65 percent overlap between frames. Consequently, paired stereo frames can be observed through stereo glasses for three-dimensional analysis of the aerial photographs.
- Orientation of shot—vertical or oblique. It is assumed that aerial photographs are taken vertically (that is, oriented perpendicular to the earth's surface) unless otherwise specified. Vertical shots have the least horizontal distortion of the earth's surface. Oblique shots are taken for illustrative effects to expose the verticality of such elements as building facades and trees.
- Product format. Aerial photographs can be delivered as film negatives, film positives, contact prints, or as electronic files on computer disk or photo CD, and reproduced or enlarged onto mylar, blueprint, or bond paper

media. The form of product may depend on management objectives (that is, how the aerial photograph will be used) and archive considerations.

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



**U.S. Department of the Interior**  
**National Park Service**  
**Cultural Resources**  

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**Park Historic Structures & Cultural Landscapes**

## *Geophysical Survey Techniques*

### INTRODUCTION

Geophysical survey techniques indirectly measure the presence of resources concealed within the earth's subsurface as a result of geologic processes or human disturbances. Geophysical survey techniques detect subsurface contrasts, including mass-density relationships, ionic or electrical potentials, magnetic susceptibilities, and elemental decay. The surveys can reveal the location of archeological resources and lead to their identification.

Geophysical survey equipment is used to investigate buried prehistoric and historic structures and artifacts. The use of geophysical survey equipment and computer aided interpretation has increased the accuracy of archeological surveys to the point where potentially destructive, random excavations can be minimized.

Geophysical survey techniques cannot positively identify a buried cultural resource, but they can provide data for interpretation from which strong inferences can be made. Geophysical surveys use remote sensing techniques, which examine earth features from a distant platform situated above a target area and usually employ high altitude aircraft or satellites. From a platform situated on or just above the earth's surface, geophysical survey equipment remotely sense earth features in a target area located beneath the earth's surface.

### APPLYING GEOPHYSICAL SURVEY TECHNIQUES TO CULTURAL LANDSCAPE RESEARCH

Geophysical survey techniques are either passive or active. Passive techniques measure naturally occurring earth-related processes, such as the earth's electromagnetic or gravitational field. Magnetometry is a passive geophysical survey technique. Active techniques involve transmitting an electrical, electromagnetic, or acoustic signal into the

subsurface. Interaction of the input signal with subsurface materials produces a modified return signal that can be measured. A familiar, amateur active technique is the metal detector. Other active geophysical techniques include ground penetrating radar, electrical resistivity, and electromagnetic conductivity.

Geophysical techniques were used in an archeological survey of Virginius Island, a nonextant, nineteenth century industrial community in Harpers Ferry National Historical Park. (See Figure 1.) Geophysical services were contracted to determine the location of twelve, nineteenth century residential structures and their associated outbuildings, buried within four acres of river terrace landscape. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix J: Project Agreements.") The general location of these residences was derived from historical documentation, maps, and photographs, but the precise location of the outbuildings and their yards was unknown. The project agreement for the geophysical survey specified ground penetrating radar and electromagnetic conductivity, but allowed for the possibility of using additional techniques to verify the location of a feature. The results of the geophysical survey led to the excavation or "ground-truthing" of specific sites to produce an accurate site plan of Virginius Island. Results of the survey facilitated development of a treatment plan, which included an interpretive program. (See Figures 2 and 3.)

### Passive Geophysical Survey Techniques

Passive geophysical survey techniques measure naturally occurring, local, or planetary fields created by earth processes. Passive techniques

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## IMPLEMENTATION AND LIMITATIONS OF A GEOPHYSICAL SURVEY

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Successful implementation of a geophysical survey depends on the following:

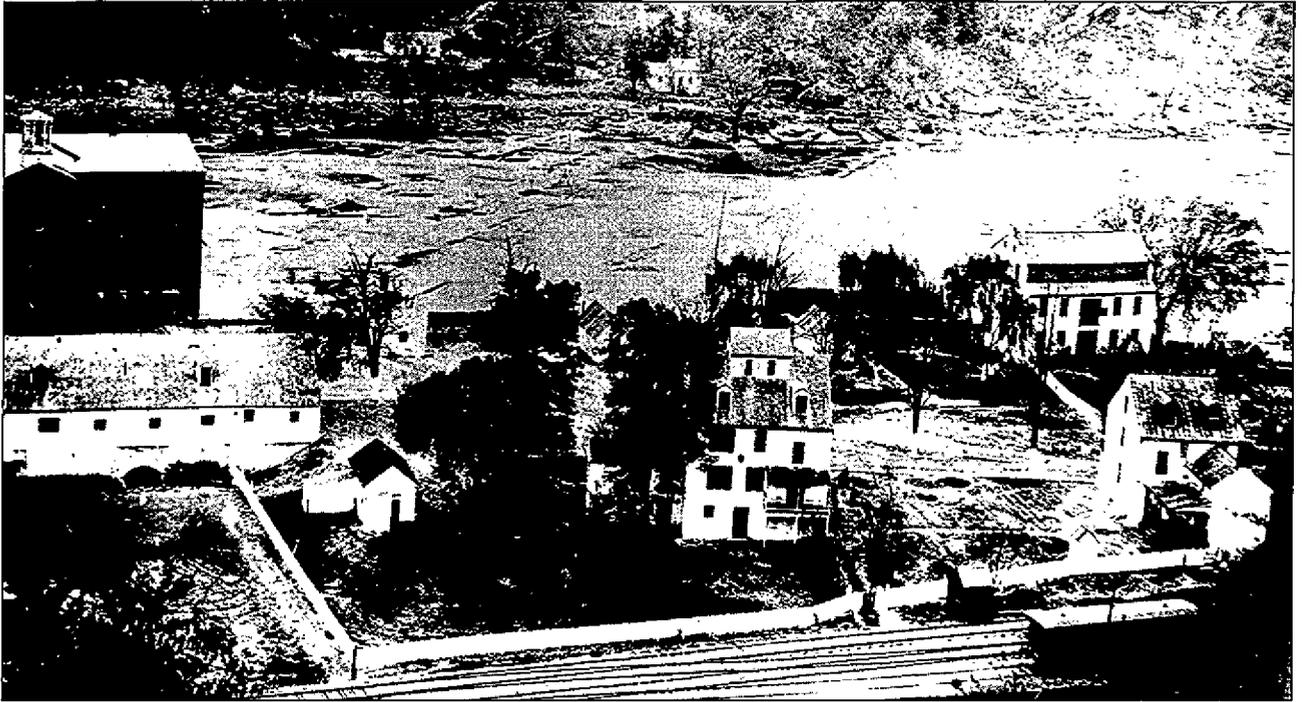
- A comprehensive survey design that specifies the set of techniques chosen for a survey (multiple techniques are requisite for a thorough site investigation), the order in which the techniques are implemented, the size and location of the survey grid applied, and the compatibility of the techniques with the site (that is, compatible with geology and physical access).
- An experienced geophysicist contractor who is skilled in multiple geophysical methods and knowledgeable about the physical and historic context of the survey and the nature of the expected results.

Possible limitations of geophysical surveys include the following:

- Geophysical surveys are equipment-intensive and may be expensive to conduct.
- Geophysical survey equipment cannot distinguish between cultural and geologic anomalies.
- Geophysical survey techniques are limited to near-surface detection. There are limits to the depth and scale of resolution.
- Geophysical survey equipment may not detect subtle contrasts or weak signals. If the contrast between the sought-after archeological material and incubating soil is small, detection is hindered.
- Erroneous readings may occur as a result of distortion from nearby cultural entities with physical or electromagnetic properties, such as subterranean utilities, powerlines, metal fences, transmission towers, buildings, roads, railroads, aircraft, and two-way radios.

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include magnetic surveying with a magnetometer and gravity surveying using a gravitometer. A magnetometer measures the earth's total magnetic field. It is useful for detecting buried ferrous objects or magnetic anomalies in soils. A gravitometer measures the anomalous acceleration of gravity due to mass/density relationships of buried features. Currently, the technique has limited use because detection is very subtle.



*Figure 1. This photograph of Virginias Island shows the proximity of the former industrial community to the Shenandoah River. The nineteenth century buildings were largely destroyed by successive floods by the turn of the century. A geophysical survey of selected areas of the island yielded information about the location of ruined residences and outbuildings. This information was used in developing a treatment plan for the cultural landscape. Harpers Ferry National Historical Park. (NPS, 1865)*

## Magnetometry

Magnetometry is used within a large landscape area to detect the presence and location of archeological resources with magnetic properties. It is useful for a preliminary level of a subsurface investigation and is particularly suitable for detecting brick structures and metallic artifacts.

Magnetometry, or magnetic surveying, uses the proton magnetometer to measure the magnetic susceptibility of buried materials. The earth's total geomagnetic field can be measured and used as a control point of reference to compare local magnetic interferences. When compared to the total geomagnetic field, local disturbances or anomalies can indicate the position of ferrous objects, displaced soils, and earthen structures.

The magnetometer is a highly sensitive instrument, capable of measuring perturbations or anomalies with an accuracy of one part in 100,000. The proton magnetometer is one of the simpler, less expensive, and more accurate geophysical instruments, and consequently is used frequently for geophysical surveys. Acquisition of spatial data over large areas is relatively easy, and qualitative interpretations can be made rapidly with relatively less geophysical experience. (See Figure 4.)

## Active Geophysical Survey Techniques

Active geophysical survey techniques involve transmitting electrical currents, electromagnetic, or acoustic energies into the earth's surface.



Active techniques include ground penetrating radar, electrical resistivity, and electromagnetic conductivity. Earthen material, such as soil or rock, are generally considered to be relatively poor conductors of energy. Much of the energy that geophysical equipment introduces is dissipated into the subsurface. Often geophysical receivers magnify the return signal to compensate for the poor conduction of energy. A comparison of amplitude, frequency, wavelength, and time delay between the input and return signals leads to the detection of buried cultural resources.

### **Ground Penetrating Radar**

Ground penetrating radar (GPR) is used to determine the depth and physical properties of buried cultural and geologic features. It can effectively map soil layers, depth to bedrock, cavities, buried stream channels, burial sites, underground utilities, structures (including concrete structures), and metallic objects.

GPR is most often used to measure reflected low frequency electromagnetic energy, which is introduced into the subsurface via a surface-contact, transmitting antenna. (See Figure 5.) As the energy passes through the earth, it may encounter buried materials of varying electrical properties. At these electrical interfaces, energy may be either reflected or attenuated. A receiving antenna on the earth's surface detects reflected energy. The receiving antenna is positioned in close proximity to the transmitting antenna. Comparison of the return signal time delay with the input signal (in billionths of a second) is a function of the speed of the signal as



*Figure 4. A magnetic survey using a GEM 19 magnetometer. Fort Laramie National Historic Site. (NPS, 1993)*

it passes through the buried material. This comparison can be used indirectly to calculate the depth of the buried material. A comparison of the amplitude and frequency of the reflected signal with the input signal provides information about the physical properties of the buried material.

Site-specific conditions may limit the success of GPR in geophysical surveys. The presence of highly conductive clay soils in proportions of 10 percent or more is probably the greatest limiting factor affecting radar signals. Highly conductive soil conditions result in the attenuation of electromagnetic energy, a reduction in signal velocity, and a decrease in depth of signal penetration. Water-saturated soils also produce a highly conductive environment. Seasonal groundwater level variations may be relevant in timing a ground penetrating radar survey.



Figure 5. A ground penetrating radar being pulled across the ground. Lockwood Stage Stop, Pinon Canon Maneuver Site, Colorado. (NPS, 1991)

### Electrical Resistivity

Electrical resistivity uses electrical resistance (poor conductivity) properties to identify buried cultural resources. A highly refined electrical resistivity survey may be the most revealing geophysical technique, but it is expensive to perform because it requires a high number of readings per unit area.

Resistivity experts interpret electrical resistivity patterns to identify the presence of nearly all forms of constructed features, such as foundations, paths, and roads. The technique can also reveal compacted soils, indicative of a former pathway, and disturbed soils, such as those found at burial sites and cultivated fields. Electrical resistivity is useful for measuring depth to bedrock and is often performed before GPR in geophysical surveys involving multiple techniques. Depth to bedrock measurements are useful in calibrating GPR equipment.

Electrical resistivity uses current electrodes to introduce into the soil an electrical current of known amplitude (amps) and frequency (volts), and potential electrodes with an ohmmeter to measure resistance changes in the soil, vertically and horizontally. (See Figure 6.) Measurements of vertical changes in resistivity are called "soundings" and measurements of horizontal changes in resistivity are called "profiling." The technique requires at least three individuals to move two current electrodes and two potential electrodes along a survey grid. It is assumed that the incubating soil has a homogeneous resistivity (due to an assumed even distribution of soil and water) and that buried cultural resources can be identified as anomalous readings of resistance.

Along survey gridlines, changes in resistance readings are used to create "contour maps" of soil resistivity. On the map, concentric contours emanating from a location (called a "spot elevation") represent material of lowest conductivity,



Figure 6. An electrical resistivity survey using a Gossen resistivity meter. Scott Air Force Base. (NPS, n.d.)

or conversely, greatest resistance. Because soil conductivity is directly related to the presence of water, locations measuring the greatest resistance will have a lower soil-water content. Nonsaturated soil conditions reveal more contrasts between potentially buried cultural resources (that have lower water content) and native soil material (having higher water content).

Ideally, electrical resistivity tests should be performed in more than one season with varying soil-water conditions. In some geologic conditions the native soil may have a lower water content and therefore higher resistivity than buried cultural resources. Because resistivity is directly related to permeability, degree of saturation, and the chemical nature of entrapped fluids, prior knowledge of indigenous geologic conditions is requisite to accurately interpret resistivity data.

### *Electromagnetic Conductivity*

Electromagnetic conductivity, also called EM and induction, is used to detect and differentiate metallic artifacts buried near the earth's surface. The technique locates near-surface cultural features (structures, compaction, excavation, and habitation sites) by their various water saturations (their conductivity). A conductivity measurement is the reciprocal of resistivity, so in theory the results of a lateral conductivity survey should mirror the results of a resistivity profile.

The main advantage to using conductivity over resistivity is that the measuring instrument does not require surface contact. Two individuals are required to perform the technique, but the

conductivity instrument can be moved from station to station by one operator. Resistivity requires a crew of at least three to move and place electrodes in the ground along a survey line. (See Figure 7.)

Electromagnetic conductivity uses a nonsurface contacting radio transmitter and receiver. The transmitter induces an electromagnetic field in the earth, causing an electrical current to flow. The electrical current generates a secondary magnetic field that causes the flow of an electrical current signal in the receiver. The receiver signal is measured for conductivity by a voltmeter incorporated in the EM instrument. The voltmeter is calibrated to measure the soil as having a homogeneous level of conductivity. It is assumed that buried cultural resources cause anomalies in the homogenous level of conductivity detected along survey lines. Large fluctuations in conductivity are indications of highly conductive subsurface materials, such as buried



*Figure 7. An electromagnetic conductivity survey using a Geonics EM38 soil conductivity meter. Fort Laramie National Historic Site. (NPS, 1993)*

utilities. Observing the physical extent and orientation of the anomaly can provide clues to its identification.

## SOURCES OF GEOPHYSICAL PROSPECTING EQUIPMENT AND SURVEYORS

### United States Governmental Agencies

United States Geological Survey  
United States Bureau of Reclamation  
United States Bureau of Mines  
Environmental Protection Agency

### State Agencies

Geologic Surveys  
Health & Environmental Agencies

### Universities and Colleges

Geological Departments  
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### Geophysical Equipment Rental Companies

### Geophysical Consultants

For access to the last five groups, acquire a copy of the Geophysical Directory, published each March. This directory provides the most

comprehensive listing of sources of equipment and geophysical survey experts available.

### The Geophysical Directory

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P.O. Box 130508  
Houston, TX 77219  
Phone 713-529-8789  
Fax 713-529-3646

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## ***Pollen, Phytolith, and Macroflora Analyses***

### **INTRODUCTION**

Pollen, phytolith, and macrofloral analyses are archeological techniques used to investigate the prehistory and history of vegetation types within a landscape. Data from these analyses provides information about former land use and changes in cultural activities over time. (See Figure 1.) Archeological and ethnobotanical expertise is required to analyze pollen, phytoliths, and macroflora.

The potential for pollen, phytolith, and macrofloral analyses to yield data about vegetation is highest when a site is undisturbed (for example, a site that has not received fill material or been inundated by flooding). In addition, information about a site is enhanced when the three techniques are conducted together. (The three analyses also complement other archeological techniques, such as the analysis of material artifacts.)

A pollen grain is the microscopic, single-celled male gamete of a flowering plant and a phytolith is a mineral fossil cast of a plant. The term, macroflora, refers to seeds and other macroscopic plant remains, such as wood, leaves, tubers, and flowers, that are preserved within an incubating sediment, such as soil. The remains of pollen, phytoliths, and macroflora can be collected from soil samples of a known deposition level within a soil profile. Based on their taxonomic classification and the soil strata in which they exist, the extant plant community of a prehistoric or historic period can be determined. In addition, the extent to which the pollen, phytolith, and macroflora remains are corroded or degraded can indicate the relative age of the sample.

## POLLEN ANALYSIS

### The Technique

To analyze pollen, a small soil sample is taken from each stratigraphic layer that has been excavated by an archeologist. Systematic excavations allow for classification of soils by temporal sequence, which creates reference points for analyzing the changes in a landscape over time. The classified soil samples are sent to a palynologist for pollen analysis. Because there are not many archaeological palynologists in the United States, the analysis may take three to six months. Currently, the cost of analysis ranges from \$85.00 to \$150.00 per soil sample.

The pollen analysis of sediment taken from sample cores in wetlands may reveal more than soil samples taken from an archaeological excavation. There are two reasons for this: first, pollen grains are better preserved in wetland cores because there is less microbiotic activity, and second, wetland cores reveal more about the intervals between human and natural disturbances, such as fire, pathogens, and climate. (The occurrence of fire is determined by counting charcoal particles found in pollen samples.)

Preserved pollen grains are extracted from an incubating sediment, such as soil, by chemical and mechanical separation treatments. Then the grains



Figure 1. Photograph of Boott Cotton Mills and Yard, the site of numerous archeological investigations that included pollen and phytolith analyses. Lowell National Historical Park. (Photograph courtesy of the University of Massachusetts at Lowell, 1890)

are examined under a microscope to identify characteristics of the parent plant. Although some pollen can be classified at the subgenus or species level, most pollen cannot be identified below the level of genus. Some plant taxa have similar pollen characteristics, making it difficult to identify the plant below the level of family. For instance, chenopod and amaranth grass families are difficult to distinguish from just their pollen grains. Nearly every family of flowering plant has been investigated palynologically, though the accuracy of pollen information varies with each family. Palynologists can identify both dicotyledonous and monocotyledonous plants from their pollen, as well as fern spores, fungal spores, and algal cysts and spores.

Pollen can persist in soils for a long time, although its longevity is determined by such factors as exposure to oxygen, grain size, the initial abundance of pollen from a particular species, and durability of the pollen grain wall. The percentages of different taxa, determined by identifying pollen, does not necessarily represent the relative composition of vegetation in a particular period; rather, it indicates the presence of a particular plant community or taxa. While pollen preservation is generally poor in prehistoric sites, recent work indicates that pollen preservation in historic sites is generally adequate enough to yield valuable information about plant communities.

