ENTRENCHED IN MEMORY: PRESERVING EARTHEN MILITARY FORTIFICATIONS AT KENNESAW MOUNTAIN NATIONAL BATTLEFIELD PARK

by

JAMES L. ROOKS

(Under the Direction of Scott Nesbit)

ABSTRACT

Earthen military fortifications at Kennesaw Mountain National Battlefield Park have experienced a tremendous amount of stress since the Civil War. Erosion of the earthworks at the battlefield is the result of this stress. Current national and international research strongly suggests that erosion of earthworks is largely the result of human interaction, invasive species, and abiotic factors such as wind and rain. Current methods and techniques employed for earthworks preservation specifically address these three factors of erosion. Thus, this thesis seeks to tailor current national and international methods and techniques employed for earthworks preservation to address any unique issues of erosion specific to Kennesaw Mountain Battlefield.

INDEX WORDS: Civil War, Kennesaw Mountain, preservation, conservation, earthworks, earthen military fortifications, erosion, invasive species, abiotic forces

ENTRENCHED IN MEMORY: PRESERVING EARTHEN MILITARY FORTIFICATIONS AT KENNESAW MOUNTAIN NATIONAL BATTLEFIELD PARK

by

JAMES L. ROOKS

B.A., Georgia Gwinnett College, 2016

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF HISTORIC PRESERVATION

ATHENS, GEORGIA

2020

ENTRENCHED IN MEMORY: PRESREVING EARTHEN MILITARY FORTIFICATIONS AT KENNESAW MOUNTAIN NATIONAL BATTLEFIELD PARK

by

JAMES L. ROOKS

Major Professor:	Scott Nesbit
Committee:	Eric MacDonald
	Alfie Vick
	Cam Graham

Electronic Version Approved:

Ron Walcott
Interim Dean of the Graduate School
The University of Georgia
May 2020

DEDICATION

To my wife Morgan, my parents Terry and Regina, my grandmother Louise, and my lifelong friends Annie B. and Bo. Cheers to the war that fades with time. May we all find greener pastures.

ACKNOWLEDGEMENTS

This thesis would not have been possible without a few key participants. I would like to thank Dr. Scott Nesbit for his patience and inordinate amount of time he spent revising and offering suggestions for this thesis. He and I have spent many months in the 'trenches' crafting this work. I would like to thank Dale Couch of the Georgia Museum of Art for listening to my first thoughts and ideas on where to even begin this thesis. During my internship with Dale, he provided valuable insights and motivation that led to my initial proposal for this thesis. I cannot express my gratitude to Anthony Winegar of Kennesaw Mountain National Battlefield Park for his assistance over the past year. Members of the Kennesaw Mountain Trail Club have also been of great importance to this work; they include Donald Olds, president of the Trail Club, Danny Leigh, invasive species specialist, and Cam Graham, retired interpreter and volunteer of the park and the club. Cam assisted me in much of the leg work involved with locating invasive species at the park as well as assistance in coordinating with park professionals and volunteers. His help has been invaluable.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

I have always been enthralled by Civil War earthworks and battlefields. I first visited Kennesaw Mountain National Battlefield Park twenty-seven years ago, and the fact that earthworks there provided a tangible, authentic link to the past, led me to become a graduate student in historic preservation years later and into the words that I now type.

To live inside the earth is to experience unpleasantry, to say the least. Living conditions quickly deteriorate because of weather, climate, and dirtiness associated with preparing the fortification and living in it, not to mention the various species of insects that love to chew on an unbathed body; and these conditions have not even been exasperated by combat at this point. I experienced these conditions as an infantryman in the U.S. Marine Corps., so I have an idea as to the miserable conditions experienced by soldiers entrenched along the Kennesaw Line in 1864. My experience and knowledge of fortification construction began at an early stage in my military education with construction of simple fighting holes; the parapet that was so commonly used during the Civil War is still used today, although much smaller, and still requires exact dimensions during construction. As I progressed in rank, my education continued with the understanding of how these fortifications not only played a role in defending oneself, but how methods of construction in relation to adjacent fortifications, and creation of interlocking fields of fire, can quickly win the respect of one's enemy. This is exactly what happened to Federal soldiers on June 27, 1864.

To be engaged in battlefield research and preservation in contemporary America is illuminating. The political climate in America has shifted in ways that attract Americans' attention to the causes and outcomes of the Civil War, especially when the subject of slavery is approached. Reenactments are now under the microscope of controversy. States, counties, cities, and towns are currently experiencing major legal issues with their Confederate Monuments. Even college campuses are interjecting heavily on the subject of slavery and representative monuments. Visitors to Kennesaw Mountain Battlefield are concerned with the validity and interpretive message of Confederate monuments there. Because battlefields have even been subjected to such scrutiny and are central to the theme of the American Civil War in both historical and contemporary America, research for this thesis is based upon my understanding that Civil War battlefields are still battlegrounds and they should continue to be protected so Americans can use these precious resources for civil engagement and conversation. Earthworks preservation intersects with these assertions because earthworks serve as tangible links to the past and lend integrity and significance to battlefields. By doing so, battlefields can continue to be platforms for engagement in an America where ideas surrounding the American Civil War are changing.

Kennesaw Mountain National Battlefield Park is located in Cobb County, Georgia. The battlefield is unique in that it receives more visitors annually than any other Civil War park because it is the largest contiguous green space in the metro-Atlanta area. Herein lies the chief issue at Kennesaw Battlefield: Cobb County is densely urbanized with an expanding population, resulting in major urban and suburban development that has minimized opportunities for recreational green space in the area, except for Kennesaw Battlefield. As residential and commercial development beyond the battlefield's current boundary continues to destroy land

associated with the battle, the voluminous supply of visitors to the park has created an enormous, destructive pressure on the battlefield's cultural resources, including earthworks. The severity of the damage has not gone unnoticed. In 1993, the Civil War Sites Advisory Commission published its *Report on the Nation's Civil War Battlefields.* The report identified Kennesaw Mountain Battlefield as a "Site With A Critical Need For Coordinated Nationwide Action By the Year 2000."[1] Following the commission's report, in 2008 the American Battlefield Trust (the acclaimed non-profit organization for American battlefields) cited Kennesaw Mountain Battlefield as an "at risk" battlefield.[2] Kennesaw Mountain National Battlefield Park recently enacted a $5 parking fee as additional annual revenue that will be used for expansion of programs at the park, new staff positions, and earthworks preservation.

Earthworks at Kennesaw Mountain Battlefield are finite historic, natural, cultural, archaeological, and architectural resources. Earthworks are considered to be finite resources because once they are gone they are gone forever. It is possible to rehabilitate or reconstruct these resources, but in doing so earthworks lose their authenticity, integrity, and significance. Earthworks are cultural resources. A cultural landscape is essentially an ecological system that has been manipulated in some way by humans. At Kennesaw Battlefield, earthworks are evidence of such human manipulation. Earthworks are one of the cultural components of the battlefield that, when protected, continue to lend integrity and significance to Kennesaw Battlefield. 'Protected' is the key word here. Research for this thesis has taught the author one thing about earthworks preservation: earthworks cannot be preserved in their entirety. It is

[1] National Park Service, "Civil War Sites Advisory Commission Report on the Nation's Civil War Battlefields," accessed January 31, 2020, http://npshistory.com/publications/battlefield/cwsac/report.pdf.
[2] National Park Service, Kennesaw Mountain National Battlefield Acquires Key Land Tract, accessed January 31, 2020, https://www.nps.gov/kemo/learn/news/kennesaw-mountain-national-battlefield-acquires-key-land-tract.htm.

impossible. However, what remains of an earthwork can be preserved for current and future enjoyment and learning.

Literature Review

Three primary sources used during this writing process were crucial in understanding the construction, function, and role of earthworks during the fighting on June 27, 1864: Confederate private Sam Watkins' memoir *Co. Aytch,* Union General William T. Sherman's memoirs, and Dennis Hart Mahan's *A Treatise on Field Fortification.* Apart from their individual importance, these sources share a connection. Mahan's *A Treatise on Field Fortification* revolutionized American wartime engineering and fortification construction because the treatise added an American point-of-view to an academic study that remained dominated primarily by French scholars. Mahan suggested that the U.S. military at the time was inept in its fighting abilities against a professional army because it was mainly comprised of volunteers and conscripts. Therefore, in order to have any chance at success on the battlefield, Americans needed to know how to properly defend themselves on the battlefield. His treatise describes, in absolute detail, the several forms, functions, strategic uses, and nomenclature of defensive fortifications used at the time in which he completed his treatise in 1836. Mahan's treatise saw publication at the outbreak of the Civil War in 1861. The treatise became the most popular field manual for both Union and Confederate armies.

William T. Sherman's and Sam Watkins' memoirs describe in vivid detail the construction and appearance of earthworks prior to the Battle of Kennesaw Mountain, and their descriptions match Mahan's suggestions in *A Treatise on Field Fortifications.* Commonalities between Sherman's and Watkins' descriptions include the use of parapets at several feet in height and width; an external, defensive ditch from which the dirt for the parapet was extracted;

and first lines of defense prior to the parapet that include abatis and chevaux-de-frise. Upon arrival at Johnston's Kennesaw Mountain Line, General Sherman described the mountain as a "looming fortress."[3] On the other hand, Confederate soldier Sam Watkins played a captivating role during the actual battle particularly at the "Dead Angle" at Cheatham's Hill. Watkins lucidly and grimly described the carnage that took place within the Confederate earthworks on June 27.

Professor of history Earl J. Hess has written many books on the construction and uses of earthworks during several major Civil War campaigns and battles. He is also currently one of the most acclaimed and leading historians of Civil War history who has written extensively on the Atlanta Campaign and the Battle of Kennesaw Mountain. His works on the Battle of Kennesaw Mountain, to include *Kennesaw Mountain: Sherman, Johnston and the Atlanta Campaign* and *Fighting for Atlanta: Tactics, Terrain, and Trenches in the Civil War,* offer well-written, coherent narratives of the campaign's and battle's unfolding and the use of extensive as primary sources that distinctly illustrate life and death in the trenches during 1864.

Scholarly sources used for documenting preservation and interpretation efforts at Kennesaw Battlefield include Kennesaw's Cultural Landscape Report, Cultural Landscape Inventory, Long Range Interpretive Plan, and *Administrative History*. This thesis could not have been completed without these documents. They describe, in detail, past preservation and interpretive efforts, current conditions, and future plans for earthwork preservation and interpretation. Additional sources that proved imperative for the completion of this thesis include the National Park Service's *Guide to Sustainable Military Earthworks Management* and,

[3] Charles Royster ed., *Sherman: Memoirs of General W.T. Sherman,* (New York: Literary Classics of the United States, 1990), 530.

at the international level, the *Vimy Declaration for the Conservation of Battlefield Terrain.* The *Guide to Sustainable Military Earthworks Management* is foundational for understanding current methods and techniques utilized for earthworks preservation at both the national and international level. The *Vimy Declaration* is a useful charter for exploring earthworks preservation because the document was crafted based on unique issues associated with earthworks at two World War I battlefields in France. The charter has been very successful in this field of study and has proved very useful for this thesis.

Research Question

Given the severity of the current condition of the battlefield and the earthworks' exposure to damage, in combination with the current literature available on the subject of preservation, the following research question has guided this thesis: How are current conservation methods being used, or how could they be used, to address any unique issues regarding earthworks at Kennesaw Mountain National Battlefield?

Methods

I have utilized a three-step process to reach my conclusions pertaining to my research question. I began by closely surveying available literature on the subject with the objective of gaining an understanding of critical issues currently associated with preserving earthworks at the national and international levels.

Secondly, I found that current research overwhelmingly shows that erosion is the critical issue involving earthworks and their sustainment. Current research also identifies three chief factors that cause and accelerate rates of erosion: biotic forces such as human interaction and invasive species, and abiotic forces such as wind and rain.

Thirdly, I created three case studies in the form of three groups of earthworks. I selected three groups of earthworks that illustrate one of the three chief factors of erosion. I found earthworks atop Little Kennesaw Mountain to be associated with human-induced erosion; earthworks located at the 24- Gun Battery site to be associated with wind and rain erosion; and earthworks atop Big Kennesaw Mountain to be associated with garlic mustard, an invasive species. Chapter 4 assesses the current conditions of these earthworks, made possible by my field work and understanding of condition assessment as outlined in the National Park Service's *Guide to Sustainable Military Earthworks Management*. I provide my recommendations for improvements in chapter 5. My recommendations are derived from Kennesaw Battlefield's Earthworks Management Plan, the *Vimy Declaration for the Conservation of Battlefield Terrain,* and chapter 3 of this thesis which details current methods and techniques used for preservation.

My field investigation began in May of 2019 and ended in February 2020. I had the opportunity to visit the battlefield every other weekend, two to three times a month, for this period of time. My investigation relied mostly on field observation and photographic documentation. Prior to selection of my case studies, I reconnoitered numerous groups of earthworks, but settled upon three locations in the northern end of the park which is the core visitation area of the battlefield. I chose these locations and area of the park for a few reasons. The availability of parking at the northern end of the park served as the primary influence for selection. The second reason for selection of earthworks in this area of the park was participant observation. The literature produced by the battlefield on the subject emphatically stated that the majority of the earthworks in the park suffered damage because of human interaction, especially within the core visitation area. Therefore, I chose to observe this phenomenon as a basic interest

of mine but was also able to identify erosion related to abiotic forces and invasive species as well.

Chapter Overviews

Chapter 1of this thesis presents the history of the Atlanta Campaign, the Battle of Kennesaw Mountain, and the battle's role in the campaign. The most important aspects of this chapter include the planning, construction and use of the earthworks prior to and during the battle. Primary sources of interest consulted for Chapter 1 include memoirs written by Ulysses S. Grant, William T. Sherman, and Private Sam Watkins. Dennis Hart Mahan's *Treatise on Field Fortification* was essential for the identifying the forms, function and components of various earthworks at Kennesaw Mountain Battlefield.