### **Applying Pollen Analysis to Cultural Landscape Research**

Pollen analysis was originally used by paleoecologists to reconstruct the prehistoric environment. In recent years, archeologists have used pollen analysis to identify the plant communities that were extant in

particular historic periods and relate vegetation changes over time to land use. Pollen data can also reveal information about climatic and ecological conditions within a particular period.

Pollen analysis has been used to chronicle the introduction of European flora with increased mercantile trade into the early colonies. For example, changing land use patterns in seventeenth century Jamestown, Virginia have been identified from preserved pollen. Similar patterns were identified at Lowell National Historical Park in Massachusetts and Harpers Ferry National Historical Park in West Virginia. In both of these landscapes, the pollen record indicated a transition from well maintained yards around dwellings at the turn of the nineteenth century to more unkempt, weedy environments corresponding with the period of the industrial revolution.

The presence of pollen in a soil sample indicates that a particular genus of plant was historically present in the vicinity, but it does not indicate the precise location of a particular plant taxa. This is due to the natural forces of wind and water that can affect the deposition and incubation of pollen. To determine the historical location of a plant taxa, soil samples must be analyzed for phytoliths, the mineral fossil casts of plants.

### **PHYTOLITH ANALYSIS**

#### **The Technique**

Phytolith analysis is most often used to reconstruct vegetation cover over time. Phytoliths are released into the soil by plant decay, deposits of

plant tissue in the soil through waste, and through cultural processing of plant tissue as fuel, food, fiber, or building material. The presence of phytoliths indicates the location of a plant, animal, or cultural activity, and can be used to reconstruct the microdistribution—the relative historic locations—of plants.

Phytoliths are formed when hydrated silicon dioxide precipitates out within plant cells and is deposited along cell walls, where it forms a hard, opaline microfossil cast. The phytoliths remain within the living plant and are released into the soil when the tissue is digested by decay organisms. Phytoliths are known to be very stable in the soil (typically more decay-resistant than pollen) and therefore may yield information about prehistoric conditions of a landscape. Phytoliths occur mostly in stems and leaves, though they may also form in root, flower, and fruit cells. Unlike pollen, phytoliths are associated with more than just flowering plants, so they have the potential to provide more information about the plant kingdom in a particular period.

Phytolith and pollen analysis are complementary techniques, with their relative strengths in monocotyledon and dicotyledon identification, respectively. Like pollen, phytoliths are identified through their morphological characteristics. A paleobotanist may perform the pollen and phytolith analyses concurrently. For the benefit of integrating pollen and phytolith data, pollen and phytoliths should be derived from the same soil samples.

## Applying Phytolith Analysis to Cultural Landscape Research

Phytolith analysis is particularly revealing for monocotyledonous plants, especially the grass family. Many genera of grasses can be identified, yielding valuable ethnobotanical information about the cultural importance of grasses as food crops, building materials, and ornamental plants. For example, the presence of turf-grass phytoliths may indicate lawns in cultural landscapes.

At Lowell National Historical Park in Massachusetts and at Harpers Ferry National Historical Park in West Virginia, phytolith analysis was used in conjunction with pollen and artifact analysis to document change in land use during the industrial revolution of the nineteenth century. (See Figures 2 and 3.) At Hampton, Virginia, archeological investigations within the early city recovered teeth from domestic livestock. Phytoliths were extracted from the deposits on the teeth, providing a physical record of the eighteenth and nineteenth century diets of livestock and domestic animals. This information has been used to interpret 150 years of change in husbandry practices and land use at the household and community levels. The analysis of phytoliths was also used to identify historic field crop patterns at Monticello in Virginia, garden flora at the Moravian Gardens in North Carolina, Bacon's Castle in Virginia, and Morvan Gardens in New Jersey.



Figure 2. The Harper Yard is the site of numerous archeological investigations that included phytolith analysis. Information yielded in part through phytolith analysis contributed to a treatment plan proposing rehabilitation of the yard to reflect its nineteenth century character as a residential garden. Harpers Ferry National Historical Park. (NPS, 1991)

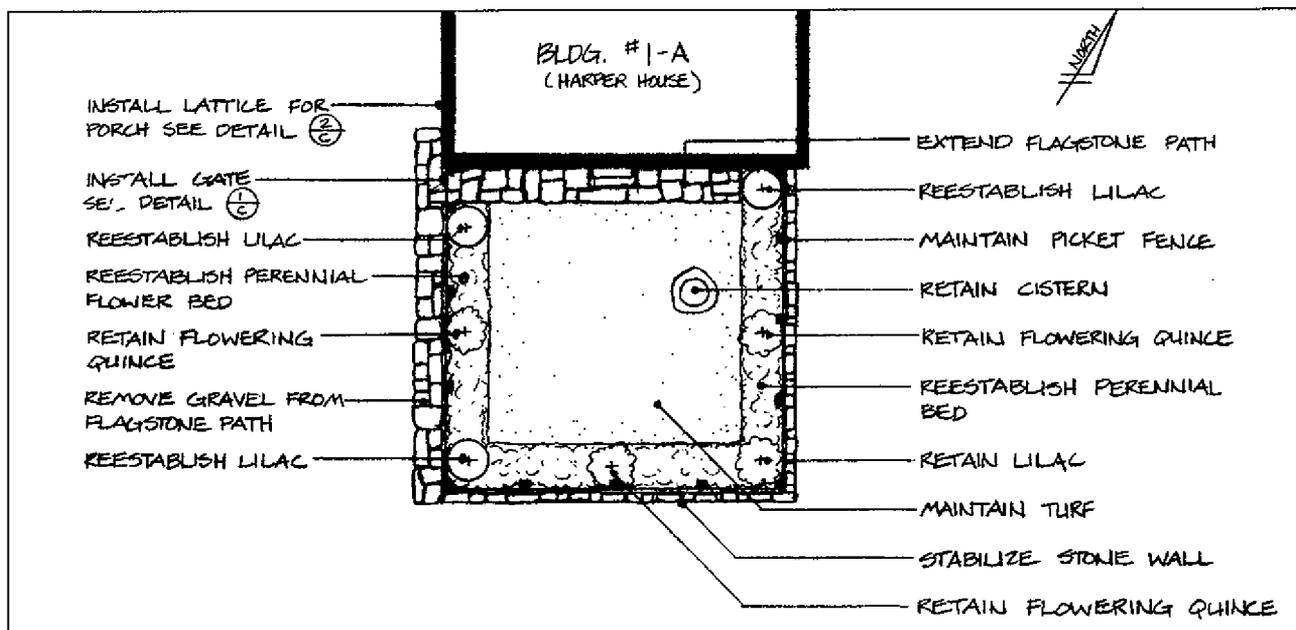


Figure 3. The proposed treatment plan for the Harper Yard. Information for the rehabilitation plan was partly derived from phytolith and pollen analyses of the yard. Harpers Ferry National Historical Park. (NPS, 1991)

## MACROFLORA ANALYSIS

### The Technique

Macroflora analysis refers to the investigation of the macroscopic, buried remains of plants. These macroscopic remains include seeds, fruits, wood, leaves, roots, and tubers. Macroflora are identified according to their parent taxa and used to construct a history of indigenous and introduced vegetation. Macroflora are also a source of ethnobotanical information, which indicates the relationship between the plants and cultural activities of a landscape.

Macroflora are preserved for the longest duration in charcoaled form, caused by charring through human activities or naturally occurring fires. Charcoal (carbon) is a relatively inert substance that is not further decomposed by microorganisms. Few seeds live longer than a century and those persisting longer are usually charred. Carbon dating can be used to determine the relative age of charcoaled macroflora.

In the absence of charring, macroflora are best preserved in incubating conditions that are least favorable to the growth of decomposing microorganisms. Such conditions include arid, dry environments and conditions with a pH either more acid or alkaline than neutral. Most living organisms occupy a narrow pH range from slightly acid to neutral. More acid conditions, such as found in bogs and privies, retard the decomposition of organic material (macroflora) because the pH inhibits the growth of microorganisms. Anaerobic, waterlogged conditions are conducive to the

carbonization of macroflora, a process similar to lignification (development of wood), which also retards decomposition.

Macroflora are derived from soil samples that have been classified according to their strata. Seeds may be incubated within human or mammalian waste (where they can provide dietary information), or directly within soil as a result of dispersal by wind, animals, and water. The macroflora analyst separates the seeds, leaves, fruits, or wood from the incubating sediment and observes the tissue under a light microscope to identify the parent taxa. Seeds and whole leaves can often be identified to the species level through examination of morphological characteristics. Certain dry fruits or succulent fruits, such as cherries and peaches, are identifiable to species. Wood must be diagnosed through the microscopic examination of conductive tissues and generally cannot be identified below the taxonomic level of genus.

### Applying Macroflora Analysis to Cultural Landscape Research

Macroflora analysis is used with other archeological techniques to reconstruct the historic appearance of a cultural landscape. Charcoaled macroflora may be used to reconstruct vegetation cover in prehistoric periods. The analysis may indicate the presence of plant species in a particular period and also provide a temporal sequence of species change through successive periods. The pattern of vegetation change may be critical to understanding how a cultural landscape evolved as a result of human intervention and natural disturbances. (See Figure 4.)



Figure 4. Soil samples are collected during an archeological excavation, organized according to their respective soil strata, and analyzed for the presence of pollen, phytoliths, and macroflora. San Juan Island National Historical Park. (NPS, 1985)

Macroflora analysis can also contribute to the reconstruction of a landscape at a particular period. For example, at Monticello in Virginia, charcoalfied seeds found in the ash of a servant's kitchen fireplace on Mulberry Row were identified as sorghum, watermelon, corn, peaches, and pokeberry. Here, macroflora analysis indicated some of the crops grown on the farm during Thomas Jefferson's occupation, and also contributed dietary information.

In New England, more general changes in vegetation over the past 2,000 years are being investigated using the record of macroflora and

pollen deposited in lake beds in central Massachusetts. The identification of historically existing species and the study of vegetation dynamics will contribute to a land use and fire history.

A very large macroflora analysis was used to reconstruct the landscape of Pompeii, Italy. In A.D. 79, Mount Vesuvius erupted, destroying Pompeii and Heraculaneum. Vegetation incinerated during the eruption was preserved as charcoalfied macroflora under a layer of pumice and ash many meters deep. Much of Pompeii has been excavated back to the level of the soil in A.D. 79. At the soil level, charcoalfied roots are excavated and identified, or concrete casts are made of root cavities, leading to plant identification by shape or size. Charcoalfied seeds, roots and branches of olives, peaches, almonds, grapes, and other woody plants are contributing information to the reconstruction of formal gardens and vineyards within the ancient city.

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Park Historic Structures & Cultural Landscapes

## Tree Coring

### INTRODUCTION

Tree coring is used to determine the age of trees and reveal information about structural health, growth rate, growth patterns, and previous wounding or disease. Annual growth rings visible on a core sample can be counted to determine tree age. The relative spacing of the rings indicates growth rate and growth patterns.

A dendrochronologist is required to analyze tree cores in detail. The analysis can reveal historic information about climate change. For example, rings are spaced farther apart when sunlight and water are abundant, when physical wounding occurs (such as fire damage), and when competition changes occur (such as the death of an overstory tree, which allows more sunlight to penetrate).

Some consider tree coring to be potentially harmful to trees. The coring technique used to take a sample wounds the tree and may introduce pathogens or open up existing pockets of infection within the wood tissue that had been successfully compartmentalized by the tree. Use of tree coring assumes that the tree is healthy enough to seal off pathogens both chemically and physically before the organisms have a chance to spread and possibly cause systemic infection.

### APPLYING TREE CORING TO CULTURAL LANDSCAPE RESEARCH

Tree coring is a valuable investigative technique in cultural landscape research when a mature tree appears to date from a known period of significance, but historic documentation about the tree is lacking. For example, in cultural landscapes where the period of significance is recent, questionable trees may have a caliper size of only six inches.

In addition, different growing conditions affect the size of trees from an assumed average, making age estimation difficult without coring. The decision to core must consider physiological and morphological characteristics of a particular species, health status, potential vulnerability, such as genetic susceptibility or local presence of pathogens, management objectives, and the proposed treatment for the landscape.

Tree coring was used as a research tool at Weir Farm National Historic Site in Connecticut to develop a restoration treatment plan for the site. Historical research had not revealed whether particular trees dated from the period of significance. The trees were cored and the data helped planners decide whether to keep or remove the trees in question.

## PERFORMING THE TECHNIQUE

### Equipment

When coring a tree, it is best to use the smallest diameter bit possible for the increment borer. (See Figure 1.) Borer bits range in diameter from 0.169 inches (4.3 mm) to 0.5 inches (12 mm). A bit diameter of 0.169 inches is adequate for determining age, but larger sizes are more typically used for quantitative analysis in silviculture research. The bit length used depends on the radius of the tree with some extra length to ensure the borer reaches the center of the trunk. Bit lengths range from approximately 6 to 30 inches. The increment borer bit should be sharp (a 3-thread bit penetrates more easily than a 2-thread bit) and sterilized with rubbing alcohol.

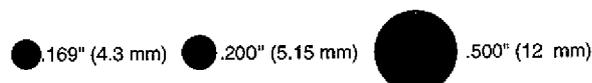
## SELECTING AN INCREMENT BORER

Three things to consider when ordering an increment borer are length, diameter, and style.



Borer bit length depends on the size of the trees you will be boring. Length is measured from the tip of the threads to the end of the round section of the borer bit. This is the maximum depth the bit will penetrate.

Core Diameter for the wood sample is determined by the inside diameter of the opening at the threaded end of the bit. .169 inches is commonly used for general forestry use, .200 inches for wood preserving testing, and .500 inches for large amounts of wood for quantitative analysis.



2- or 3-Thread Style is a matter of personal preference. A 2-thread borer has two threads on the cutting edge of the bit, each originating 180° apart. A 3-thread borer has three threads, each originating 120° apart. The 3-thread borer, due to its higher pitch, will penetrate the wood deeper per revolution than a 2-thread and also produce less friction because more threads are pushing against the wood. It is important to remember that the ease at which a borer penetrates wood depends on wood hardness, friction properties, and capability/strength of the user.



Figure 1. Photograph of an increment borer and extractor and a diagram indicating how to select an appropriate increment borer size. (Photograph courtesy of Forestry Suppliers, Inc., 1996)



Figure 2. An increment borer is used to core a Douglas Fir (*Pseudotsuga menziesii*) tree. San Juan Island National Historical Park. (NPS, 1987)

Sterilization should be repeated between successive cores to prevent disease transmission between trees. After sterilization, the increment borer is lubricated with a natural wax, such as beeswax. If beeswax is coated along the borer to the same length as the radius of the tree, the end point of the wax can be used as a gauge of when the centerpoint of the trunk is reached.

### Drilling the Core

The best position for drilling is the one that allows for the operator's optimum leverage and control. Tree coring is a strenuous activity, so the preferred working position for the operator is at stomach or chest height.

Coring involves removing a core sample from the trunk of a living tree using the increment borer. (See Figure 2.) The core is a segment of the cylindrical trunk, corresponding in length to the trunk radius (the core extends from the outer bark to the center of the trunk). To obtain the core that is best for aging the tree, drilling should occur at the lowest point on the trunk before the transition to the root zone (just above the root flair). This location contains the greatest number of rings because it is the oldest part of the tree. The higher up the tree trunk, the fewer the number of growth rings. If the core is taken too low in the root flair, the core will be difficult to read. In this transition zone, stem cells are modified as root cells and the signature of rings becomes diffused. Approximately three to four feet above ground level is ideal.

Once the drilling location is determined, the increment borer is positioned so it can reach the center of the trunk. After drilling, just beyond the center (or up to the end of the beeswax), the drill is reversed through one revolution to loosen the core. An extractor is then inserted to remove the core. The borer should be backed-out immediately so that proximate tissues will not swell. If swelling occurs, removing the borer will be difficult, if not impossible. The drill hole in the tree trunk should be left untreated.

If the tree radius is larger than the bit length of the increment borer, the center of the trunk cannot be reached in a single core. The age of the tree then must be interpolated. Age interpolation is done by determining what percentage of the

radius the borer can penetrate, calculating the number of rings per inch in the extracted core, then interpolating how many rings the remaining uncored tissue will bear. The same interpolation must be applied when a tree trunk is hollow and a complete core cannot be extracted. It may be very difficult or impossible to remove the increment borer from a hollow tree trunk.

### Determining Age

A core should extend a little beyond the center of the trunk to ensure that the centerpoint can be visually identified. Wetting the core with water or applying core dye may make the rings more legible. Consecutive growth rings at the center of the trunk (at the end of the core) appear as increasingly acute single "parentheses," which become inverted beyond the centerpoint. The midway point between the only "paired parentheses" marks the centerpoint; this is the reference point to either begin or end counting. Each growth ring represents one year of life.

Some species are easier to read than others, due to ring size, porosity of cells, presence of tannin, or chemical discoloration. In the more difficult cases it may be necessary to use staining treatments or dyes, magnifying lenses, and microscopes to visually enhance the rings for counting. These procedures may demand the expertise of a dendrochronologist.

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## Surveys

### INTRODUCTION

To conduct the historical research and existing conditions investigations for a Cultural Landscape Report (CLR), several types of surveys may be needed. Generally, the two primary surveys required are a site survey and a topographic survey. The site survey graphically documents the findings of a site investigation. The topographic survey accurately records existing conditions and is often used to prepare a base plan. Other types of surveys provide site-specific information, such as legal boundaries and the location of utilities, and are conducted as needed, based on a CLR's project agreement. The following sections briefly describe relevant types of surveys, their purpose in a CLR, and the expertise required to perform them.

### SITE SURVEY

Documentation of the existing conditions of a cultural landscape requires both site research and a site survey. Site surveys are usually conducted by a historical landscape architect and require the recording of as much information as is pertinent to, and defined by, the project agreement.

Site surveys range from general reconnaissance and windshield surveys to detailed condition assessments for individual features. Site surveys require on-the-ground fieldwork to inventory and document existing landscape characteristics and associated features, such as vegetation, circulation, and land use. Also recorded are contemporary site functions and detailed technical information, as appropriate. The goal of the site survey is to record the landscape as objectively as possible.

The findings from the existing conditions investigation and site history are compared to identify the landscape characteristics and associated features that have significance based on National Register criteria. Significant landscape characteristics and associated features are those that have existed since a period of significance and have retained integrity.

Ideally, a site survey should be preceded by historical research so that the history and historic context of the landscape are understood. With this information, the type of landscape characteristics and associated features likely to be found can be anticipated. In preparing for a site survey, landscape boundaries should also be determined. If legal property lines are not known, a boundary or cadastral survey may be required before the site survey. During the site survey it is useful to have copies of a United States Geological Survey (USGS) map, a historic site map, an aerial photograph, historical photographs, and a topographic survey map.

The appearance of landscape characteristics and associated features, their physical condition, and visible changes that have occurred since the period(s) of significance, should be recorded in a format that is easily used for analysis and evaluation. A standard form may be prepared for recording observations, including a map for geographically referencing landscape characteristics and associated features, and space for writing notes and making sketches. Field work should include taking black and white photographs and color slides, as well as detailed notes and sketches.

A datalogger, a type of hand-held computer used as a part of a Global Positioning System, may be used to expedite the recording of site survey data. A datalogger can be digitally programmed with a "data-dictionary" or standard inventory form before the survey begins, allowing responses to be entered in the field. The recorded information can then be downloaded to a computer. (See *Landscape Lines 11: Global Positioning Systems*.)