Chapter 2 comprises a survey of post-Civil War preservation efforts at Kennesaw Mountain National Battlefield Park to present day. Examples of preservation efforts include those exhibited by veterans during the 'Golden Age of Battlefield Preservation' in the 1890s, followed by the Civilian Conservation Corps' efforts and key federal legislation such as the Mission 66 Program. Examples of preservation specifically related to earthworks at Kennesaw include changing interpretive methods, examples of rehabilitation of earthworks over time, and the chronological development of essential National Park Service guidelines pertaining to earthworks. Research for this chapter depended heavily on the use of the National Park Service's Integrated Resource Management Applications Portal (IRMA). Here documents such as Kennesaw Mountain's cultural landscape report and inventory, administrative history, visitation data, and other pertinent documents, can be found.

Chapter 3 introduces comparative current methods and techniques used nationally and internationally for the preservation of earthworks around the world. Research for this chapter

illustrates the fact that soil erosion is the overwhelming process of degradation for earthworks on a global scale. Therefore, information in this chapter is dedicated to fundamental soil erosion management; an introduction to invasive species; introduction to the use of geotextiles; introduction to earthworks management in open and forested conditions; and preservation planning. The more acute causes of soil erosion identified in this chapter are human-induced erosion, invasive species, and abiotic forces such as wind and rain. Research for this chapter depended on information provided by the United States Department of Agriculture, the National Park Service, and international documentation such as the *Vimy Declaration for the Conservation of Battlefield Terrain.*

Chapter 4 comprises case-studies conducted at Kennesaw Battlefield in which current conditions were analyzed for three specific groups of earthworks that correspond to one of the three chief causes of erosion. The artillery redoubts located at Fort McBride atop Little Kennesaw Mountain correspond to human-induced erosion. The earthworks located at the 24-Gun Battery site correspond to abiotic erosion such as wind and rain. The earthworks located at Big Kennesaw Mountain correspond to the effects of invasive species. The completion of these case-studies depended on the information presented in Chapter 3 as well as the National Park Service's *Guide to Sustainable Military Earthworks Management*.

Chapter 5 presents recommendations for issues found in Chapter 4, as well as additional thoughts. Recommendations relied primarily on two documents: Kennesaw Battlefield's Earthworks Management Plan and the *Vimy Declaration for the Conservation of Battlefield Terrain.* Kennesaw's Earthworks Management Plan sets forth preservation policies and guidelines relied upon by park staff and volunteers. Findings in Chapter 5 hardly deviate from the Earthworks Management Plan's inspection of earthworks conducted between 2009 and 2013.

Some deviation exists, however, that correlate with the earthworks atop Little Kennesaw Mountain and human-induced erosion there, as well as the National Park Service's conclusion that earthworks maintained in forested conditions retain their form and integrity over a longer period of time than earthworks maintained under grass cover do. Proactive preservation methods through the use of erosion prevention devices presented in the *Vimy Declaration* have been largely successful at two World War I battlefields in France and can achieve similar success at Kennesaw Battlefield. These devices used for earthworks preservation include timber boardwalks, correct use of signage, and the potential use of viewing platforms.

Conclusion

Summarily, the purpose of this thesis is to apply to select earthworks at Kennesaw Mountain National Battlefield Park current national and international methods used in earthworks preservation. Primary source descriptions of Kennesaw Battlefield's earthworks in Chapter 1attest to the significance of the earthworks' construction and role during the battle, therefore providing the reason for later preservation. Chapter 2 fulfills the purpose of this thesis by investigating any changes to earthworks following the Civil War to present day. Chapters 3, 4 and 5 fulfill the purpose of this thesis by discussing current national and international preservation methods and techniques and the application of the methods to select earthworks at Kennesaw Mountain Battlefield.

CHAPTER 2

THE BATTLE OF KENNESAW MOUNTAIN

Introduction to the Atlanta Campaign

From November 1863 to the summer of 1864, key events emerged in the South that culminated in the Atlanta Campaign. Firstly, Chattanooga, the Gateway City to the South, fell under complete Union control under Union General Ulysses S. Grant and his Military Division of the Mississippi. Confederate strongholds in the South could now be invaded as supply and transportation routes emanated from Chattanooga like tentacles that traversed the deep South. Secondly, and perhaps more importantly, Lincoln hoped that battlefield victories in Virginia and Georgia would improve his chances at reelection in November 1864.[4]

Militarily, the Atlanta Campaign was in no way an isolated military strike into Georgia, and Georgia alone. In March 1864, following his success at Chattanooga, President Abraham Lincoln promoted Grant to the rank of lieutenant general and commander of all Union armies. Grant decided to orchestrate a series of offensives that would include Richmond, Virginia; central Virginia; the Shenandoah Valley; Mobile, Alabama; and Georgia. This strategic offensive would diminish the Confederates' ability to shift troops and supplies from one region to another as well as take full advantage of the Confederacy's deficiency in man power.[5] According to Sherman, "These armies were to be directed against the rebel army commanded by General Joseph E. Johnston…and I was required to follow it up closely and persistently, so that

[4] Richard M. McMurry, *Atlanta 1864: Last Chance for the Confederacy* (Lincoln and London: University of Nebraska Press, 2000), 2-5, 16, 17.
[5] Daniel J. Vermilya, *The Battle of Kennesaw Mountain,* Civil War Sesquicentennial Series (Charleston: The History Press, 2015), 18, 20, 22.

in no event could any part be detached to assist General Lee in Virginia…so that he could not respond to any calls of help by Johnston."[6] Grant decided to place his headquarters in the East. By doing so, he would personally command the offensive against Lee in Virginia by overseeing the Army of the Potomac. As Grant moved east, Sherman assumed command of the Military Division of the Mississippi on March 18, 1864.[7]

It then became Sherman's responsibility to prepare for the offensive in Georgia — the Atlanta campaign. Sherman maintained three armies within the Military Division of the Mississippi. Major General George Thomas' Army of the Cumberland was comprised of more than sixty thousand men with130 guns. Major General James B. McPherson's Army of the Tennessee consisted of more than twenty-four thousand men with 96 guns. Major General John M. Schofield's Army of the Ohio exceeded thirteen thousand men with 28 guns, leaving the Army of the Ohio with only one corps in strength.[8]

Following the Confederate defeat at Chattanooga in November 1863, Confederate general Joseph E. Johnston assumed command of the Army of Tennessee in December.[9] Johnston arrived at Dalton, Georgia in December and quickly began to rebuild his army, reorganize, and boosted the morale of his men. His army comprised sixty thousand men and 144 guns. Johnson's army, as he found it, consisted of two infantry corps led by Major General William Hardee as commander of the first corps and Lieutenant General John Bell Hood as commander of the second corps. With four division of cavalry corps commanded by Major General Joseph Wheeler, Johnston's army combined amounted to 37,000 men. Johnston urged Richmond

[6] Charles Royster ed., *Sherman: Memoirs of General W.T. Sherman,* (New York: Literary Classics of the United States, 1990), 489.
[7] Vermilya, *The Battle of Kennesaw Mountain,* 20.
[8] Earl J. Hess, *Kennesaw Mountain: Sherman, Johnston, and the Atlanta Campaign* (Chapel Hill: University of North Carolina Press) 1.
[9] Vermilya, *The Battle of Kennesaw Mountain,* 24-25.

to unite several commands with his at Dalton to include Lieutenant General Leonidas Polk's Army of Mississippi and additional troops under James Longstreet in the West. Johnston's numbers swelled to 55,000 by April 1864.[10] Johnston chose to assume a strong defensive posture as his only option against Sherman's advance.[11]

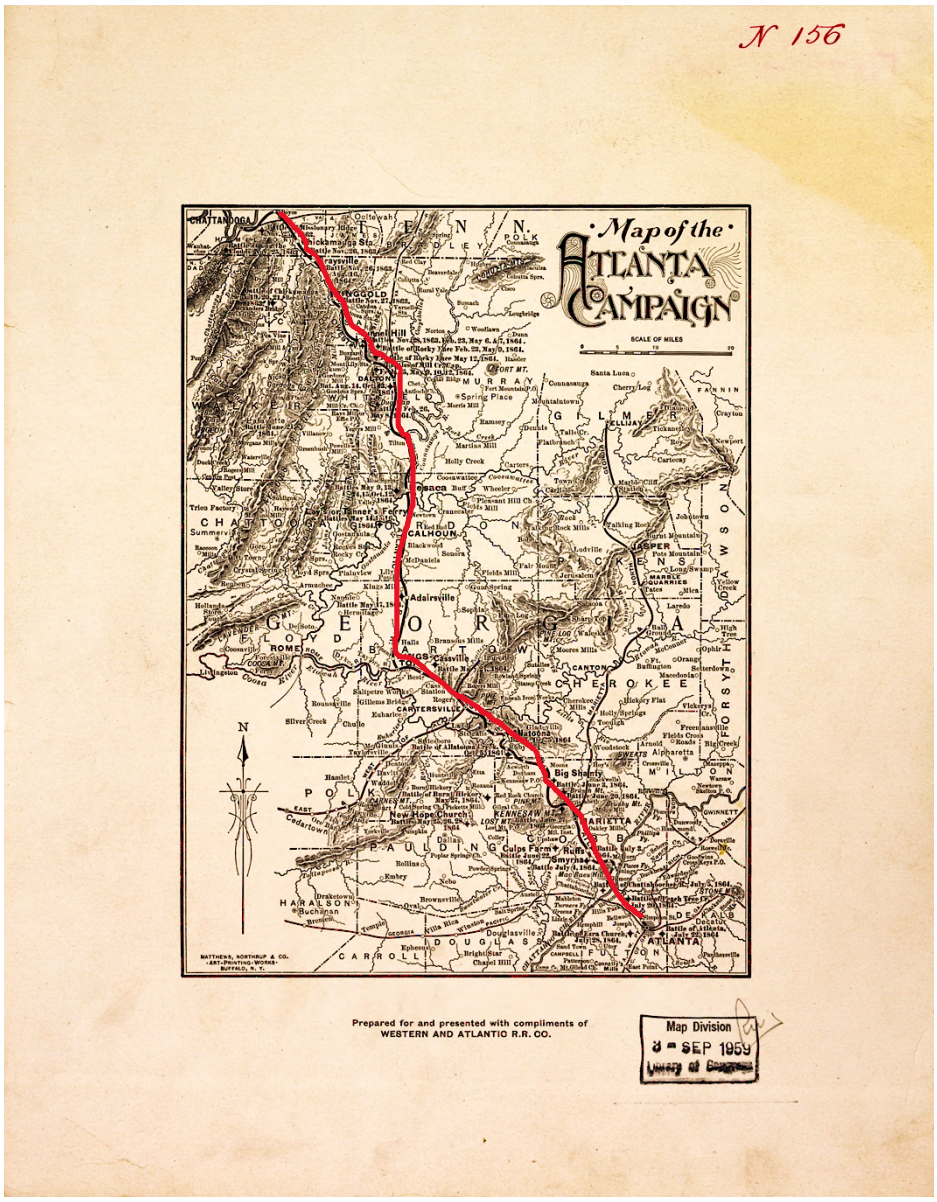

Figure 2.1 Map showing the path of the Western-Atlantic Railroad (marked in red) from Chattanooga south to Atlanta (Library of Congress).

[10] Ibid., 30, 31.
[11] Ibid.

Union General William T. Sherman's Military Division of the Mississippi embarked on the campaign for Atlanta on May 7, 1864.[12] Both Sherman and Johnston relied upon the Western-Atlantic Railroad that ran from Chattanooga south to Atlanta as a supply line (Figure 1.1). Because of the opposing armies' reliance upon the supply line, battles during the campaign occurred along the railroad's path.[13]

Throughout the campaign, Sherman used his superior numbers to outflank Johnston's positions, which forced Johnston to continuously withdraw from his defensive lines. Johnston assumed his final defensive line, referred to as his Kennesaw Line, from June 19 - July 2. The new line stretched for seven miles and became Johnston's ninth defensive fortified position of his campaign thus far. The Kennesaw Line consisted of rigorous uneven terrain and included Big and Little Kennesaw Mountains and one large hilltop, Pigeon Hill. The Line supported a contiguous mound of higher ground about 2.5 miles long with very abrupt slopes facing the Sherman's army group. Two creeks protected Johnston's flanks: Noonday Creek protected his right flank and Noyes Creek protected his left.[14]

Earthworks Along the Kennesaw Line

This section introduces examples of the basic fundamental uses and nomenclature associated with earthworks along Johnston's Kennesaw Line before continuing with this chapter. It is best to introduce this material now so that the reader might have a firmer understanding of the importance of these fortifications and their placement along the Kennesaw Line.