The scheduling and number of site surveys is determined by park operational and program functions, and the management objectives and level of investigation outlined in the CLR project agreement. For example, management objectives may require more than one site survey to investigate the effect of seasonal changes in the existing conditions of a landscape. Operational or program functions may require site surveys to be scheduled at only off-season times of the year. A limited level of investigation may restrict the site investigation to one site survey. A site survey must be scheduled during the most revealing conditions for information gathering; for example, when wetlands are submerged rather than dry, when deciduous trees, shrubs, and herbaceous plants have foliage, when steep topography is traversable, or when the daily altitude and azimuth of the sun best reveals geologic formations in black and white photography.

## TOPOGRAPHIC SURVEY

A topographic survey (also called a location ground survey) is an accurate technique for recording the positions of all detectable landscape

characteristics and associated features on or above grade (ground elevation). Landscape characteristics and associated features are recorded on a topographic survey map, which is then used to create a base plan for subsequent plan drawings, including period plans and existing conditions plans.

The topographic survey map shows contours at a prescribed interval and indicates spot elevations of peaks (high-points), depressions (low-points), and selected features. (See Figures 1 and 2.) To determine the position of landscape characteristics and associated features, the survey uses the horizontal and vertical position relative to an established "ground control" point. (See "Ground Control Survey" later in this text.) The types of

features identified include building foundation outlines, edges of paving materials, fence and wall lines, surface utilities (poles, wires, transformers, and manhole covers), water features, vegetation masses and individual plants, roadway centerlines, top and bottom of walls, curbs, gutters, and steps.

The level of detail desired in a topographic survey, such as the contour interval and accuracy of spot elevations, must be specified. The specifications should indicate that a registered land surveyor or civil engineer will perform the topographic survey.

Unlike a site survey, a topographic survey does not record qualitative information about the appearance, physical condition, or relative

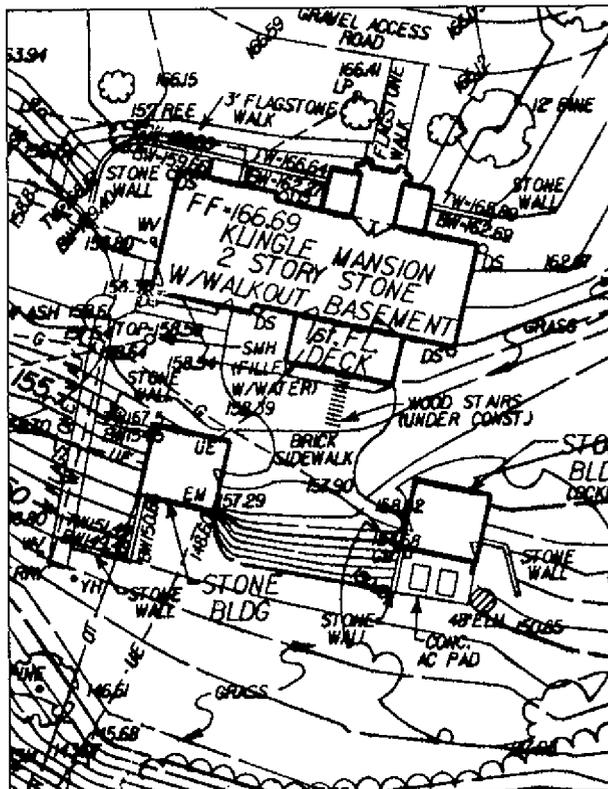


Figure 1. Typical portion of a topographic and utility survey for Klinge Mansion, Rock Creek Park. (NPS, 1995)

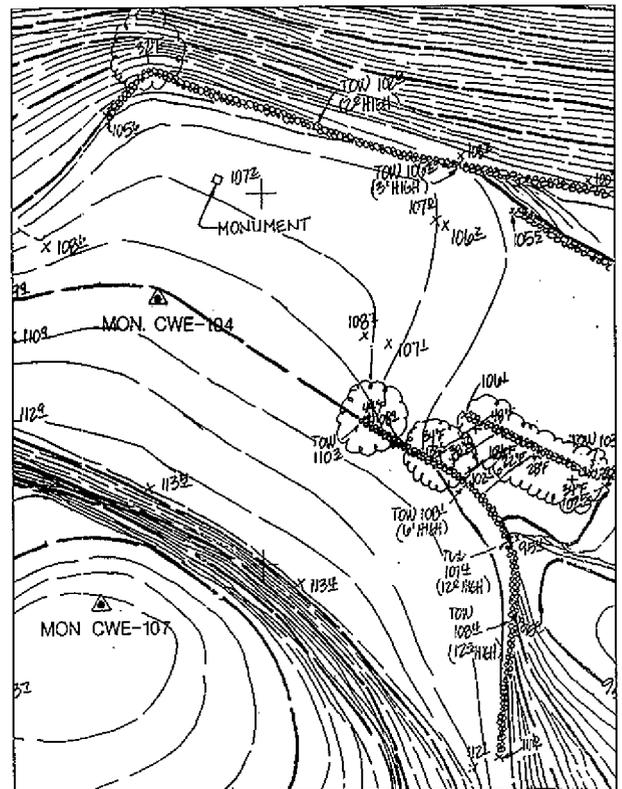


Figure 2. Typical portion of a topographic survey of English Camp, San Juan Island National Historical Park. (NPS, 1987)

importance of a cultural landscape. A site survey performed before a topographic survey can aid in selecting features to be recorded in a topographic survey. If a topographic survey is performed before a site survey, the resultant topographic survey map can be used during a site survey to document landscape characteristics and associated features.

Aerial photogrammetry is an alternative technique for obtaining topographic information through the use of ortho-rectified (horizontally and vertically georeferenced), aerial photographs. (See Figure 3.) However, because the topographic informa-

tion is derived from a specialized photograph taken above ground level, the information is less refined than the information based on a traditional topographic survey. Aerial photogrammetry may be used to derive the overall topography of a large landscape, whereas a traditional topographic survey may be performed in landscape areas with a greater density of features. (See *Landscape Lines 5: Graphic Documentation*.)

The need and scope of a topographic survey and its scale depend on the type and size of the landscape, and the density of existing features. Also influencing the survey's scale are the

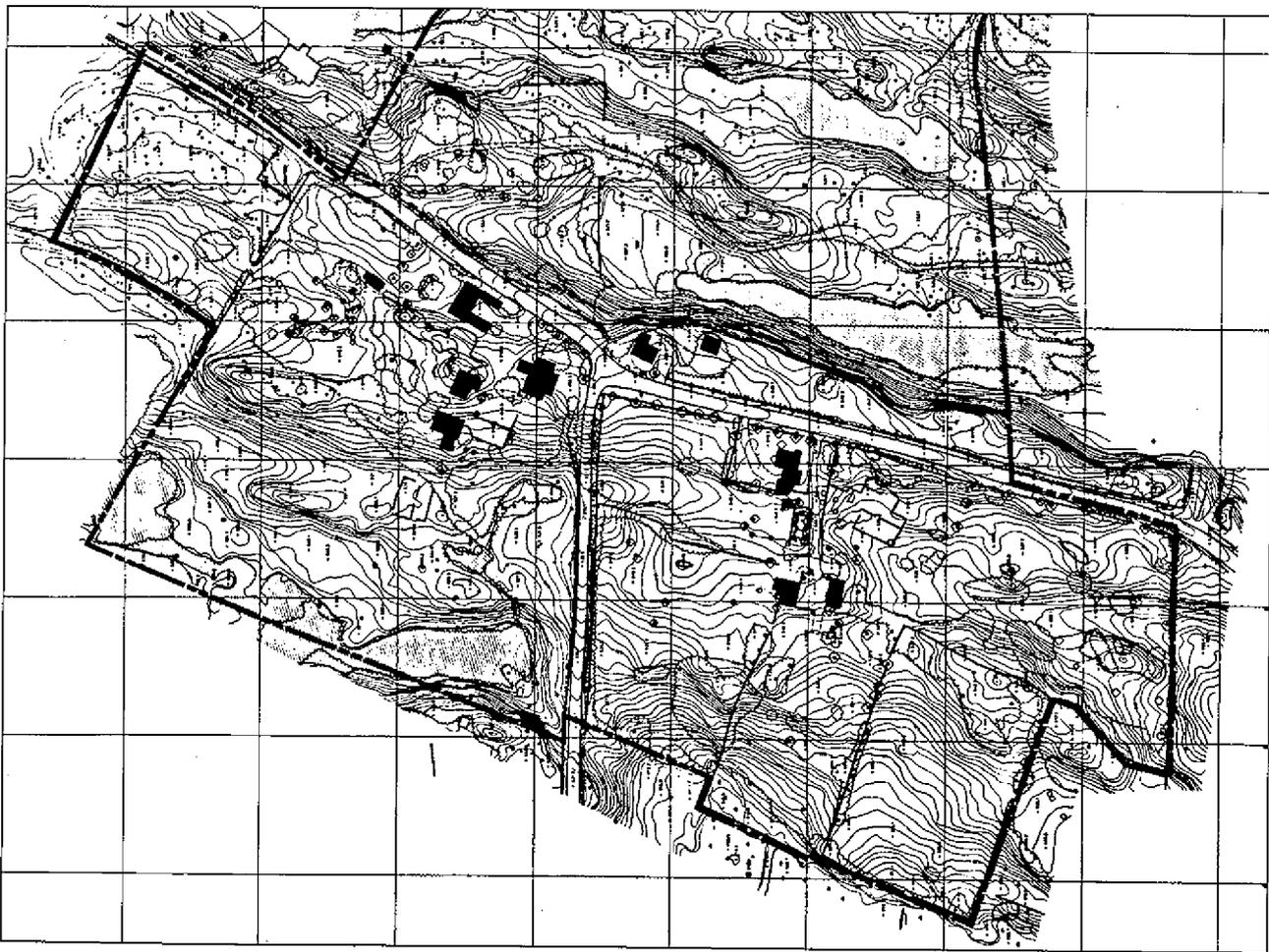


Figure 3. Topographic survey generated using computer aerial photogrammetry. Weir Farm National Historic Site. (NPS, 1992)

management objectives and the level of investigation for the CLR. Typically the scale of resolution of a USGS topographic quadrangle map at 1: 2400 is too small to accurately depict topographic contours on a 1: 200 base plan. For larger landscapes, a survey derived from aerial photogrammetry may be satisfactory and less expensive than a traditional topographic survey for obtaining landscape topographic data. If traditional methods are used to record the topography of an entire landscape, the costs can be reduced by using a larger contour interval for the overall landscape and a smaller (more detailed) contour interval for areas with a greater density of features.

Topographic information may be delivered as either a print document or electronic files (on disk). If the graphic documentation of a CLR is produced using computer aided design (CAD), it is best to receive that information from the surveyor as electronic files saved as a specified CAD format. This will make it easier to create a CAD base plan.

## GROUND CONTROL SURVEY

A ground control survey establishes geographic control points, or benchmarks, to which all surveyed coordinates relate. The survey records horizontal and vertical ground control monuments already in place, or positions new ground control monuments where none exist.

A ground control survey is performed concurrently with other types of surveys to provide points of reference. If no benchmarks exist or

their coordinates are unknown, establishing a ground control may be necessary before topographic, utility, or hydrographic surveys are conducted. Traditional survey equipment, such as a transit, theodolite, electronic distance meter, level, and measuring tape is used in this technique. (See Figure 4.) A survey grid is established from either the ground control monument or benchmark.

## UTILITY SURVEY

A utility survey identifies and locates existing or abandoned utilities, above and below ground, and documents their horizontal and vertical positions relative to a ground control. A utility



*Figure 4. Surveyors using laser transits to perform a topographic survey. San Juan National Historical Park. (NPS, 1987)*

survey is performed by a certified geophysical survey contractor and may involve identifying all utilities or just specified utilities.

Types of information recorded during a utility survey may include the type of utility, line diameter and location, materials of construction, and related structures or mechanical features. Geophysical survey equipment, such as ground penetrating radar, is used to detect the utilities. A utility survey also requires collection of all existing documentation from utility companies, although the documentation does not always include all site improvements that have occurred over time, such as the installation of, or modifications to, drainage, irrigation, and lighting systems.

Utility surveys contribute information to the development of the site history of a landscape, but the information is more likely to be useful in preparing construction drawings for work to be done as a result of a treatment plan. It may be more efficient to combine a utility survey with a topographic survey rather than contracting the two surveys separately.

## **CADASTRAL SURVEY**

A cadastral survey, which can include and may be referred to as a property title search, involves researching the legal description of a property, including easements, former surveys and permits, and all other legal records related to the property through successive ownership. Such documents are found at the local courthouse, recorder of deeds office, tax assessors office, and any other jurisdictional offices.

The product of a cadastral survey may be a reference file containing copies of all legal documents related to the property, or a composite map that graphically presents legal information about the property. The survey may include a narrative or graphic description of the property in metes and bounds, a copy of the property plat, deeds, previous plats, permits or easements (such as utility easements), and ground control monuments. This information can be used to understand the historic and contemporary legal status of the property, to date certain features of the landscape shown or described in legal documents, and to identify any legal restrictions associated with the preservation and management of the landscape. (See Figure 5.) A historian, historical landscape architect, or other technical staff members can perform the survey.

## **BOUNDARY SURVEY**

A boundary survey establishes legal property lines by locating and identifying coordinates for the boundaries of a cultural landscape. Knowledge of property boundaries is important for performing other kinds of surveys, such as topographic and utility surveys. Ideally, the location of property boundaries should be known before a site survey is performed.

A registered land surveyor or civil engineer will conduct a boundary survey when no record of property lines exists, or when no legal boundary markers are found on the property. Boundary surveys are performed using traditional survey equipment and they are often conducted with topographic and cadastral

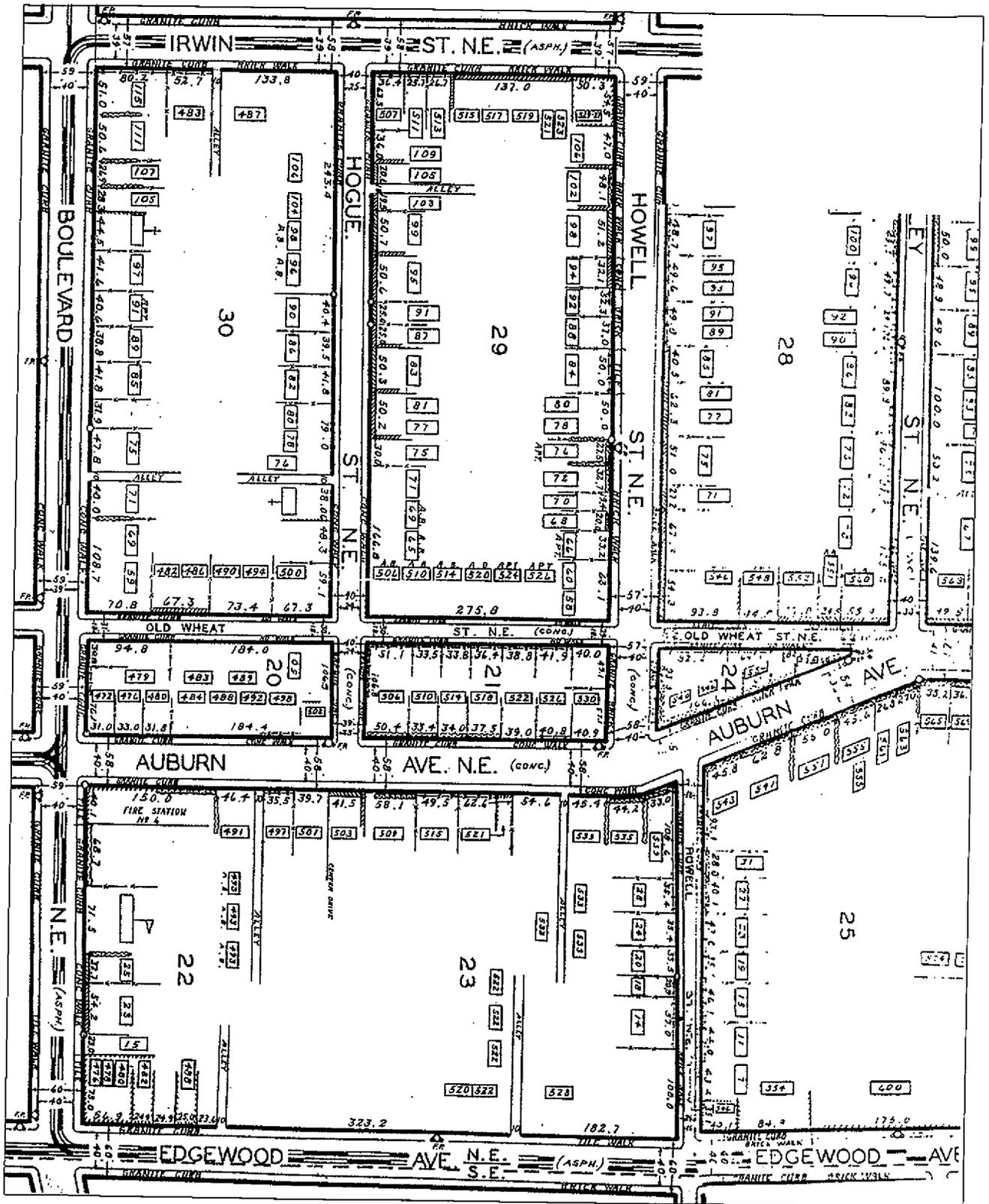


Figure 5. A historic cadastral survey map, performed by the Works Progress Administration in Atlanta. Map indicates the dwellings, property frontage, street width and alignment, and sidewalk conditions along Auburn Avenue. Martin Luther King, Jr., National Historic Site. (NPS, 1937)

surveys. The boundary survey may locate boundary markers and produce a narrative or graphic description of the property boundaries.

## HYDROGRAPHIC SURVEY

A hydrographic survey maps the submerged topography and configuration of natural or constructed water features and locates and identifies underwater objects. A certified geophysicist contractor often performs this survey with an archeologist.

Geophysical survey equipment mounted on a floating vessel is used to conduct the soundings of a hydrographic survey. A side scan sonar uses reflected acoustic energy to record topography and locate submerged objects. Soundings are taken at regular intervals along survey lines perpendicular to the shore line. Supplementary soundings are taken of objects or features of particular interest, which may include sewer outfalls, sedimentation areas, spillways, dams, and rock outcroppings. The horizontal and vertical location of soundings is based on established ground control points.

Topographic and location information is received by a recorder and can be printed as a survey map or stored as an electronic file.

A hydrographic survey may be limited to investigating to a specified depth of sediment or surface geology beneath certain water features. Sediment cores or rock samples are taken from the bottom of the water feature using boring equipment. Archeologists, geologists, geophysicists, and archeobotanists may analyze the samples to better understand the cultural and natural history of the water feature and its environment.

A hydrographic survey may be necessary as part of an existing conditions investigation to better understand the underwater qualities of a water feature. This may be particularly important when a water feature contributes to the significance of a landscape, when the presence of submerged cultural artifacts is suspected, and when the size, shape, or depth of a water feature has changed since a historic period and the cause or effect of this change needs to be understood.

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## Geographic Information Systems

### INTRODUCTION

Geographic Information Systems (GIS) are used to input, store, manipulate, analyze, and map spatial data. Although GIS is often considered a type of computer system, the first GIS systems involved manual techniques to perform some of the same functions now performed by computers. In the late 1960s, the noted landscape architect Ian McHarg popularized the technique of using transparent film map overlays to perform landscape analysis, about the time when computers were being configured with software for rudimentary mapping. Computers and GIS software have become much more sophisticated and can generate new data and maps far faster than is possible by hand. The utility of GIS in cultural landscape management is now universally recognized.

Perhaps because of its roots in landscape analysis, the analytical capabilities of GIS are considered among the most important uses of the technology. Given the necessary historic data, GIS can be a powerful tool for examining cultural landscape changes over time. For example, if a park has digitized historic land use maps that are appropriately georeferenced, GIS can overlay the historic data on current land use data to determine the magnitude and spatial extent of the changes. GIS can also model or predict various outcomes of different treatment alternatives presented in a Cultural Landscape Report (CLR).

Mapping, or cartographic output, is another important use of GIS, and is often valuable for more intuitive, less explicit, visual analysis. (See Figure 1.) For many years the quality of cartographic output available through GIS software could not equal that achieved with manual methods or computer aided drafting (CAD) systems. But this is no longer the case. Numerous mapping tools are now available in most GIS packages,

including desktop systems, which offer the added benefit of being easy enough to learn and use for even non-GIS specialists.

GIS also offers an efficient method for storing and retrieving cultural landscape data. Unlike hardcopy maps, digital data does not decay over time (although the storage media may need to be updated), is easily copied with no loss of data quality, and requires little physical space. And while CAD systems may be just as effective in storing and retrieving spatial data, GIS is far superior for managing attribute information; that is, data describing spatial features, such as the year in which a building was constructed.

## APPLYING GIS TO CULTURAL LANDSCAPE MANAGEMENT

The National Park Service (NPS) has used GIS extensively to document and analyze cultural landscapes. The system can provide cartographic models analyzing the effect of visitor use and assist planners in developing alternatives for a visitor facility or placing roads and trails. GIS can also be used for viewshed analysis in which the computer, using a digital elevation model, generates a data layer of all areas visible from critical points within a park. This data layer can then be used in conjunction with data about neighboring properties to predict how local planning, zoning, and development proposals might impact park views.

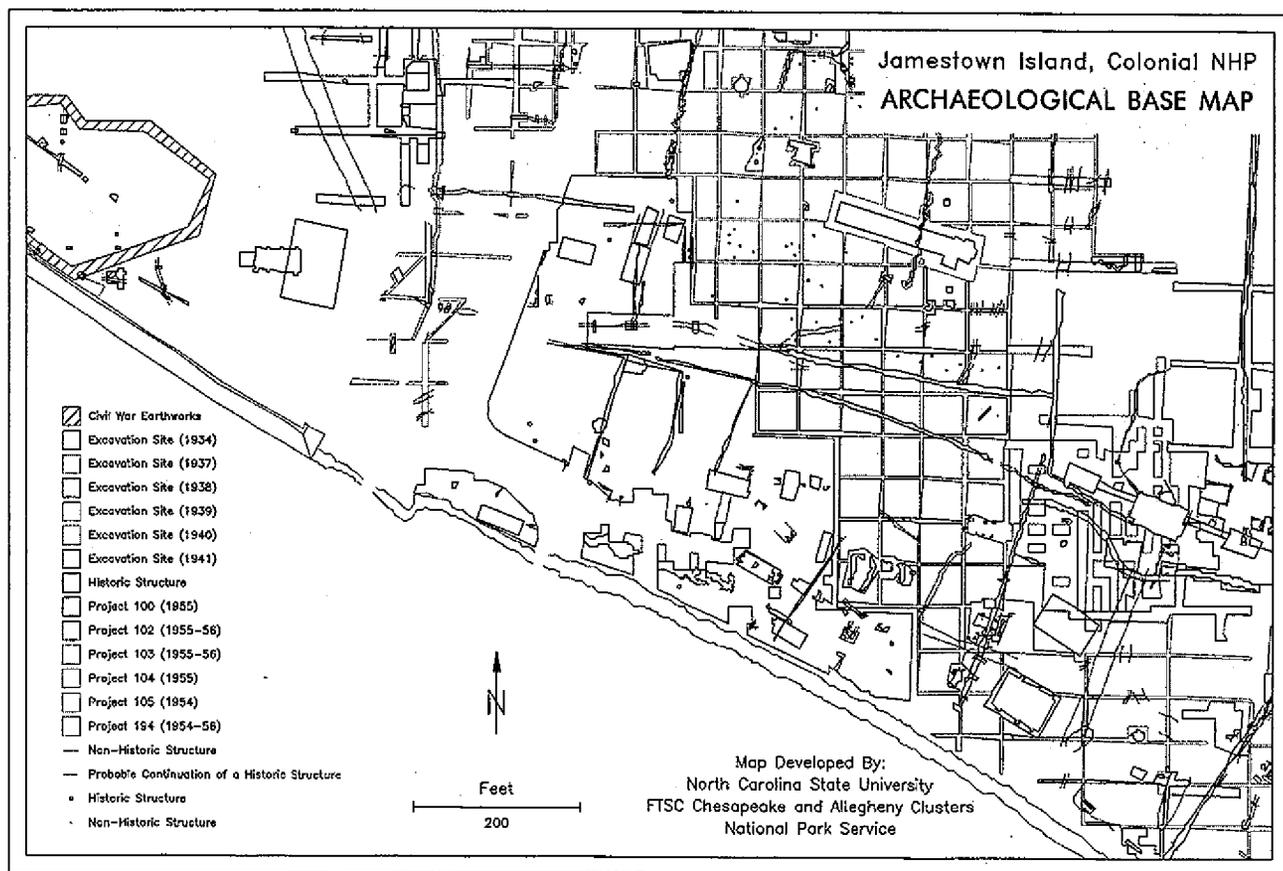


Figure 1. GIS map of an archaeological survey. Jamestown National Historic Site. (Map courtesy of North Carolina State University, n.d.)

For example, Manassas National Battlefield Park used GIS to protect its viewshed. The park was able to simulate the effects of a proposed shopping mall and office development within view of the battlefield. This helped the NPS garner public support to oppose the development and eventually stop the project.

Inventories of park cultural features have often been facilitated by the use of GIS. (See Figure 2.) Using Global Positioning System (GPS) receivers, Richmond National Battlefield collected locations of all earthworks inside the park. The digital data was then entered directly into the park's database. The park also used GIS to

inventory and monitor every tree in its historic orchard. Similar databases have been developed at many parks throughout the national park system.

## TECHNICAL CONSIDERATIONS

### Data

Data is a critical element in GIS and it represents the biggest investment of resources. None of the previously mentioned implementations of GIS in cultural landscape management would have been possible without good data. Poor or inadequate data can lead to erroneous results, which is often

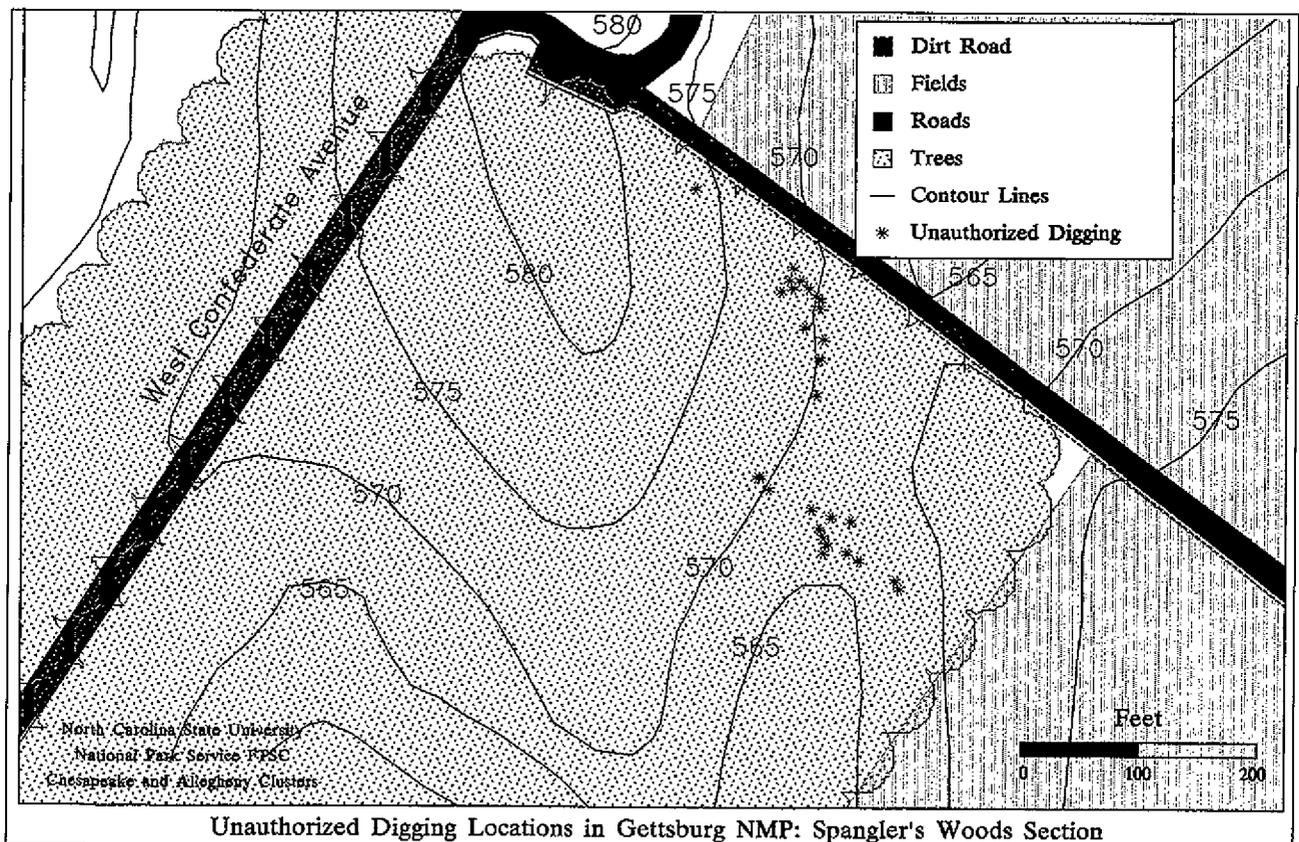


Figure 2. GIS plan of unauthorized digging in Spangler's Woods. The plan indicates topography, circulation, and vegetation, along with the location of digging. The plan was created using Atlas GIS and AutoCAD. Gettysburg National Military Park. (Plan courtesy of North Carolina State University, n.d.)

worse than having no data at all. Care must always be taken to use data that is appropriate for the task at hand.

### *Types of Data*

There are two basic types of data used in GIS: vector and raster. Vector data includes points, lines, or polygons and has one set of attributes associated with each feature. Raster data is a continuous area broken into a regular grid of cells, each cell having a value (attribute) associated with it. For example, a soil grid might have the soil type found at each cell location. The main difference between vector and raster data is that vectors are feature-oriented and rasters are landscape-oriented. Discrete data, such as a structure, is better suited to a vector format, while continuous data, such as slope, is better suited to a raster format.

Spatial data is usually separated into layers. A layer represents a group of features with a common set of attributes. For instance, roads, trails, soils, and terrain aspect are all possible data layers. In some cases, seemingly different features can be combined into one layer if the attributes are general enough. For example, roads and trails can be combined into a single layer called transportation, with an attribute describing whether the feature is a road or a trail.

### *Obtaining Data*

Although obtaining data has always been, and remains the single largest roadblock to developing successful GIS applications, the tools available for collecting data are more numerous and easier to use than ever before. Some of the more popular methods for cultural landscape data collection include the following:

- Global Positioning Systems (GPS). This involves the use of hand-held receivers that receive signals from satellites to determine the user's location on the ground. (See *Landscape Lines 11: Global Positioning Systems*.)
- Map scanning. Scanners have become a quick and efficient method for entering data from old maps and are much faster than hand-digitizing on a digitizing table, although sometimes the latter method must still be used. (See Figures 3 and 4.) A scanned image is converted from a raster format to a line format through vectoring software.
- Digital orthophotography. This is aerial imagery in which all the distortion due to terrain, camera angle, etc., is removed so that it is essentially a photo map. Many software packages allow "heads up" digitizing on a computer monitor with the digital orthophoto image displayed as a backdrop.

In the next few years the development of very detailed satellite imagery may become a useful source of data for cultural landscape management.

### *Storing Data*

All georeferenced data must be stored in a coordinate system and datum. Furthermore, to use two or more data sets together, they must be stored in the same coordinate system and datum. There are many coordinate systems available, including latitude/longitude and state plane, but the one most commonly employed within the NPS is the Universal Transverse Mercator (UTM) system. This coordinate system is based on a series of Transverse



Figure 3. A large scanning device converts map information to digital form. (USGS, 1995)

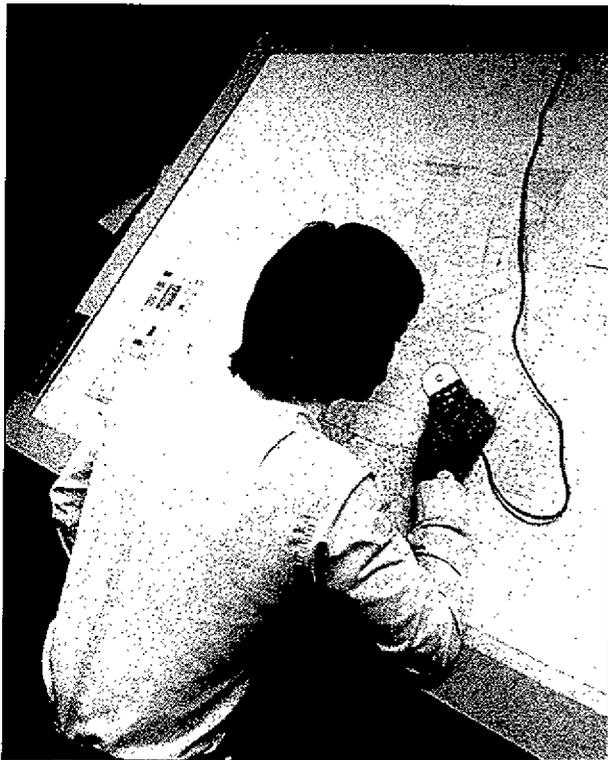


Figure 4. Digitizing converts map information to digital form using a hand-held mouse. (USGS, 1995)

Mercator projections, each one having its own set of parameters that control how the spatial coordinates are displayed. There are 60 zones encircling the earth corresponding to these projections, each zone being six degrees of longitude in width. Since each zone has its own Transverse Mercator projection and set of associated parameters, all data to be used together must be stored in the same UTM zone.

There are two datums in widespread use around the agency: North American Datum of 1927 (NAD27) and North American Datum of 1983 (NAD83). The latter is a more accurate description of the earth's surface and NPS guidelines recommend that data should be placed in this datum whenever possible. However, since many agencies still use NAD27, there is often the practical consideration of converting large amounts of data obtained from other sources to NAD83. Again, the most important concern is that all data to be used together be in the same datum.

#### *Resolution, Accuracy, and Scale*

Other issues pertaining to data include resolution, accuracy, and scale. Although these terms are not synonymous, they are often used interchangeably, sometimes leading to confusion. Resolution refers to the degree of precision in a data set; that is, how finely described the data is. In a raster data set, resolution is the same as the cell size. In a vector data set, resolution can be thought of in terms of how closely the shape points in a line or polygon are spaced. (For a straight line, no more than two points are needed to describe it precisely.)

Accuracy describes how close a feature in a data set is to its real location on the ground. This is easier to do with vector data than with raster data. Because raster data is not feature-based, it is often difficult to discern errors in spatial accuracy from errors in attribute accuracy unless the entire grid has been shifted, or rotated from its true location.

Finally, scale is a nearly meaningless term when applied to digital data storage. Digital data is essentially scaleless until it is displayed, and even then its display scale can be easily changed. When performing spatial analysis or creating cartographic output, the most important considerations are the resolution and accuracy of the data. Data presented at too low a resolution will appear crude and blocky when displayed at a large scale. Since cultural landscape management often deals with small areas displayed at large scales, it is often necessary to have very high resolution data.

A good source for information about the suitability of a data set for a particular need is the layer's metadata. Metadata is information about data. It should include such things as the source of the data, estimated accuracy, and time from which the data was collected. Metadata can be stored in many forms, ranging from a simple text file for an entire data layer to complex attribute fields describing each feature in a layer.

## **Hardware and Software**

When the NPS began heavily promoting the use of GIS in the mid-1980s, there were few powerful software packages available for personal

computers (PCs). Consequently, most parks turned to workstation computers running the UNIX operating system. Early GIS software included GRASS, a package developed by the United States Army Corps of Engineers, but most of these systems are now running Arc/Info, a proprietary package from the Environmental Systems Research Institute, Inc. (ESRI). The last few years have seen the rise of GIS software for PCs, primarily ArcView, another product from ESRI. Desktop GIS is seen by many in the agency as the best way to get non-GIS specialists actively involved in using spatial data for analysis and mapping. Many opportunities exist for cultural resource managers to receive training for desktop GIS. Contact a regional or cluster GIS coordinator for information.

## **WHERE TO GO FOR ASSISTANCE**

Within the NPS there are many sources for obtaining further technical assistance related to GIS. Many parks have staff who are knowledgeable in the use of GIS and who can respond to inquiries. Many regions and clusters have field technical support centers that provide GIS services. In addition, there are regional and cluster GIS coordinators throughout the NPS who can provide technical guidance and direct individuals to appropriate resources. Their names and phone numbers, along with other agency-related GIS information, are available on the NPS GIS world wide web site ([www.nps.gov](http://www.nps.gov)). For general program information, the national GIS coordinator can be reached at 303-969-2964. The national GIS program office also has a cooperative agreement

with North Carolina State University to provide consultation and training services. Finally, the NPS Cultural Resource GIS (CRGIS) Facility of the Heritage Preservation Services Program in Washington provides GIS training and data collection service.

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



U.S. Department of the Interior  
National Park Service  
Cultural Resources  
Park Historic Structures & Cultural Landscapes

## Global Positioning Systems

### INTRODUCTION

In little more than a decade, the Global Positioning System (GPS) has revolutionized the surveying and mapping sciences. Until the early 1980s, the surveyor's transit had been the primary tool for accurately locating one's position on the earth's surface. This equipment takes months to learn to use properly, and years are required to master the technique sufficiently to become a licensed surveyor. With relatively little training a novice GPS user can now record his or her location to within a few meters.

GPS was developed by the United States Department of Defense (DOD) for military purposes. Although DOD believed that there would be civilian use of the system, it was never anticipated that nonmilitary applications would quickly surpass defense uses in volume and diversity. The system's foundation is a constellation of satellites known as NAVSTAR. These satellites continually send out signals that are picked up by GPS receivers and used to calculate a receiver's location in three-dimensional space. This information is then translated to any of several geographic coordinate systems, such as latitude and longitude or Universal Transverse Mercator (UTM).