Both Sherman's and Johnston's positions at Kennesaw Mountain consisted of earthen military fortifications. The importance of these fortifications for opposing armies before and

[12] Vermilya, *The Battle of Kennesaw Mountain,* 33.
[13] Ibid., 26-27.
[14] Royster, *Memoirs,* 526-527. Also see Hess, *Fighting for Atlanta,* 95.

during the Battle of Kennesaw Mountain cannot be overstated. For Sherman's army, earthworks served as devices that allowed Sherman to carry out Grant's policy of applying constant pressure to Johnston's defensive lines. For Johnston, defensive fortifications served as an impediment to any attack Sherman might make. However, earthworks served as defensive mechanisms for both armies. Both armies designed and used their earthworks in the same manner, but not out of coincidence. In 1836, Dennis Hart Mahan, a professor at West Point, published his most influential work: *A Treatise on Field Fortification*, which profoundly impacted American military thought and practice in the nineteenth century. His manual served as the primary treatise on field fortification construction for both the Federal and Confederate armies during the Civil War.[15] In *A Treatise on Field Fortification,* Mahan defined field fortifications as "All dispositions made to enable an armed force to resist, with advantage, the attack of one superior to it in numbers, belong to the Art of Fortifications."[16] Mahan also considered materials used to improve and construct fortifications as artistic in nature and exist in the forms of earth, stone, and wood."[17]

Mahan identified a variety of figures that have been used in the past as plans for "simple entrenchments."[18] An earthwork can be defined as any earthen structure excavated for military purposes. In simplest form, a defensive earthwork was composed of a *parapet* or protective mound of earth and a *ditch* from which the earth was excavated. Removal of the earth during construction formed the ditch, situated in front of the parapet that also served as an obstacle to attackers. The

[15] Earl J. Hess, *Field Armies and Fortifications in the Civil War: The Eastern Campaigns. 1861-1864* (Chapel Hill: University of North Carolina Press, 2005), 5-9.
[16] Ibid., 1.
[17] Ibid.
[18] Ibid., 11.

exterior slope of the parapet faced the enemy, and the *interior slope* faced inward toward the defenders. The *superior slope* served as the top of the parapet (Figure 1.2).[19]

Figure 2.2. Nomenclature of an infantry parapet (Photo by Author).

For the purposes of Kennesaw Mountain, the author has positively identified the redoubt and infantry trenches as the primary forms of earthworks. A redoubt is a semi- enclosed fortification designed to be defended from all sides. The *trace* (profile) of a redoubt could be square, polygonal, or occasionally circular. The artillery redoubts at Kennesaw are both semi-circular and square in shape. Excellent examples of these redoubts are located at Cheatham Hill and Cleburne's sector along Cheatham Hill Road (Figure 2.3). An additional characteristic of these larger redoubts is the extension of the parapet well to the rear of the redoubt itself. The

[19] Dennis Hart Mahan, *A Treatise on Field Fortification: Containing Instructions on the Methods of Laying Out, Constructing, Defending, and Attacking Intrenchments, With the General Outlines Also of the Arrangement, the Attack and Defense of Permanent Fortifications* (Originally published by the US War Department in 1836), Preface VII, catalog.Hathitrust.org/Record/011536129.

extended parapet, presumably, would have protected the flanks of those inside the redoubt, similar to a traverse. On the other hand, smaller redoubts are more numerous across the battlefield's landscape. They appear to have been used in locations in which an attack was not imminent, or locations in which the terrain restricted the size of the redoubt. These characteristics are easily identifiable at Kennesaw Mountain National Battlefield Park.

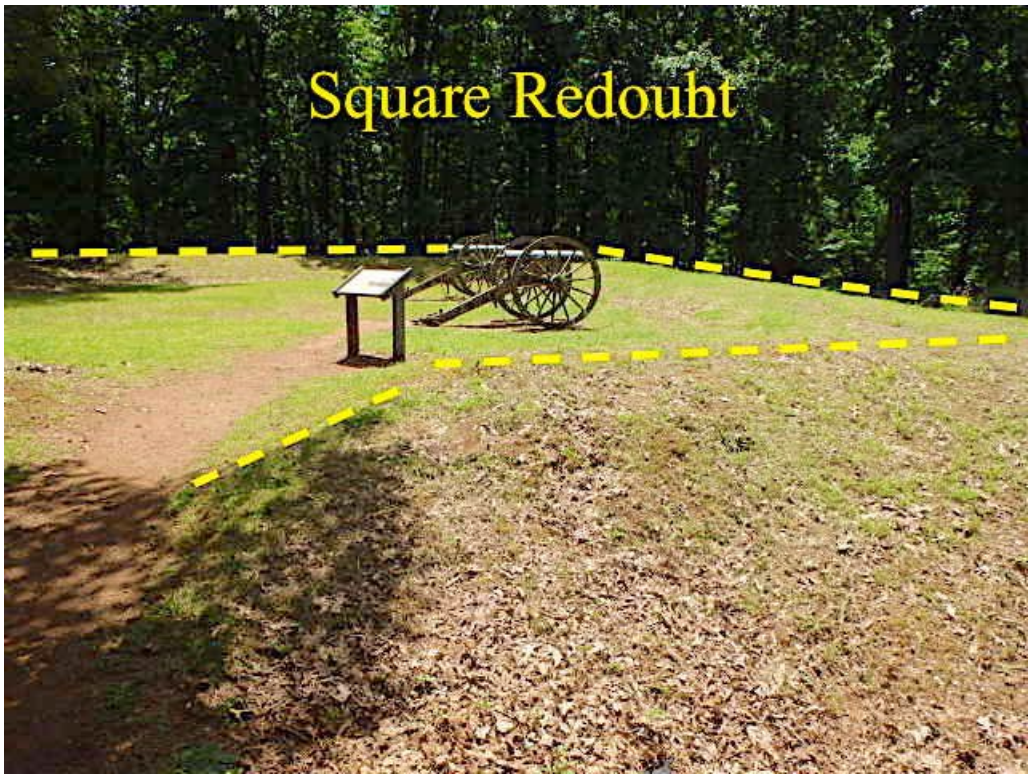

Figure 2.3. Square artillery redoubt at Cheatham's Hill (Photo by Author).

Taking Positions

Confederate forces began to take positions along the Kennesaw Line on June 19. Major General William H. Loring positioned his Army of the Mississippi on the heights in the center. Major General Samuel French's division of Loring's corps was slated to assume positions along the tops of Big and Little Kennesaw as well as occupy the much smaller conical rise, Pigeon Hill, linked to Little Kennesaw. Therefore, Loring's left flank rested on Burnt Hickory Road,

which skirted the foot of Pigeon Hill. Lieutenant General John Bell Hood's Corps established a line to the right of Loring, which straddled Belle's Ferry Road. Lieutenant General William J. Hardee positioned his corps to the left of Loring, straddling the Dallas and Marietta Road.[20]

By June 19, Sherman's army group had pressed close along Johnston's Kennesaw Line. With Sherman's new lines closing in fast, Johnston faced a prominent tactical dilemma: the location of his artillery. If he was going to have a fighting chance at defending his position, Johnston's artillery needed to be placed at elevated positions that offered commanding views of the surrounding area. By doing so, Johnston could at least impede an attack by Sherman while providing cover for infantry trenches along the crests of the twin peaks as well as Pigeon Hill. The prospect of hauling artillery pieces up the steep slopes of Big and Little Kennesaw Mountain was initially daunting and intimidating for Confederate artillery officers. Upon assuming the Kennesaw Mountain Line on June 19, Major General S. Storrs, commander of the battalion of three batteries attached to French's division, placed Captain James A. Hoskin's Mississippi Battery on top of Pigeon Hill. However, on June 20, Storrs scouted a route up the slope of Little Kennesaw facing the Federal army where he thought that cannons could be hoisted by ropes, despite headquarters' conclusion that the endeavor would be too difficult. Despite its insurmountable difficulties, Storrs managed to pull two reserve units, Captain Henry Guibor's Missouri Battery and Captain John J. Ward's Alabama Battery, up the hill. A brigade of Hood's corps hauled up the ammunition and dug the emplacements and parapets on the night of June 20. By the morning of June 21, Storrs had placed nine pieces on top of Little Kennesaw Mountain,

[20] Hess, *Kennesaw Mountain,* 15.

while the top of Big Kennesaw Mountain had been fortified as well. As movements and fighting began to slowly rise on June 21, Little Kennesaw Mountain served as an artillery platform that began to bombard Union fortifications at the foot of the mountain.[21]

Figure 2.4. Union earthworks facing Big Kennesaw Mountain (Digital Library of Georgia).