There are several types of GPS receivers that are useful for different applications. (See Figure 1.) Military grade receivers, which can decode a special noncivilian signal called precise positioning system (PPS), are very helpful for navigating (within about 10 meters) to known sites. Normal civilian GPS receivers, which use coarse acquisition (CA) signals, are better suited to mapping applications. After data is collected in the field with these receivers, accuracy can be greatly improved (to approximately two to seven meters) through a process called differential correction (discussed later in this section). Some GPS receivers are capable of collecting data in either

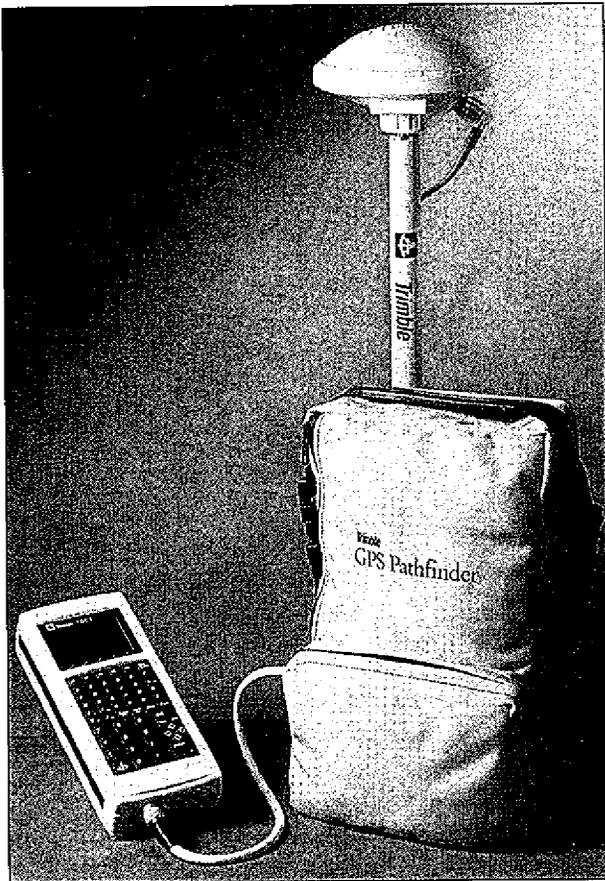


Figure 1. Catalog photograph of a GPS rover unit. (Photograph courtesy of Trimble Navigation, Inc., 1995)

PPS or CA mode. There are also receivers specifically designed for extremely high-accuracy surveying. Most of these units can deliver coordinates accurate to within a centimeter. The most precise GPS receivers have even been used to detect motion in the earth's crust to within a millimeter.

## APPLYING GPS TO CULTURAL LANDSCAPE MANAGEMENT

In association with a Geographic Information System (GIS), GPS is an expedient and accurate tool for verifying the location of specific landscape characteristics and associated features to

identify UTM coordinates. The coordinates can, in turn, be used to verify georeferenced spatial data in GIS and aerial photographs. A GPS unit with an accuracy to within nine feet horizontally will most often be used to locate cultural landscape characteristics and associated features on a 1 inch = 20 feet base map. A survey grade GPS unit is more likely to be used when locating features on a 1 inch = 20 feet base map.

## TECHNICAL CONSIDERATIONS

When a GPS receiver picks up signals from four satellites simultaneously, it can calculate a three-dimensional position for the user. When GPS first came into use, the NAVSTAR satellite system was incomplete. As a result, it was always necessary to plan data collection times to coincide with maximum local satellite visibility to ensure that four satellite signals would be detected by the receiver (often referred to as "mission planning"). Now satellite coverage is available nearly continuously throughout the world, and data collection can be performed almost anywhere at any time. However, there can still be problems receiving a sufficient number of satellite signals in deep canyons or under heavy canopy. Under these conditions, mission planning may still be advisable.

## Accounting for Signal Error

Because DOD wants to retain a strategic advantage over other countries' military organizations, it introduces a deliberate random error into the civilian satellite signals called selective availability,

or SA. This error makes it necessary to take extra measures to obtain coordinate locations more accurate than 100 meters.

The most common method of eliminating SA-introduced error is known as post-processed differential correction. This technique requires that a second GPS receiver, known as a base station, be established at a known location, preferably over a survey control monument or other such site. The base station must be collecting data from the same satellites at the same time as the rover unit. As the base station collects data recording its location, the coordinates recorded wander randomly due to the SA error. When field collection is complete, software is used to apply a set of corrections to the base station's data, based on its known, true location. These same corrections are then applied to the corresponding rover data. In this manner, data that was no more accurate than 100 meters can be made as close as two meters or even better. To ensure that the base station and rover unit "see" the same satellites, it is usually recommended that the rover unit be no farther than 500 kilometers from the base station, and that no signals from satellites lower than a certain level above the horizon (usually 15 degrees) be used in calculating rover positions.

Another method of eliminating SA error is real-time differential correction. The process is similar to post-processed differential correction, except that the base station has a radio beacon that transmits its corrections to the rover unit as data is collected. The rover unit is equipped with a radio receiver to pick up the correction signals, and an internal computer to calculate the corrected coordinates.

Military grade receivers that use PPS to record their locations avoid SA altogether. To prevent use by foreign countries, however, PPS is a coded signal that can only be read by a receiver properly configured to decode it. Through an agreement between the departments of Interior and Defense, the NPS has access to purchase and use receivers capable of decoding PPS signals. Most of the receivers of this type procured to date by NPS are Rockwell PLRGs (nicknamed, "pluggers").

### Satellite Visibility Constraints

Sometimes, even when more than four satellites are visible, it is not possible for the GPS receiver to get an accurate reading for its location. This is due to other sources of error in the system, such as atmospheric and ionosphere effects on the satellite signals, and errors in the internal timing mechanisms in the receivers. Most of this error can be minimized when the satellites being used to calculate a position are in a desirable geometrical configuration. However, often the angles between the satellites are too shallow or too near 180 degrees to help eliminate enough of these other errors to produce a good positional reading. This problem is known as position dilution of precision (PDOP), and can be quite vexing in less than ideal terrain or canopy situations. Often a GPS user may be having a difficult time just trying to get enough satellites, only to find that when a fourth signal kicks in, it results in a reading with much too high a PDOP to be acceptable for mapping. Sometimes the GPS user can move to a more favorable location and record an "offset" distance to the desired point, but unfortunately there is often nothing that can be done other than



Figure 2. GPS operators and equipment in the field. (Photographs courtesy of Trimble Navigation, Inc., 1995)

to wait for a lower PDOP reading. This is why it is still important to use mission planning software when collecting data under difficult satellite visibility conditions.

### Using a Data Dictionary

As data is collected by the user (see Figure 2), the points, lines, and/or polygons being recorded are stored in the receiver's data logger. When collecting data for input into a GIS it is often useful to have a list of the types of features to be collected, and information about

them, stored in the data logger. This list is known as a data dictionary. As an example, if data about a cultural landscape were being collected with a GPS receiver, the data dictionary might contain a field for a unique feature identifier number, and another field containing the type of feature, such as building, fence, or rock wall. The user can select the appropriate codes as each feature is collected, saving time and confusion trying to remember which feature was which after the data has been entered into a GIS. (See *Landscape Lines 10: Geographic Information Systems*.)

## WHERE TO GO FOR ASSISTANCE

Within the NPS there are many sources for obtaining technical assistance on GPS. Many parks have staff who are knowledgeable about using GPS and who can respond to inquiries. In addition, many regions and clusters have field technical support centers that provide GPS services. There are regional and cluster GIS coordinators throughout the agency who can provide technical guidance and direct individuals to appropriate resources. The coordinators' names and phone numbers, along with other agency-related GIS information, are available on the NPS GIS world wide web site ([www.nps.gov](http://www.nps.gov)). For general program information, the national GPS coordinator can be reached at 505-988-6710. Finally, the NPS Cultural Resource GIS (CRGIS) Facility of the Heritage Preservation Services Program provides GPS training and data collection service.

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**U.S. Department of the Interior**  
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**Park Historic Structures & Cultural Landscapes**

## Treatment of Plant Features

### INTRODUCTION

Virtually all cultural landscapes are influenced by and depend on natural resources and processes. In many ways, the dynamic qualities inherent in natural systems differentiate cultural landscapes from other cultural resources. Plant and animal communities associated with human settlement and use are considered "biotic cultural resources." These can reflect social, functional, economic, ornamental, or traditional uses of the land.

Vegetation is considered a biotic cultural resource when it can be linked to an established period of significance and adds to the overall significance of the landscape. Vegetation is a common landscape characteristic associated with the historical development of a cultural landscape or resulting from cultural activities on the land. Vegetation has a cycle of growth, change, and eventual death and often requires constant management and intervention to retain its overall structure and appearance. The features associated with vegetation are recognized as either a system (such as a forest or wetland), an aggregation of plants (such as a hedge or orchard), or an individual plant (such as a tree or shrub); all of which have distinct, unique, or noteworthy characteristics in a landscape.

It is important to understand the degree to which change contributes to or compromises the historic character of a cultural landscape, and the way in which natural cycles influence the ecological processes within a landscape. For example, preservation of a single tree in a designed landscape may be critical to the overall integrity of the design. In contrast, an entire woodlot may have significance, in which case it is necessary to preserve the ecological processes of the system rather than an individual tree. Determining a treatment strategy for the vegetation within a cultural landscape involves consultation with appropriate natural resource professionals.



*Figure 1. Planted in the early nineteenth century, this Ginkgo Tree is an individual plant feature. Vanderbilt Mansion National Historic Site. (NPS, 1995)*

This text describes the process of historical research, existing conditions investigation, and analysis and evaluation conducted during the preparation of a Cultural Landscape Report (CLR) as it relates to treating vegetation, in particular individual plants and aggregations of plants. Individual plants are solitary (see Figure 1), whereas an aggregation of plants is a physical grouping of multiple individuals of the same plant type, such as a hedge, alley, bosk, and orchard. The aggregation of plants shares the same aesthetic or functional role in the landscape because of the collective arrangement of plants in space. In most cases, an aggregation of plants can be treated similarly to an individual plant because its composition is uniform. (See Figures 2 and 3.)

This text emphasizes the need to determine, during analysis and evaluation, how the features of vegetation contribute to the significance of a landscape. This is particularly important in selecting a primary treatment for a landscape and in implementing treatment and management of plants. This text also discusses special considerations for treatment activities, including replacement of declining vegetation. Because vegetation is living material, plant replacement is an inevitable activity regardless of the treatment. Throughout this text, the term "plant features" refers to both individual plants and aggregations of plants that contribute to the significance of a cultural landscape and retain integrity.

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## BIOTIC CULTURAL RESOURCE MANAGEMENT.

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The treatment and management of biotic cultural resources was first discussed in Ian Firth's 1985 study: *Biotic Cultural Resources: Management Considerations for Historic Districts in the National Park System, Southeast Region*. The treatment and management of agricultural landscapes, battlefields, and private estates in the Southeast are described using the extant plants and animals associated with historic uses of the land. The document emphasizes the need to preserve biotic cultural resources as a historic record and a living connection with the past, as well as abiotic features that convey the historic character and significance of a landscape.

In a discussion of the treatment of biotic cultural resources in accordance with the Secretary of the Interior's Standards, the 1985 study illustrates the unique challenges in preserving biotic, rather than abiotic features. Biotic features have an inherently dynamic nature, that gives rise to such challenges as managing the size of livestock herds, the need to sow and harvest agricultural crops, resisting ecological succession in a now unglazed pasture, and interpreting the role of a replanted seedling forest in the maneuvers of a Civil War battle, despite the slow pace of restoration. Referring to the attempt to restore biotic cultural resources to depict the appearance of a historic period, Ian Firth states:

*A repetition of a historic scene composed of several plant and animal communities requires a conjunction of all biotic cycles in their appropriate phases. Therefore, like Halley's Comet, a historic scene may return perhaps once in a lifetime.*

The treatment and management of biotic cultural resources must anticipate and plan for the natural process of change. It must establish acceptable parameters for change and manage the appearance of biotic resources within those parameters.

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## PLANT FEATURES AND THE CLR

### Historical Research

Historical research is performed while preparing a CLR to produce the site history narrative. The narrative describes and illustrates the development and appearance of a landscape through successive historic periods. When vegetation is a characteristic associated with the historic development of a landscape, research includes identifying the

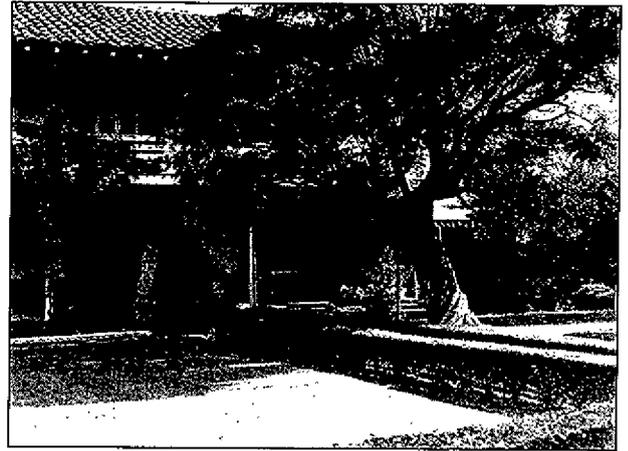


Figure 2. These evergreen shrub hedges represent an aggregation of plants. Eugene O'Neill National Historic Site. (NPS, 1944)



Figure 3. This birch allee is an aggregation of plants. Saint-Gaudens National Historic Site. (NPS, 1966)

historic location, appearance, and identity of plant features during each relevant period. (See Figures 4 and 5.)

Sources for historic research of plants include: historic maintenance logs, agricultural records, personal letters, diaries and journals, receipts of plant purchases, historic photographs (including historic aerial photographs), paintings, sketches, planting plans, and oral histories. (See Figure 6.)



Figure 4. The historic record for Rim Village indicated that large trees were selected from other areas in the park, root pruned, and transplanted to the Rim as part of the designed landscape. Crater Lake National Park. (NPS, 1933)

The identification of plants from historic documentation sources, rather than from living or herbarium specimens, is a special technique that may require a plant taxonomist. Some site investigation techniques, such as archeobotanical analysis (the analysis of pollen, phytoliths, and macroflora) and tree coring can also yield information on the existence of plants in historic periods.

### Existing Conditions Investigation

The existing conditions investigation provides an understanding of the present conditions of a cultural landscape. The investigation involves both a site survey and site research to identify and document the location and condition of all extant landscape characteristics and associated features, including vegetation and plant features. (See Figure 7.) Based on the site survey and research,

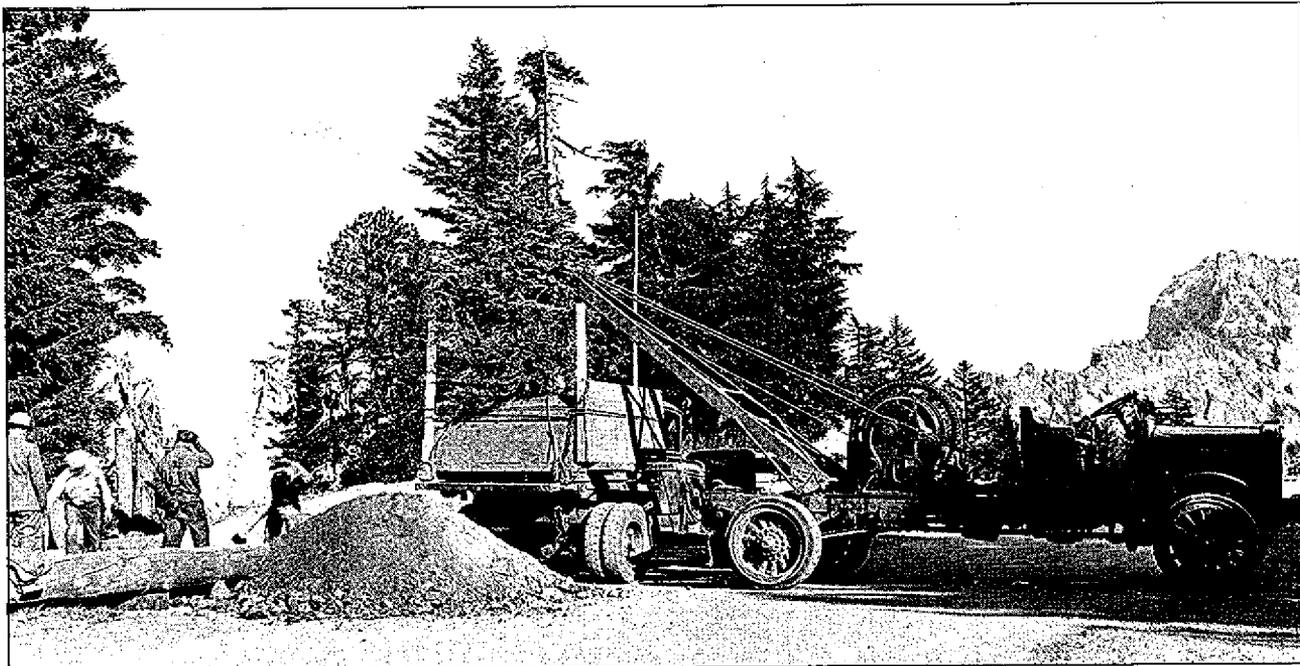


Figure 5. Research illustrated that large conifers were moved and planted at Rim Village in the 1930s to create a "natural appearing landscape." Crater Lake National Park. (NPS, 1933)





Figure 7. Field documentation of plants at Lake Crescent Lodge, Olympic National Park. (NPS, 1984)

Global Positioning System with a Geographic Information System, and hydrographic surveys for submerged vegetation.

## Analysis and Evaluation

The analysis and evaluation performed while preparing a CLR compares the findings of the site history with the existing conditions investigation to determine the type and extent of landscape change since a site's earliest historic period. The analysis and evaluation identifies the extant landscape characteristics and associated features and defines their contribution to a landscape's significance. If vegetation is a landscape characteristic, plant features are analyzed to determine their integrity and association with the landscape's significance.

In analyzing and evaluating vegetation and plant features, the process must acknowledge the dynamic nature of living organisms; plant features will have changed in appearance since the historic period(s). Therefore, evaluating the integrity of plant features involves determining whether a plant's contemporary appearance is evidence of an association with the significance of a landscape. Plant features may retain integrity if the historic type, distribution, size, and structure are still recognizable.

Plant features are evaluated according to National Register criteria in the same manner as abiotic features of the landscape. Plant features may be associated with a significant event, person, design, or function, or have the potential to yield information about the history or prehistory of a landscape. But generally, plant features are not significant independent of their landscape context; rather, they contribute to the significance of the entire cultural landscape. For example, the fruit trees of Adams National Historic Site in Massachusetts are associated with the lives of John and Abigail Adams (criterion A). The woods and fields of Chickamauga-Chattanooga National Military Park in Georgia are associated with the event of a Civil War battle. The woods influenced the pattern of maneuvers and conduct of the battle in the landscape in 1863 (criterion B). The indigenous eastern woodland of Prospect Park, Brooklyn, New York is associated with the picturesque design of the landscape. The design was carved from the existing woods by Olmsted and Vaux in 1868 (criterion C). The filbert trees of the 75-acre, 90-year-old orchard of Dorris Ranch in Oregon have yielded information about the early cultivation and breeding of filberts in the

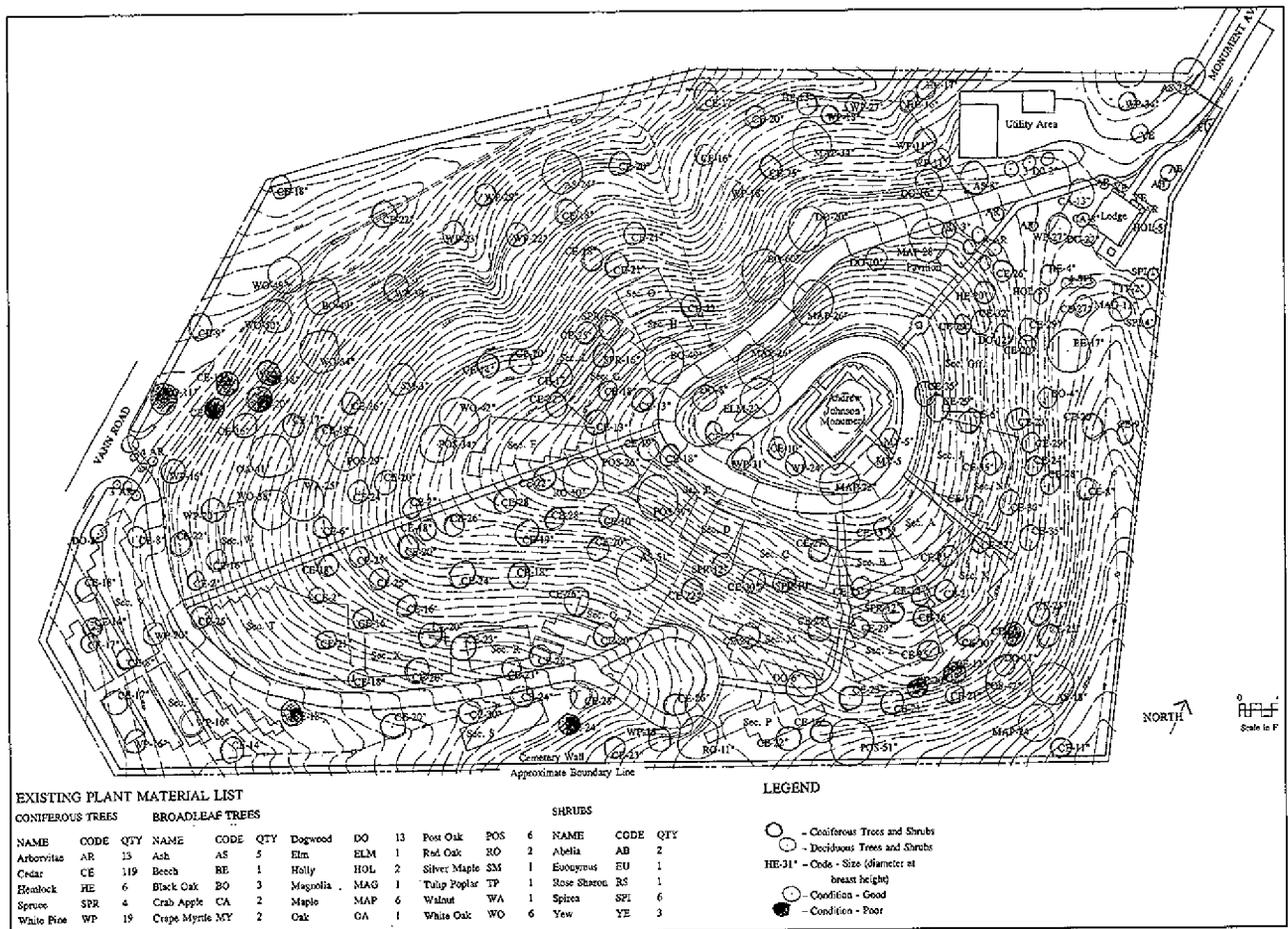


Figure 8. This vegetation assessment plan identifies broadleaf and coniferous trees, and indicates their common name, quantity, diameter at breast height, and physical condition. Andrew Johnson National Cemetery. (NPS, 1992)

United States in their experimental planting arrangements, spacing, culture, and genetic composition (criterion D).

An understanding of the significance of plant features in a landscape is a critical factor in determining how it should be managed. For example, the fruit trees at the Adams National Historic Site were one of the reasons John and Abigail purchased the property south of Boston in 1787, and subsequent generations of the Adams family continued to plant and experiment with the fruit trees. The orchard is an important feature in light of its association with the Adams family. The type

and variety of plant material may also contribute to the significance of a cultural landscape. An inventory of the orchards at the Moses Cone Estate on the Blue Ridge Parkway uncovered several unusual varieties of apples that date from the turn of the century. These historic cultivars are part of the historic record at this site, and because of their rarity these cultivars should be genetically preserved within the landscape (through maintenance and propagation for genetic authenticity).

The importance of the plant material may also be derived from its function in the landscape as part of a particular design or land use practice rather than

from its association or unique genetic makeup. At Eleanor Roosevelt's rural retreat, Val-Kill (now Eleanor Roosevelt National Historic Site), in Hyde Park, New York, a line of red pines was an effective screen between the drive and the stone cottage during the 1950s. As the pines matured, the lower limbs were lost with a resulting loss of screening. To regain the function of the pine hedge as a landscape feature, the trees were removed and replaced in-kind. A decision was made that the significance of the red pines as a hedge in the landscape was more important than the fact that they were original plantings from the time when Mrs. Roosevelt lived on the property. Similarly, in vernacular landscapes, such as an agricultural district, perpetuation of a particular crop may not be as important as the retention of the overall landscape patterns.

## Treatment

The treatment section in a CLR either states the primary treatment (if already known through park planning), proposes a primary treatment (preservation, rehabilitation, restoration, or reconstruction), or proposes treatment alternatives for a cultural landscape. Landscape character areas and management zones may also be discussed in the treatment section of a CLR.

Determining the primary treatment (the goal for the overall appearance of the landscape) for a cultural landscape is influenced by the following:

- integrity and condition of the biotic and abiotic features
- management objectives for the park
- type of cultural landscape and significance
- contemporary use of the landscape

Treatment is guided by policy, guidelines, and standards contained within *NPS Management Policies*, *Cultural Resource Management Guideline*, and *The Secretary of the Interior Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. These documents identify four treatments for cultural landscapes: preservation, rehabilitation, restoration, and reconstruction.

Plant features are addressed in relation to the primary treatment for a cultural landscape, along with designated character areas or management zones. For example, the CLR for the Van Buren National Historic Site in New York proposes restoration as the primary treatment, and treatment recommendations include replanting the fruit orchards that existed during Van Buren's occupation. The CLR for the Frederick Law Olmsted Site in Brookline, Massachusetts proposes restoration of the landscape to its appearance circa 1930 to illustrate the landscape designed and developed by Frederick Law Olmsted, Sr. and perpetuated by his sons, John Charles and Frederick Law Olmsted, Jr. As a result, the CLR prescribes removing over 200 nonhistoric trees and shrubs and introducing over 800 trees, shrubs, and vines based on the character of the landscape in circa 1930. (See Figure 9.)

All treatments for a cultural landscape are represented by a sequence of activities given in order of increasing physical intervention: protect and maintain, repair, replace, design for missing features, and design compatible alterations and



*Figure 9. Photographs showing before and after the clearing of recolonizing vegetation. This activity was part of a restoration treatment plan. Frederick Law Olmsted National Historic Site. (NPS, 1994)*

additions. The sequence first establishes that significant features, such as plant features, are preserved by regular maintenance and by protecting them from adverse influences. The sequence promotes repairing before replacing deteriorated features, requires substantiated design for replacing missing features, and asserts that alterations and additions be compatible with the historic character of the landscape. The frequency with which various activities occur varies with a given treatment. For example, the majority of activities in preservation involve protection, maintenance, and repair, while restoration involves more replacement and design for missing features.

## SPECIAL CONSIDERATIONS FOR TREATMENT ACTIVITIES

Treatment activities applied to plant features may be restricted, modified, or influenced by:

- protection and maintenance
- repairs and replacement

### Protection and Maintenance

The protection and maintenance of significant plant features, including their form and scale in a landscape, is a high priority in all treatments. Good horticultural practices can enhance the longevity of significant plant material. Although genetics is a major factor in determining plant longevity, external factors can also play a role. For example, erecting barriers, staking, tying, and cabling plants are protective measures that can be performed. Maintenance is performed

by irrigating, fertilizing, pruning, dividing, transplanting, mowing, and performing integrated pest management. Such activities create a favorable growing environment and promote the health of plants, but they may also be designed to achieve particular visual effects.

With an aggregation of plants, each individual plant is equally protected and maintained to achieve a uniform effect. The protection and maintenance of plants must integrate a knowledge of the cultivation requirements of individual plant species with an understanding of the primary landscape. For example, the optimal growth and reproductive potential of a plant may be compromised to achieve a visual appearance that accurately conveys the landscape's significance. Protection and maintenance regimes may be modified to achieve a particular effect (for instance, infrequent or high grass mowing to resemble the appearance of meadow-like sod that existed before the advent of lawnmowers).

Contemporary environmental legislation may restrict the protection and maintenance of plants associated with the significance of a cultural landscape. Many old cultivars or varieties of agricultural crops are prohibited by federal or state law to prevent new epidemics of pests and diseases and conserve soil fertility. For example, each year at the Shiloh National Military Park in Tennessee, a representative portion of land is planted in cotton to reflect the appearance of the land at the time of the Civil War battle. To guard against loss of soil fertility, state law requires that the cotton crop be rotated to a different area each year.

Contemporary standards of environmental quality also affect land management practices. These standards may influence the protection and maintenance of certain plant species or affect current practices that eradicate others. New technologies, such as geotextiles and biological pest controls, should be integrated wherever possible into the protection and maintenance of plant features.

## Repair and Replacement

The repair of plant features may involve remedial or rejuvenative pruning, cabling, or grafting to remove infection or decay, provide physical support, and promote healing or the regeneration of new tissue. Plant features must be closely monitored to determine the vitality of plants and identify agents that may cause their decline. Replacement typically occurs when repair is no longer possible. Loss of vitality due to age, pest and disease infestation, mechanical damage, natural disasters, or environmental modification may negate attempts at repair and necessitate replacement.

Replacing plant features involves removing a declining plant in a particular location and replanting it with another plant. (See Figures 10 and 11.) The replacement plant may be genetically identical to the former plant, taxonomically the same, or be a substitute cultivar, variety, species, or genus for the former plant. The desired degree of authenticity of the replacement plant is a decision influenced by various factors, but it is primarily based on the association of the plant with the landscape's significance.

When repair and replacement is applied to an aggregation of plants, it may involve just one individual of the group (removing and replanting one dying individual) or the entire group (removing and replanting every plant). The decision to remove and replant one or all individuals of an aggregation of plants must consider two factors:

- whether the feature still conveys its association with the significance of the landscape in its current state
- the vitality, longevity, growth rate, and size of the plant to be replanted

The questions to be answered are what is the condition and anticipated life span of the remaining plants of the feature, and what will be the visual effect of incremental replacement in terms of conveying the historic character of the landscape?

For example, at Saint-Gaudens National Historic Site in Cornish, New Hampshire, the home and studio of the nineteenth century sculptor, Augustus Saint-Gaudens, a significant aggregation of plants is the more than one mile of hedges that divide the landscape into intimate garden rooms. Historically, the hedge was primarily white pine transplanted from the surrounding fields. Park maintenance staff has developed a replacement strategy that integrates new material into the existing hedge. In contrast, if the individual elements of the hedge were deteriorated, missing, or out of scale with the original intent, so that the historic feature as a whole was no longer discernible, the entire hedge would be replaced.



Figure 10. Boxwood around these ponds did not thrive in the climatic conditions and was therefore replaced with Japanese Holly. Naumkeag in Stockbridge, Massachusetts. (Photograph courtesy of the Trustees of Reservations, n.d.)

### *In-Kind Replacement*

The in-kind replacement of plant features in a cultural landscape involves replanting with the same cultivar, variety, or species as the former plant. The degree of authenticity selected for the replacement plant should consider the particular association of the former plant with the significance of the landscape and the primary treatment for the landscape. Individual plants and aggregations of plants directly associated with the significance of a landscape may require the highest level of genetic authenticity in their replacement.

For example, at Adams National Historic Site, the genetic identity of the fruit trees (their particular varieties) is of great importance in associating them with the landscape's significance (the acquisition and development of the property by John and Abigail Adams). The fruit tree replacement at the Adams' property therefore requires the highest level of authenticity. Replac-



Figure 11. Japanese Holly being planted as a functional replacement for Boxwood. Naumkeag in Stockbridge, Massachusetts. (Photograph courtesy of the Trustees of Reservations, n.d.)

ing one dying tree in a woodland of a designed landscape would not require the highest level of genetic authenticity because each tree is indirectly associated with the significance of the landscape. In this case the exact genetic replacement of the dying tree is not as important as the protection, cyclical maintenance, repair, and replacement of the entire woodland. A dying tree may be felled and left as a nurse log, allowing natural regeneration to take place. A replacement tree could be the same species as the former tree or another species of the woodland, according to the management regimes established for the entire woodland. Woodland managers may insist that the replacement tree has the same provenance as the former tree (originating from seed of the same localized region in the United States), but woodland managers would generally discourage attempts to clone the former tree, as genetic diversity contributes to the vitality of such plant communities as woodlands.

The need to clone a plant in decline may be due to the lack of availability of a replacement plant through other sources. Some plants of cultural landscapes are no longer commercially available, either because they are no longer fashionable (extinct as a result of lack of propagation), or they are difficult to find as "unimproved" (nonhybridized) straight species or varieties. Some plants can be found in other cultural landscapes where they have been accurately identified and maintained. But when a source cannot be found for a plant in decline, vegetative propagation guarantees the accurate identity of the replacement plant and the prevention of extinction of the cultivar, variety, or species. If old-fashioned cultivars, straight varieties of exotic plants, or other unusual forms of plants exist, it is useful to check on plant availability before the onset of mortality so that a viable propagule can be made. When genetic authenticity is important, the spectrum for the genetic authenticity of replacements should be considered when planning a replacement.

Plants can be asexually propagated by cuttings, by grafting onto another plant, or sexually propagated by seed, with genetic authenticity decreasing, respectively. Nursery stock has no direct genetic association with the original plant to be replaced; the greatest level of authenticity of nursery stock is another individual of the same variety or species. Note: cultivars must be asexually propagated. All members of a cultivar (or a man-made cultivated variety) are genetically identical.

### *Substitutions*

In-kind replacement of the original species or variety may not be possible because of changes in the site's growing conditions, disease and insect problems, or simply because the original is no longer available. In these cases, substitution of plant material may be necessary. This may be the appropriate action when plants negatively impact the habitat of a rare and endangered species or a diseased plant cannot be replaced

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## GENETIC AUTHENTICITY OF PLANT REPLACEMENTS

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The following list, prepared by the Olmsted Center for Landscape Preservation, illustrates the spectrum of genetic authenticity associated with the following types of plant propagation.

### **Highest Level of Genetic Authenticity**

#### CLONAL

- Shoot Cuttings
- Root Cuttings

### **Intermediate Level of Genetic Authenticity**

#### SUBCLONAL GRAFTING

- Cloned Rootstock x Cloned Scion
- Cloned Rootstock or Scion x Seedling Rootstock or Scion
- Seedling Rootstock x Seedling Scion

#### SEEDLINGS

- Manually Pollinated, Seed Collected from Original Plant
- Naturally Pollinated, Seed Collected from Original Plant
- Naturally Pollinated, Seed Collected from Same Plant on Site

### **Lowest Level of Genetic Authenticity**

#### NONCLONAL NURSERY STOCK

- Substitution of Cultivar or Variety
  - Substitution of Species
  - Substitution of Genus
-

with the same plant. For example, Anthracnose disease precludes the replanting of the dogwoods *Cornus florida* or *Cornus nuttalli* with these species, and Dutch Elm disease precludes the replanting of American Elm, *Ulmus americana* with the same species, though the Liberty Bell or Princeton cultivars are disease-resistant substitutes.

In decisions on substitution, care should be given to match the visual, functional, and horticultural characteristics of the historic plant material. A substitute plant should be compatible with the role of the former plant in its association with the significance of the landscape. The importance of the former plant's genetic identity, aesthetic or functional historic role, physical form, texture, color, size, and longevity should be considered in selecting the substitute plant. These attributes may include the form, shape, and texture of the original, as well as its seasonal varieties, such as the bloom time and color, fruit, and fall foliage. When substitutions are made, it should be recorded to allow future generations to distinguish between historic plants and later alterations and additions to the landscape.

Ideally, plant features should be protected, maintained, repaired, and replaced (in-kind or with substitutions) to accurately preserve the historic character of a cultural landscape. However, under some circumstances, plants that are removed are not replaced. For example, if a plant feature threatens the perpetuation of an endangered species, it may not be preserved or replaced. In addition, when the growth of a plant feature is undermining the structural integrity of another cultural resource,

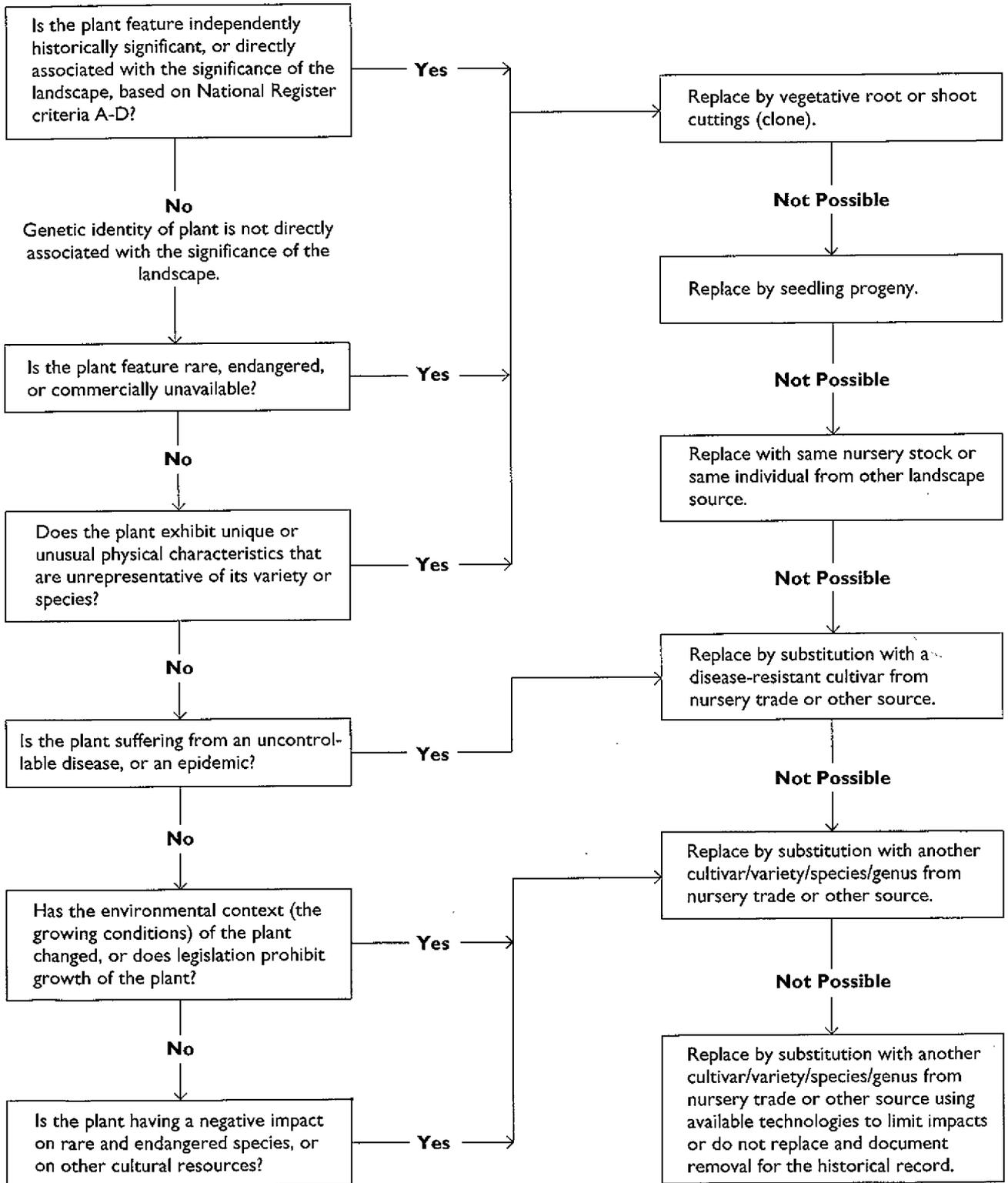
such as the facade of a building or a buried archeological resource, the plant may be removed before its decline and not replaced. However, prior to the removal of such plant features, the available technologies, such as root barriers and support systems in replanting attempts, as well as the plant's association with the significance of the landscape should be considered.