Confederate artillery forced the Yankees to dig in for protection. The Federal works opposite Kennesaw Mountain were just a vast and impressive at the Confederate's (Figure 2.4). On the night of June 22, the Federals managed to mass together twenty-four guns in one location opposite Kennesaw Mountain. Although Federal works were impressive, Kennesaw Mountain posited a few concerns for Sherman. Kennesaw Mountain represented a salient that, if Sherman acted carelessly, had the potential to split the Union army due to terrain alone. Secondly, and most grave to Sherman, Kennesaw Mountain represented a looming fortress. According to Sherman as he approached the Kennesaw Mountain Line, "The whole country is one vast fort,

[21] Ibid., 22, 25-26.

and Johnston must have at least fifty miles of connected trenches, with abatis (a particular type of field fortification to be discussed later) and finished batteries."[22] If Sherman were to consider a full attack, he now had to calculate the effect that the batteries atop Little Kennesaw Mountain would have as well as the lofty and heavily defended positions to his front. In addition to these strategic considerations, it had rained constantly for over two weeks and Sherman's progress had been greatly delayed.[23]

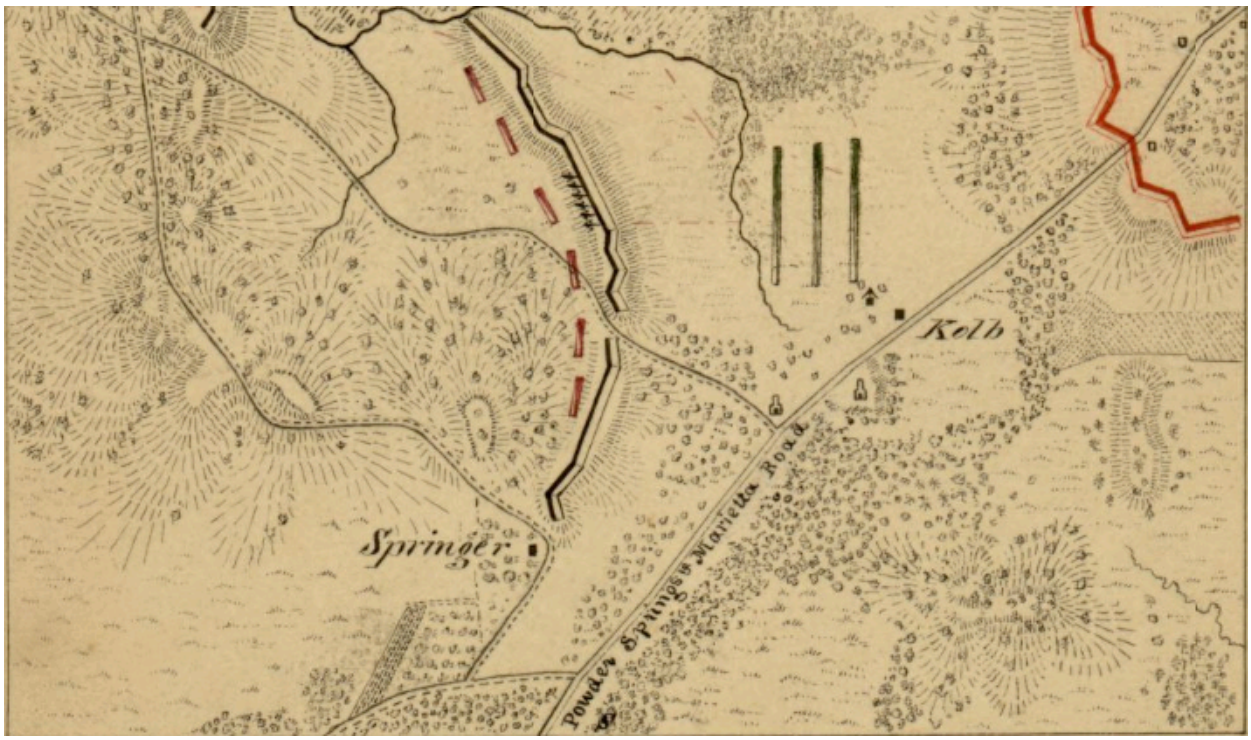

Figure 2.5. Area map of the Battle of Kolb's Farm on June 22, 1864. Hood's Corps' fortifications are outlined in red to the east of the farm, and Union fortifications are outlined in black to the west of the farm (Library of Congress).

As seen previously during the campaign, Sherman wasted little time in reconnoitering the Confederate flank. Sherman chose to probe Johnston's left flank on June 22. He needed to assess the extent of the Confederate left flank in order to maneuver around it by moving east along the Powder Spring Road, which ran directly to Marietta. The 20th and 23rd U.S. Army

[22] *Sherman Memoirs,* 530.
[23] Hess, Kennesaw Mountain, 27, 56.

Corps assumed positions along the Powder Springs Road and Kolb's Farm.[24] Union skirmishers spotted and reported the formation of a Confederate battle line to their front.[25]

The opposing Confederate force consisted of Lieutenant General John Bell Hood's Corps, which had moved earlier that morning to support Johnston's left flank and block the Union advance along the Powder Springs Road. Hood attacked Union forces along the road without proper knowledge of the terrain that lay ahead of his corps. The battle resulted in the needless loss of 1,000 Confederate lives.[26]

Sherman made a decided change in the way that he conducted operations at Kennesaw Mountain following June 22. Sherman did not expect Hood's corps to be present, which meant that Johnston's line extended further south than previously realized. As a result, Sherman responded by extending his lines to parallel Johnston's. In doing so, Sherman exercised caution to not overextend his army and thin his own ranks. By June 24, Sherman and his army commanders agreed that Union lines could no longer be stretched any further to stretch Johnston's any further. According to Sherman "During the 24th and 25th of June General Schofield extended his right as far as prudent, so as to compel the enemy to thin his lines correspondingly, with the intention to make two strong assaults at points where success would give us the greatest advantage…we all agreed that we could not stretch out anymore, and therefore there was no alternative but to attack 'fortified lines…' a thing carefully avoided up to that time."[27] In addition to this, the weather stymied Sherman's advance, and may have influenced Sherman's decision to attack as well. As he recalled on June 21, one day prior to the brawl at Kolb's' Farm, "This is the nineteenth day of rain…I am all ready to attack the moment

[24] Vermilya, *The Battle of Kennesaw Mountain,* 70.
[25] Hess, *Kennesaw Mountain,* 32-33.
[26] Ibid., 35, 36-40.
[27] *Sherman's Memoirs,* 530.

the weather and roads will permit."[28] Sherman needed to advance upon Atlanta as quickly as possible.