### **Management Considerations**

Beyond the implementation of a treatment plan, all treatment activities eventually focus on protection, maintenance, repair, and replacement. Preserving the landscape characteristics and associated features is the focus of landscape management. The changing appearance of the landscape must be anticipated through planning and managed within well defined parameters that best support the significance of the landscape.

When protection and maintenance are regularly practiced, the requirement for repair is infrequent and the cyclical need for replacement can be anticipated. Maintaining accurate plant records is useful for management. These records may include information on the anticipated longevity of a plant feature, current condition, protection and maintenance regimes, and records of repair and replacement interventions. A record of the anticipated replacement strategy can be included for each plant feature to expedite the replacement process when replacement is necessary. A replacement strategy is particularly important for plant features that will be propagated, because

## DECISION PROCESS FOR REPLACEMENT OF PLANT FEATURES



cuttings or grafts must be taken from live, healthy tissue, and special growing facilities may need to be used. Herbarium specimens of plant features, particularly those to be replaced, are excellent archival records.

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



**U.S. Department of the Interior**  
**National Park Service**  
**Cultural Resources**

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**Park Historic Structures & Cultural Landscapes**

## Accessibility

### INTRODUCTION

Since the Civil Rights Act of 1964, disability rights legislation and increasing public awareness about the rights of people with disabilities have produced various pieces of legislation, the most extensive of which is the Americans with Disabilities Act, Public Law 101-336. Passed in January 1990, the law identifies equal access as a civil right and prohibits discrimination on the basis of disability in both privately and publicly owned accommodations. Public accommodations include services, programs, activities, goods, and commercial establishments, such as restaurants, hotels, theaters, hospitals, museums, and parks.

The executive branch of the federal government is not bound to the provisions of the Americans with Disabilities Act. Executive agencies and recipients of federal funding are required to comply with the accessibility provisions contained in two pieces of earlier legislation:

- Architectural Barriers Act (1968)
- Section 504 of the Rehabilitation Act (1973)

### ACCESSIBILITY REQUIREMENTS

Both the Architectural Barriers Act and Section 504 of the Rehabilitation Act contain standards and guidelines that identify the conditions necessitating accessibility requirements and give technical specifications for new construction, alterations, and additions. For both Acts, the minimum standards of accessibility for federal buildings and facilities is defined by the *Uniform Federal Accessibility Standards* (UFAS), published in 1984 by the Architectural and Transportation Barriers Compliance Board.

For nonfederal public accommodations, minimum accessibility requirements are outlined in the *Americans with Disabilities Act Accessibility Guidelines (ADAAG)*. The ADAAG was published in 1991 by the Architectural and Transportation Barriers Compliance Board.

The UFAS and ADAAG have common technical requirements. The general technical requirements for ADAAG (titled "Accessible Elements and Spaces") are the same as the UFAS technical requirements. Both require that the design of new construction be accessible; however, they differ slightly in their scoping requirements for existing facilities. ADAAG has many new technical requirements for various types of public accommodations, including restaurants and cafeterias, medical care facilities, business and mercantile, libraries, transient lodging, and transportation facilities. Both UFAS and ADAAG have special rules for historic preservation, which are discussed in this text.

The technical requirements common to both UFAS and ADAAG are actually derived from accessibility standards first developed in 1961 by the American National Standards Institute (ANSI). The ANSI standards have been modified very little over the past 30 years despite medical and technology advancements and increased awareness about the needs and life expectations of people with disabilities.

The federal government intends to revise the UFAS to be at least equivalent to the ADAAG in its technical and scoping requirements. In a June

30, 1993 memorandum, the Department of Justice requested that until the UFAS are revised, the executive agencies use the higher standards of the ADAAG whenever the guidelines result in more universal access. Currently, both the UFAS and the ADAAG are being reviewed by the Architectural and Transportation Barriers Compliance Board for possible revisions to their respective technical requirements. This review is being conducted in conjunction with the Civil Rights Division of the Department of Justice and the four standard-setting agencies under the Architectural Barriers Act: General Services Administration, the United States Postal Service, the Department of Housing and Urban Development, and the Department of Defense.

## UNIVERSAL DESIGN

Universal design is based on the premise that a facility or product should be usable by anyone. Despite advancements toward universal accessibility, the disability community and universal design advocates have criticized the use of accessibility guidelines. Critics maintain that the use of minimum construction specifications does not promote a greater understanding about the needs of people with disabilities, or contribute to removing attitudinal barriers.

Critics believe that for designed environments, attitudinal barriers are more persistent than architectural ones, and the way to remove the attitudinal barriers is to increase awareness about the many distinctive needs of users. Critics assert that in practice, minimum design standards



Figure 1. View of the original office walkway and location of a proposed accessibility project to create universal access. Frederick Law Olmsted National Historic Site. (NPS, 1995)

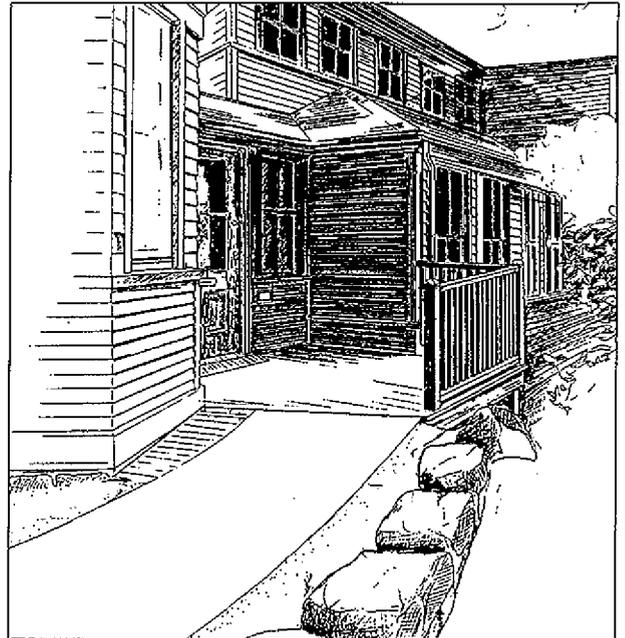


Figure 2. A sketch of the proposed universal access design, which raises the elevation of the historic entrance porch to meet the threshold, and includes a new walkway with an accessible gradient. Frederick Law Olmsted National Historic Site. (NPS, 1995)

become maximum standards, and compliance with minimum standards is viewed as the goal rather than the means to achieving universal or equal access.

Universal design advocates believe strict adherence to accessibility guidelines may result in a design solution that does not create equal access. They distinguish accessibility from universal and equal access, noting that separate provisions for one group of users may ignore the needs of another group with different disabilities. They emphasize education about the concept of “fitness for use by anyone” as the basis for the environmental design process. (See Figures 1, 2, and 3.)

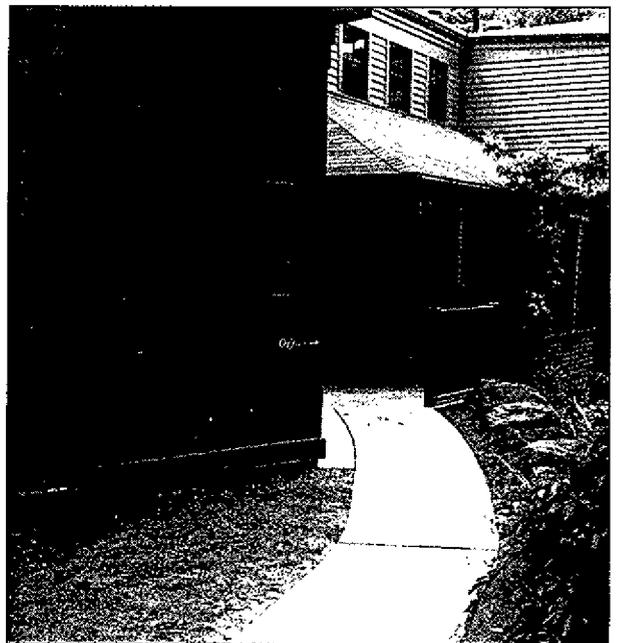


Figure 3. Office walkway following implementation of the accessibility project. The historic stone edge condition of the original walkway was salvaged and relaid to match the gradient of the new walkway. Frederick Law Olmsted National Historic Site. (NPS, 1997)

## THE EQUAL FACILITATION CLAUSE

A fundamental difference between the UFAS and ADAAG in guiding the creation of universally accessible environments is that the ADAAG has an extra clause within the general provisions, titled "Equivalent Facilitation" (ADAAG 2.2). The clause states:

*Departures from the particular technical and scoping requirements of this guideline by the use of other designs and technologies are permitted where the alternative designs and technologies used will provide substantially equivalent or greater access to and usability of the facility.*

The ADAAG allows designers to depart from the specifications. For designers to take advantage of this creative opportunity, they should understand the needs of people with disabilities and the reasons underlying the existing guidelines. For example, the reason for requiring handrails along both sides of a ramp or set of steps is that people with different capabilities on either side of their bodies (such as people who have suffered strokes) can use the handrail matching their physical abilities.

Universal design advocates are critical of the prevalence of eight percent gradient ramps with handrails (permitted by UFAS and ADAAG guidelines), because an eight percent gradient is too steep for many people with limited mobility and handrails are unusable by many people with disabilities. They encourage the use of the ADAAG's Equivalent Facilitation clause because it has more potential to change attitudes and improve the usability of designed environments.

## ACCESSIBILITY IN CULTURAL LANDSCAPES

Historically, the needs of people with disabilities have not been considered in the design and construction of places. As a result, many historic properties have features that are obstacles to equal access. Unfortunately, equal access and historic preservation have often been portrayed as anti-thetical, technically infeasible, and even impossible. But designing equal access to historic properties, including cultural landscapes, does not have to preclude the preservation of significant resources.

Historic preservation exists to allow experiential access to historic properties that are considered culturally valuable or significant. In this context, the goal of equal access is to create equal access to the experience as well as improve physical accessibility. (See Figure 4.) To create equal access to the opportunity to experience the significance of a cultural landscape, the goal of accessibility needs to be united with the goal of preservation. The loss of integrity resulting from the implementation of an accessibility project represents a compromise to the goals of both equal access and preservation.

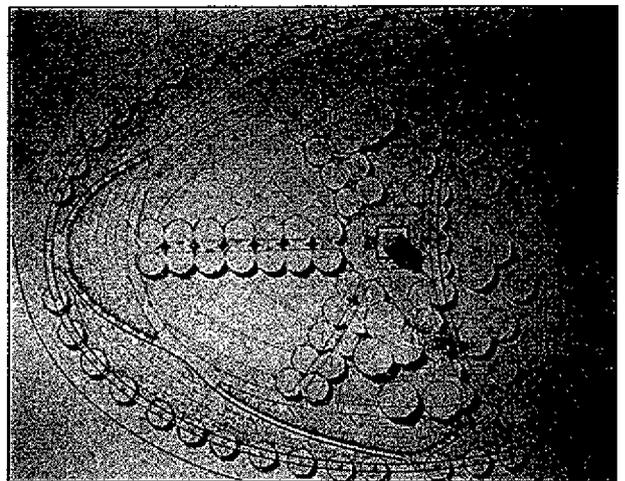
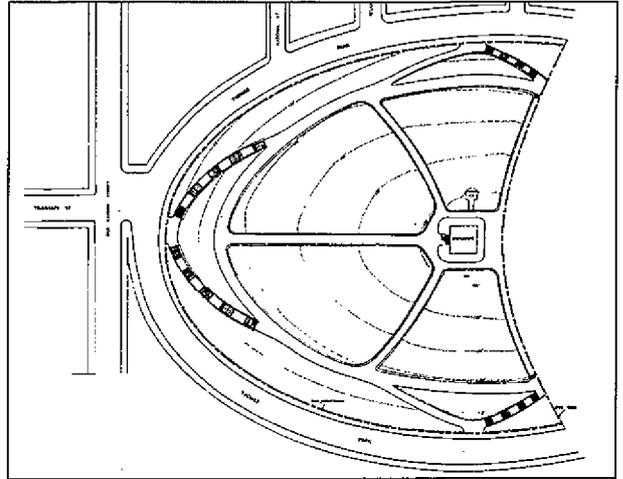
Equal access to the experience of a cultural landscape is achieved when the significance is conveyed through the physical integrity of landscape characteristics and associated features and when the experience is equally available to all visitors or users. As defined by the National Register of Historic Places, integrity relates to the presence of physical features that have existed since a period of significance and that contribute to and convey the significance of a

historic property. Therefore, the design of accessibility projects in a cultural landscape should retain the extant landscape characteristics and associated features that contribute to and convey the significance of the landscape. New features that are added to provide equal access should be designed in a manner that is compatible with the character of the landscape. The goal is to provide the highest level of access with the lowest level of impact on the integrity of the landscape. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix I: Treatment Policy, Guidelines, and Standards.")

Accessibility in a cultural landscape is part of the preservation planning process. Currently, under UFAS scoping requirements, only existing facilities undergoing substantial alteration (all alterations in one year amounting to 50 percent or more of the property value) trigger requirements for accessibility. Under ADAAG scoping requirements, any alterations to an existing element, feature, space, or area, triggers new construction standards for accessibility. Until the UFAS has been revised to the greater scoping requirement of ADAAG, the Department of Justice and the Architectural and Transportation Barriers Compliance Board encourage the executive agencies to use the greater scoping requirement of ADAAG for alterations.

## ACCESSIBILITY PLANNING

The planning and design of accessibility projects is a multidisciplinary activity involving the expertise of preservation professionals, accessibility specialists, and individuals with disabilities and their organizations. Accessibility coordinators, usually



*Figure 4. Before (top) and after (bottom) existing conditions plans of Dorchester Heights, the site of an accessibility project in 1995. The accessibility project occurred as part of a rehabilitation treatment plan. It involved "stretching" the pattern of the historic circulation plan (the central walk and the north and south ramps were elongated), to achieve a more shallow, accessible route up to the Dorchester Heights Monument. Boston Historical Park. (NPS, 1994)*

located in the National Park Service (NPS) support offices, should be invited to participate in the planning process.

Accessibility planning and design requires a clear understanding of a cultural landscape's significance and how it is conveyed through its extant landscape characteristics and associated features.

Equal access must be defined for each particular cultural landscape based on a variety of factors, including significance, landscape characteristics and associated features, integrity, treatment, and contemporary use of the landscape. These factors influence how a landscape's significance is presented to visitors, and, therefore, affect the extent and location of modifications required to provide access and the physical appearance of access designs.

If a cultural landscape is eligible for listing or is listed in the National Register of Historic Places, and the access project is a federal undertaking, the planning and design stages of an accessibility project involve the review process cited in Section 106 of the National Historic Preservation Act. The NPS initiates consultation with the State Historic Preservation Office to develop a Memorandum of Agreement on the planning and design of access modifications. As a result, the Memorandum of Agreement outlines actions that are agreed upon and it is submitted to the Advisory Council for Historic Preservation for comment. The same review procedure is followed when the less comprehensive scoping requirements of UFAS and ADAAG are used to plan and design access modifications.

Both UFAS and ADAAG have special rules for historic preservation that reduce scoping requirements for particularly challenging circumstances. The rules apply to situations in which creating equal access would destroy the integrity of a historic property because its significance is wholly conveyed by the exact location, original materials, original workmanship, or original

design of a feature or features. The special rules add flexibility to the process of creating access changes that retain the integrity of a historic property and therefore allow the significance to be conveyed and experienced. If using the general scoping requirements for accessibility would destroy the integrity of a cultural landscape, the special rules of UFAS and ADAAG are permitted. The circumstances in which to apply the special rules for historic preservation of UFAS (4.1.7 (2)), and ADAAG (4.1.7 (3)) are relatively rare and only apply to a small number of historic properties.

Listed below are the special rules for historic preservation, which are written to apply most directly to historic buildings.

- Allow only one accessible route from one site access point (such as a parking lot) to an accessible entrance.
- The accessible entrance may be different to the one used by the general public (though it cannot be locked and ADAAG requires directional signage to the accessible entrance).
- A ramp steeper than is ordinarily permitted may be used in space limitations (a gradient of 16.6 percent (1:6) for a maximum run of two feet).
- Only one accessible restroom is required and it may be unisex.
- Accessible routes are only required at the elevation of the entrance.
- Interpretive materials should be located where they can be seen by seated persons.

ADAAG also has an exception rule for historic preservation (ADAAG 4.1.7 (1)), which states that if the integrity of a historic property could be destroyed by following the special rules, scoping requirements are reduced even further. The exception permits use of alternative methods to make services and programs available (that is, to create the opportunity to experience the significance of a property). Alternative methods include the use of interpretation (such as audio visual materials), using facilitators to assist individuals with disabilities, and adopting other innovative methods such as those invited by the Equivalent Facilitation clause of ADAAG. UFAS has no exception rule for historic preservation.

## SOURCES OF FURTHER INFORMATION

The Uniform Federal Accessibility Standards and information can be obtained from:

**Architectural and Transportation  
Barriers Compliance Board**  
1111 18th Street, NW, Suite 501  
Washington, DC 20036  
1-800-USA-ABLE

The Americans with Disabilities Act Accessibility Guidelines and information can be obtained from:

**Office of the Americans with  
Disabilities Act—Civil Rights Division**  
**U.S. Department of Justice**  
P.O. Box 66118  
Washington, DC 20035-6118  
202-514-0301

For NPS accessibility enquiries contact:

**Accessibility Program Coordinator**  
**Parks Facility Management Division**  
**National Park Service**  
P.O. Box 37127, Suite 580  
Washington, DC 20013-7127  
202-343-3674

## TECHNICAL AND SCOPING ACCESSIBILITY REQUIREMENTS FOR ELEMENTS AND SPACES

Following is a partial list of ADAAG and UFAS "Technical Requirements for Accessible Elements and Spaces," which are most pertinent to access projects in cultural landscapes. For the full list of technical and scoping requirements, refer to the UFAS or ADAAG.