Sherman's only options on the 24th were to strike Johnston's lines or continue to turn Johnston's flank to its breaking point. Therefore, on June 24, Sherman issued Special Orders 28. Sherman's new orders specified that each of his army commanders would devise an attack at 8:00 a.m. on June 27. "The plan was to breech the rebel center, hold in check one wing of Johnston's army, and sweep around and flank the other half," according to Sherman's orders.[29] Each army commander then received his orders. Major General Schofield received the order to continue to harass the Confederate left flank and threaten to push along the Powder Springs Road toward Marietta. Major General McPherson received the order to demonstrate against Johnston's northern (right) flank(a demonstration being a feigned attack), while launching an actual attack south of Kennesaw Mountain itself. McPherson's attack would be a feint for the main assault which was to be made at the Confederate center by Major General Thomas' Army of the Cumberland. Confederate Lieutenant General William Hardee's Corps would receive the Union's main assault.[30]

The Battle of Kennesaw Mountain

The weather had cleared by the morning of the 27th but it was an unusually hot day. The Federals signaled the attack with a ferocious cannonade at 6 a.m. and the infantry attack began at 8 a.m. To the north, on Johnston right flank and right center of the Confederate line, Major General James B. McPherson's Army of the Tennessee launched its attack.

[28] Ibid., 527.
[29] Ibid., 531.
[30] Vermilya, *The Battle of Kennesaw Mountain,* 79.

McPherson's attack consisted of sending skirmishers up the slope of Big Kennesaw while simultaneously launching a much larger attack south against Little Kennesaw and Pigeon Hill. McPherson mandated a division of Major General John Logan's 15th Corps as the assault force. The division commander, Major General John Logan, centered his attack along the Burnt Hickory Road.[31]

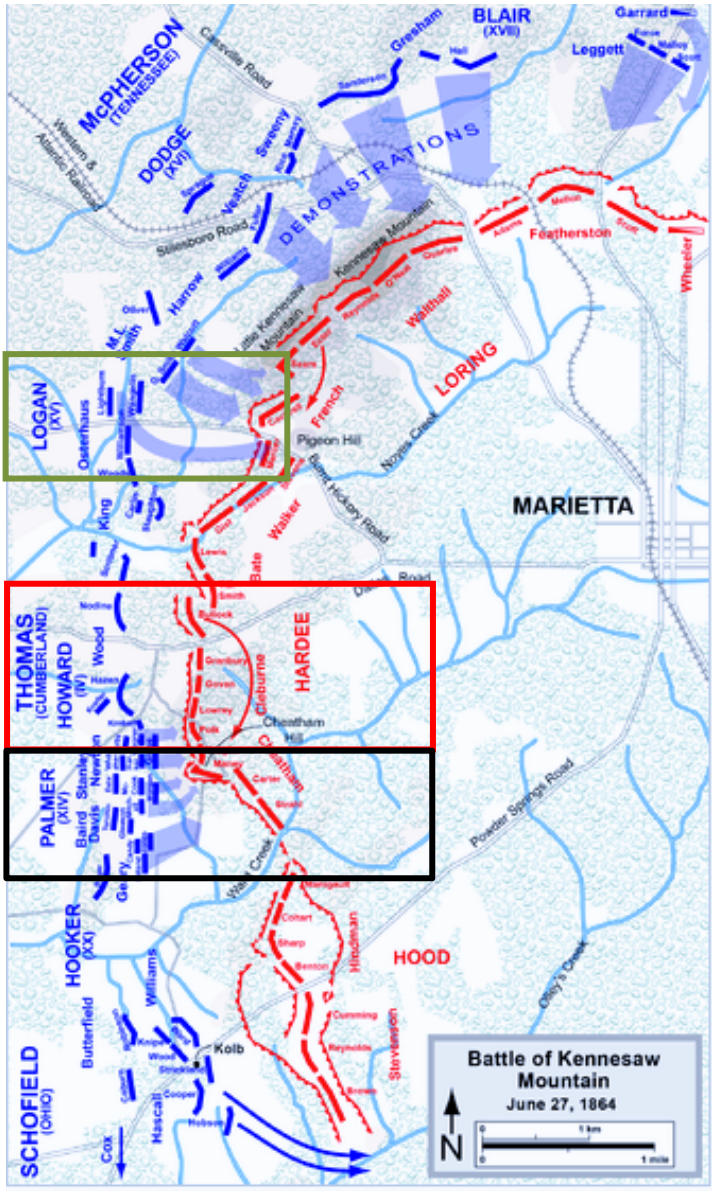

Figure 2.6. Map depicting the Union assault on June 27. Principal Army corps and their assault sectors are marked by the colored rectangles, one color for each corps (Map by Hal Jespersen www.civilwarmaps.com).

[31] Ibid., 91.