### Accessible Route Minimum Specifications

- Width = 36 inches
- Passing zone = 60 inches wide occurring at 200-foot intervals
- Wheelchair 180-degree turning zone = 60 inches x 60 inches
- Gradient = 5 percent (1:20)
- A gradient greater than 5 percent shall be called a ramp
- Cross pitches (cross slopes) = 2 percent (1:50) or less
- Abrupt level changes are no greater than 0.5 inch in height

- 0.25-inch level change is permitted without a beveled edge
- 0.5-inch level change must have a beveled edge
- Surfaces must be of stable, firm, slip resistant material

## Accessible Parking

- Space = 96 inches wide
- Access aisle is considered to be part of an accessible route
- Spaces and aisles have a 2 percent (1: 50) maximum gradient in any direction
- Passenger loading zone (access aisle) = 60 inches wide x 20 feet long, adjacent and parallel to the vehicle pull-up space

## Curb Ramps

- Must be located wherever an accessible route crosses a curb
- 5 percent (1: 20) gradient or less, unless space is limited, then a gradient between 8 percent (1: 12) and 10 percent (1: 10) is permitted for a rise of 6 inches
- Must have flared sides if they are located where pedestrians must walk across the ramp or are not protected by handrails or guardrails
- Maximum gradient of curb ramp flared sides = 10 percent
- Must have returned curbs where pedestrians do not walk across the ramp

- Built-up curb ramps must be located where they do not project out into vehicular traffic lanes
- Must have a detectable warning of raised, truncated domes or contrasting color that extends the full width and depth of the curb ramp
- Must be located where they will not be obstructed by parked vehicles
- Diagonal curb ramps (corner ramps) must have at least a 48-inch width clear space at the bottom of the ramp
- Where a sidewalk landing beyond a curb ramp is less than 48 inches deep, the curb ramp gradient must not exceed 8 percent (1: 12)

## Ramps

- Must be at least 36 inches wide
- Gradient greater than 5 percent (1: 20) and a maximum of 8 percent (1: 12)
- Maximum rise on any run = 30 inches in height
- In space limitations, a ramp gradient no greater than 16.6 percent (1: 6) may be used for a horizontal run of 2 feet
- In space limitations, a ramp gradient between 8 percent (1: 12) and 10 percent (1: 10) may be used for a maximum vertical rise of 6 inches
- An 8 percent (1: 12) gradient and a rise greater than 6 inches, or a horizontal run greater than 72 inches, must have handrails on both sides of the ramp

- Surface must be stable, firm, and nonslip
- Ramps and landings with dropoffs on either side must have curbs at least 2 inches high
- Must be well draining to prevent the accumulation of rainwater
- Cross pitch (cross slope) must be no greater than 2 percent (1: 50) gradient

### Landings

- Must be located at every 30-inch vertical rise in a ramp
- Dimensions of landing = 36 inches wide x 60 inches deep at the top and bottom of a ramp run
- Dimensions of landing = 60 inches wide x 60 inches deep at a ramp dogleg
- Drop-offs must have curbs with a minimum height of 2 inches
- Height of door thresholds = 0.5-inch high or less, with a beveled 50 percent (1: 2) edge
- Width of clear landing on latch side of door = 24 inches wide

### Handrails

- Not required on curb ramps
- Required on either side of 8 percent (1: 12) gradient ramps with a 6-inch rise or greater, or a 72-inch horizontal run, and on either side of stairs
- Must be continuous on the inner side of a dogleg ramp or dogleg stairs
- Must continue at least 12 inches beyond the top and bottom of a ramp and be parallel to the ground plane

- Must continue at least 12 inches beyond the top riser of stairs parallel to the ground plane, and continue to slope for a distance of one tread width from the bottom stair riser and become parallel to the ground plane for an additional distance of 12 inches
- Distance from mounting wall = 1.5 inches wide
- Gripping surface must be uninterrupted
- Diameter or width of gripping surface of handrail or grab bar must be 1.25 - 1.5 inches, or the shape must provide an equivalent gripping surface UFAS 4.26.2.
- Top of gripping surface = 34 - 38 inches in height above the ramp or stair tread surface
- Terminal ends of handrails must be rounded off or returned smoothly to the ground, wall or post.

### Stairs

- Must have uniform tread widths and riser heights
- Width of treads must be no less than 11 inches high
- Open risers are not permitted
- Nosings must project no more than 1.5 inches
- Nosing undersides must be angled at no greater than 60 degrees from the horizontal
- Handrails must be located on either side of stairs
- Inside handrail at stair dogleg must be continuous
- Handrails must extend 12 inches beyond the top riser, and at least one tread width and an additional 12 inches beyond the bottom riser

- Handrails at the top of stairs must be parallel to the ground plane, and at the bottom of stairs, handrails must continue to slope for a distance of one tread from the bottom riser and for an additional 12 inches be parallel to the ground plane
- Handrail gripping surface must be uninterrupted and be located 34 - 38 inches above the stair treads
- Terminal ends of handrails must be rounded or returned smoothly to the ground, wall, or post
- Stairs must be well draining to prevent the accumulation of rainwater

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The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



**U.S. Department of the Interior**  
**National Park Service**  
**Cultural Resources**

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**Park Historic Structures & Cultural Landscapes**

## Cataloging, Printing, and Distribution

### INTRODUCTION

The guidelines in this text describe how to prepare a camera-ready copy of a Cultural Landscape Report (CLR) for printing and how to catalog and distribute the report.

There is considerable variety in the layout, style, and graphic conventions used in producing the camera-ready document (the final document ready to be printed). However, the steps leading to publication are standardized across the National Park Service (NPS).

A strongly recommended first step is to have the document edited. Especially when a CLR involves more than one author, an editor can improve the document by making the writing style consistent from section to section. Following editing, the document can be desktop published, which involves designing the page layout, integrating the text and graphics, and formatting the document. Both the editorial and formatting conventions should be based on the most recent edition of the *Chicago Manual of Style*.

Desktop publishing is accomplished using a computer software application. Many contractors (editors and desktop publishers) and printers offer desktop publishing services. They can integrate the text and some, if not all, of the graphics into electronic files. (Some graphics may have to be manually pasted into the camera-ready printout.) When the CLR is camera-ready, the finished typographic format of the document is defined in the project agreement or through subsequent negotiation. If a CLR is to have the same format as an existing document (if it is part of a series of documents, for example), a sample may be provided for the preparer.

Each NPS Region or Support office has a printing coordinator who serves as a liaison between the NPS and the United States Government Printing Office (GPO). The GPO has branches throughout the United States and each Region may have access to more than one GPO within the larger cities of the Region. According to a 1994 memorandum, all NPS printing contracts must currently be tendered through the GPO. In some NPS Regions, the GPO negotiates limited term contracts with local printing contractors for miscellaneous printing services, which may result in lower printing costs. The Form 2511 is used for miscellaneous printing term contracts. Check with a printing coordinator for more information on how to arrange a printing term contract. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix L: Government Printing Office Forms.")

The procedure for printing and distributing a document through the GPO requires preparation of several forms, some of which are filled out by the contracting agency (NPS) and some by the printing coordinator. The printing coordinator communicates with and forwards the completed forms to the GPO. The printing coordinator may also send the camera-ready copy and mock-ups to the GPO.

## THE CAMERA-READY COPY

The camera-ready copy is the completed, edited, and formatted document that is ready to be delivered to the printer. The camera-ready copy may or may not contain all of the graphics. Graphics that are not computer-generated (such as photographs) may need to be processed as halftones by the printer and pasted into the camera-ready printout.

In the camera-ready copy, space must be set aside for each graphic. To indicate the location of images, boxes may be drawn with a nonphoto blue pencil or a black hairline. Inside the space designated for graphics, the figure number and caption, any required percent enlargement or reduction, and location should be noted. Instructions to the printer should include the location and size of graphic images in the document.

The camera-ready printout has single-sided pages with a blank separation page inserted wherever the subsequent page has a blank second side. In all cases, no additional changes to the text are anticipated and the document has a title and cataloging information assigned to it, which includes a Library of Congress catalog card number.

## GRAPHIC IMAGES

Copies of black and white line art, which have been sized to fit the allocated space in the document, may be directly pasted into the camera-ready printout. Alternatively, black and white line art may be digitally scanned in and positioned within the document. Other types of graphics, such as color line art, grayscale images (with color or shaded areas), and photographs are usually photographed as a halftone by the printer and presented separately from the camera-ready document. Each graphic to be half-toned is notated with the figure number and page on which it will be located. If an enlargement or reduction of the original photograph is required to fit the allocated space, the percent reduction or enlargement should also appear on the note.

It is useful to compile a figure specification sheet, which lists each figure, whether it is to be pasted in or incorporated, and any instructions, such as the percent reduction or enlargement, or extent of cropping. The printer photographs each graphic to be incorporated as a halftone and may manipulate light and darkness to some extent. Contractors with scanning capabilities may directly incorporate scanned, halftone images of the desired size into the camera-ready document, eliminating the need for drawing boxes and leaving spaces in the body of the document.

The GPO requires copyright permission for any copyrighted materials (photographs, maps, charts, and drawings) that are to be reproduced in the CLR. The GPO may also require reprint permission for materials from private sources that are to be reproduced.

## **MOCK-UPS**

A document mock-up indicates how folded inserts, illustrations, pocket inserts or other special details should be handled. A mock-up is created by photocopying a camera-ready copy, and then pasting in photocopied images at the correct size and placement. Any cropping of graphic originals can be indicated in the mock-up. The mockup serves as a template to guide the printer. It should be submitted at the time of printing along with the original camera-ready document and all the artwork.

## **CATALOGING USING THE LIBRARY OF CONGRESS PROCEDURE**

A CLR can be cataloged with the Library of Congress' Cataloging in Publication (CIP) or the Preassigned Card Number (PCN) programs. The two programs are mutually exclusive. Each has its own requirements and a publication can be cataloged using only one program. Both CIP and PCN are concerned only with books, and for the purposes of cataloging with the Library of Congress, a CLR is considered to be a book.

CIP is the preferred program for CLRs because it provides more cataloging information about the document. To apply for CIP, the CLR text must be complete (if not camera-ready). Allow six weeks for obtaining CIP information prior to the anticipated printing date. When received, the CIP information can be typed in directly or pasted onto the back side of the front cover or title page (the copyright page) before printing.

Once a catalog card number has been assigned by the Library of Congress, the title of a CLR cannot be changed. Participation in either CIP or PCN requires the anticipated publishing date and number of pages. Cataloging is an opportunity to organize and name the publication according to a series to emphasize a relationship to existing documents. For example, a series might include "Cultural Landscape Publication No. 1, 2, or 3" in the title or subtitle, or indicate "Volume 1, 2, or 3," etc.

The advantage of CIP is that more information is included on the copyright page of the book. Although the PCN program provides only a catalog card number, it should be considered in

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## CATALOGING PROGRAMS

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The Library of Congress Cataloging in Publication Division offers two cataloging programs: the Cataloging in Publication (CIP) program and the Preassigned Card Number (PCN) program. At a minimum, a CLR needs to be cataloged using the PCN program, but CIP provides additional cataloging information that make it the preferred program to use.

While both programs assign a Library of Congress catalog card number to a CLR, CIP provides a description of a CLR's contents. The description is an additional aid to researchers, enhancing access and retrieval of the document. The Library of Congress catalog card number is a bibliographic control number that facilitates retrieval of the CLR from any library.

### Cataloging in Publication (CIP) Program

The CIP program provides a CLR with a Library of Congress catalog card number, a description of contents, and other publication data to be printed in the book on the copyright page. CIP requires an application form (referred to as the data sheet) and a copy of the complete galley (preferably camera-ready copy or quality draft).

CIP requires ten working days once the application is received by the Library of Congress. The criteria for eligibility to receive CIP data include the likelihood that the publication will be widely acquired by the nation's libraries. CIP also requires that a complimentary "best copy" (most durable copy) of the document is sent to the Library of Congress after publishing.

To apply for CIP, call the CIP data liaison for the NPS at the Library of Congress 202-707-1630, or write to:

The Library of Congress • Cataloging and Publication Division • Washington, DC 20540-4320

### Preassigned Card Number (PCN) Program

The PCN program provides a Library of Congress catalog card number to be printed in the copyright page of the CLR. PCN requires an application form and a copy of the document's title page, and it requires five working days once the application is received by the Library of Congress.

The criteria for selection by the Library of Congress to receive a PCN include the likelihood that the publication will be selected by the Library of Congress for its collections. PCN requires that a complimentary "best copy" is sent to the Library of Congress after publishing.

To apply for a PCN, call the PCN liaison for the NPS at the Library of Congress 202-707-9791, or write to:

The Library of Congress • Cataloging in Publication Division • Washington, DC 20540-4320

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a situation where it is not possible to send a completed draft of the document to the Library of Congress to qualify for CIP. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix L: Government Printing Office Forms.")

## COPYRIGHT INFORMATION

Although the GPO is responsible for printing and distributing CLRs, the NPS is considered to be the publisher of these documents. Because government funds are used to prepare, print, and distribute a CLR, its contents are public domain. Therefore, a CLR should not be registered for copyright. The following statement should appear on the copyright page, under the heading *Publication Credits*:

*Information in this publication may be copied and used, with the condition that full credit is given to the authors, their companies, and the National Park Service. Appropriate citations and bibliographic credits should be made for each use.*

## GPO PROCEDURE FOR PRINTING AND DISTRIBUTION

### Form 3868

Thirty days before sending in the printing requisition to the GPO (Forms SF-1 and DI-1), the "Notification of Intent to Publish Form 3868" must be completed. Form 3868 may be completed and forwarded by the printing coordinator. This form is necessary for the GPO to include the published document in its sales and depository library

programs. If a CLR is intended for sale, Form 3868 requires a description of the target audience. The GPO may issue the CLR with an International Standard Book Number (ISBN) for sales of the publication. If indicated on Form 3868, the GPO will distribute copies of the publication to federal depository libraries throughout the United States including the Library of Congress, at no expense to the NPS. (See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix L: Government Printing Office Forms.")

## Cost Estimate

To obtain an accurate cost estimate from the GPO, printing specifications must be known. Each specification will add to the printing cost, and the more detailed the specifications provided, the more accurate the GPO estimate will be. A printing coordinator or GPO representative can help determine the full range of printing specifications for an estimate. The following are typical specifications required by a printing coordinator to obtain an estimate:

- Number of copies. The number of copies required for minimum distribution is 35. Beyond the minimum number of copies, the number of any additional copies printed is influenced by the following factors:
  - ▶ distribution objectives
  - ▶ demand for the document
  - ▶ cost of additional copies
  - ▶ potential use of the information in the document (a CLR that addresses planning issues may have a broad appeal)

- Paper stock and ink. A local printer may be a good reference source for reviewing and choosing standard materials. The printing coordinator may also have sample swatches of paper and an ink color chart.
- Composition. This is only important when the document is completely typeset by the printer. If the CLR will be camera-ready when given to the printer, specify that a camera-ready copy and mock-ups will be furnished.
- Press and bindery. A book-like document is usually printed "head-to-head" (forms can be printed "head-to-foot"). Indicate the overall document size (width x height), number of inserts, if any, and the type of binding. Adhesive bound (also called perfect binding) is commonly used for NPS documents. In this binding method the pages are glued to the spine. Comb binding and saddle stitching are alternatives for smaller documents. Different document formats work better with certain types of binding; for example, lightweight paper, rather than heavy cover stock, should be used as dividers between chapters in adhesive bound publications. Heavy stock tends to crack and fall out of adhesive bindings.
- Proofs and delivery. A date for receipt of proofs for review and delivery date of final product should be indicated. Also indicate whether these dates may be extended. Proofs are reviewed for errors in image placement, enlargement, or reduction. It is too late to review the text for errors at this stage. Proofs can be cropping proofs of illustrations, and blueline or gray dylux proofs of the entire document. Blueline proofs have

greater legibility, though gray dylux proofs are less expensive. A press proof may also be requested. (This is an exact copy (printed and bound) of the finished product. The press proof is the most expensive proof.) Indicate "suitable" for delivery packaging unless there is a specific requirement.

## Form DI-1

The DI-1 Requisition Form obligates funds for printing a CLR. The DI-1 requires a requisition number, an appropriation number, and a description of the printing specifications. The DI-1 must be completed by the NPS and forwarded to the printing coordinator. The description of printing specifications must be the same as those provided for the estimate. A printing coordinator will use the information provided on the DI-1 to fill out the Standard Form or SF-1.

## Form SF-1

Form SF-1, Printing and Binding Requisition to the Public Printer, is submitted along with the DI-1 to the GPO by the printing coordinator, after an estimate has been received. The same printing specifications as above are outlined on the SF-1, along with the following additional information:

- Any enclosures to be sent with the SF-1 are listed: typically the camera-ready copy, two mock-ups, original artwork, and reprint permission for materials from private and copyrighted sources.

- It should be indicated that all originals, master plates, film negatives, etc., must be returned to the NPS. The negatives may be used to reprint more copies of the document in the future, at lower cost.
- Printers to be included on the bid list may be indicated.

(See *A Guide to Cultural Landscape Reports: Appendices*, "Appendix L: Government Printing Office Forms.")

## MINIMUM DISTRIBUTION LIST

Copies of final CLR's should be provided to the following offices and repositories (the list has been excerpted from the *Cultural Resources Management Guidelines*, Release No. 5.) A CLR containing an archeological report must have a certification of its level of availability. Copies of a CLR are sent to those on the minimum distribution list by the NPS. GPO automatically has the printer send copies to the Library of Congress and to Depository Libraries if so indicated on the Form 3868.

### No. of Copies Send to:

- |   |  |
|---|--|
| 2 | <b>Associate Director, Cultural<br/>Resource Stewardship and<br/>Partnerships<br/>National Park Service<br/>P.O. Box 37127<br/>Washington, DC 20013-7127</b> |
|---|--|

- 2     **Associate Director, Natural  
Resource, Stewardship and Science  
National Park Service**  
Natural Resources Library  
Washington, DC 20240
  
- 1     **Associate Director,  
Professional Services  
National Park Service**  
P.O. Box 25287  
Denver, CO 80225-0287
  
- 2     **National Park Service  
Harpers Ferry Center Library**  
P.O. Box 50  
Harpers Ferry, WV 25425-0050
  
- 1     **National Trust for Historic  
Preservation  
McKilden Library  
University of Maryland**  
College Park, Maryland 20742
  
- 1     **Smithsonian Institution Libraries  
Gifts and Exchange**  
Washington, DC 20560
  
- 1 ea   **Cultural Landscape Program  
Managers in all System Support  
Offices (recommended)**
  
- 20-25   **Superintendent of Park**
  
- 1     **State Historic Preservation Officer**
  
- 1     **Support Office Archeology or Preser-  
vation Center**

- 1     **Support Office Library**
  
- 1 ea   **Coauthors or consultants**

## FURTHER INFORMATION

*The Chicago Manual of Style* (University of Chicago Press, 14th edition, 1993) has helpful information on printing technology and copyright issues for publishers. *The Mac is not a Typewriter* by Robin Williams (Peach Pit Press, 1990) is a useful reference for basic information on preparing a camera-ready document, including desktop publishing.

National Park Service. *Editing Reference Manual*. This manual provides guidance for capitalization, preparing bibliographies and notes, and other information useful for preparing documents for public distribution. Copies of the manual are available from Denver Service Center, Technical Information Center.

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