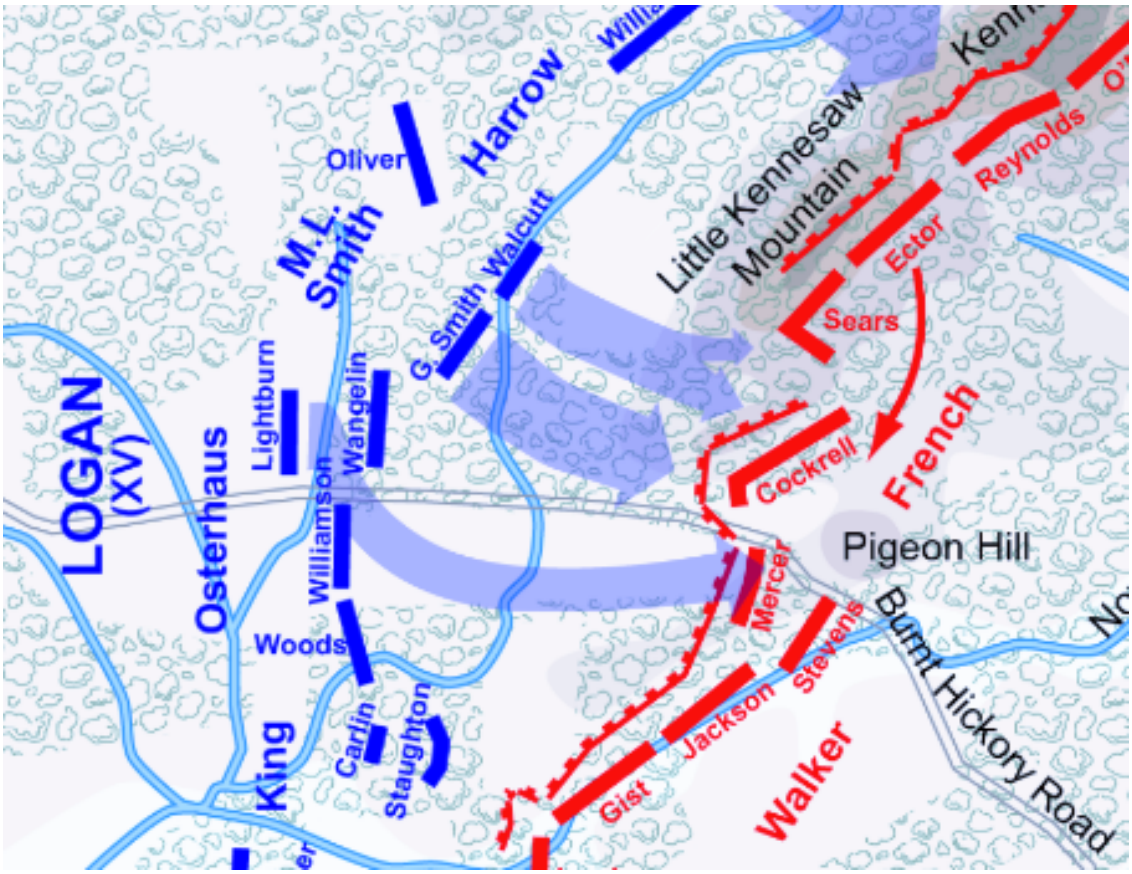

Figure 2.7. Logan's attack. Logan's sector of attack is marked by the green rectangle in Figure 1.6. (Map by Hal Jespersen www.civilwarmaps.com).

Logan aimed his attack primarily at the saddle between Pigeon Hill and Little Kennesaw. Logan's division consisted of three brigades of approximately 5,500 men. This was a very small force, especially considering the tough terrain they would face during the assault.[32] Brigadier General Charles C. Walcutt's brigade received orders to attack the saddle. Brigadier General Giles A. Smith's brigade received orders to attack Pigeon Hill. Brigadiers General Joseph A. J. Lightburn's brigade received orders to attack the flat land south of Pigeon Hill. Opposite the Federal position, and defending the ridges of Little Kennesaw and Pigeon Hill, were the Confederate brigades of Brigadier General Claudius Sears and Brigadier General Francis

[32] Ibid., 91.

Cockrell. Sears was not present during the battle due to wounds sustained previously, so his command was transferred to Colonel William Barry. Barry's left flank on Little Kennesaw Mountain and Cockrell's right flank on Pigeon Hill bent toward one another, creating a devastating interlocking field of fire in the heavily vegetated slope, exactly where Walcutt's brigade would attack.[33] The vegetation and the slope of the ground would make it impossible for Logan's force to maintain uniformity once they ascended the hills.

Walcutt's brigade advanced first while the other two brigades began their advance once they heard firing. However, once on the move, all three brigades were forced to navigate their way through the heavily vegetated Noyes Creek which impeded their movement. Once the brigades navigated the tangled mess, they were then forced to run across an open field toward Confederate lines while under heavy fire. Two of Walcutt's regiments, the 46th Ohio and the 103rd Illinois, began receiving fire before they even exited the underbrush toward the field. Under a pulsating fire, Walcutt's men made it across the field. Walcutt's left flank entered the gorge between Little Kennesaw and Pigeon Hill. As they moved up the slope, men in the left flank observed enemy positions on their right and attempted to redirect their attack accordingly. As the neared the Confederate positions, Walcutt's men were forced to traverse a ravine directly in front of the Confederates. The Confederates positioned themselves in such a way that allowed them to sweep the area with fire while using the ravine as a defensive barrier. Men from the 46th Ohio reported that the slopes were just too steep to climb, but they managed to get within fifteen yards of the Confederate line.[34] Walcutt's brigade fell back to its starting point where it entrenched and awaited orders.[35]

---

[33] Hess, *Kennesaw Mountain,* 71, 76-77.
[34] Vermilya, *The Battle of Kennesaw Mountain,* 94-95.
[35] Hess, Kennesaw Mountain*,* 117.

To Walcutt's right, Giles Smith's brigade faced Cockrell's main line of Pigeon Hill, north of the Burnt Hickory Road. After traversing the thickly vegetated Noyes Creek, Smith's brigade struck Confederate skirmishers at the base of the mountain. The Federals were successful and continued forward. One Confederate soldier recalled the sight of the oncoming Federal soldiers as "pouring on in column…filling all the plain below and still pouring out of the timber in the rear." As Smith's men advanced up the slope, they were devastated by a terrible fire from Cockrell's position that slowed the advance to crawl. At 9:00 a.m., Cockrell requested support from Little Kennesaw, and it arrived in the form of several regiments. The now combined force at Cockrell's division led one Federal private to recall that "Death and destruction held absolute reign among us…men fell around me in masse as we ran up, a bullet bored the comrade at my side and smashed my rifle to pieces, and everywhere I felt the wind of the bullets as they whizzed around me." Smith's men could advance no more and began to retreat from the hill throughout the remaining day.[36]

Lightburn's brigade made its attack a short distance south of Pigeon Hill. The brigade too was slowed by Noyes Creek upon its initial advance. Once the Federals traversed the open ground, the encountered a Confederate skirmish line in a swampy area. This encounter between Lightburn's brigade and the 63rd Georgia led to some of the fiercest fighting of the entire battle on June 27. The fight quickly progressed into a mauling as bayonets impaled enemies and rifles used as clubs. The Union troops continued toward their objective as the 63rd retreated. The fields south of Pigeon Hill were entirely open and in full view of Confederate defenders. Lightburn's men digressed from their path and directed their fire on Pigeon Hill. In response, artillery atop Pigeon Hill redirected its fire into Lightburn's men. A Federal officer later recalled

[36] Vermilya, *The Battle of Kennesaw Mountain,* 96-98.

that “batteries of every description swept our position in every possible direction…men’s heads, arms etc. were blown off and scattered over the earth.[37]

Figure 2.8. View from Cockrell’s positions atop Pigeon Hill. Federal troops crossed the fields in the distance (Library of Congress).

McPherson’s planned attack further north on Big Kennesaw Mountain did not fare any better. Men from the 16th and 17th Corps were sent toward the Confederate line as skirmishers in order to harass Confederate defenders up the slope. On the extreme left flank, Union commanders Major General Grenville Dodge and Major General Francis Preston Blair Jr. demonstrated against Big Kennesaw with a degree of success against opposing skirmishers but failed to seize the heights of the mountain. Confederates on the heights witnessed every move of the Federal assault up the mountain because of the lack of forestation. The Federal attackers

[37] Ibid., 100.

were subsequently pinned down. After several hours of attacks and exertion, the Federals retreated to their initial positions and entrenched.[38]

Two miles south of Pigeon Hill, the Army of the Cumberland, commanded by Major General George C. Thomas, also began its attack at 8.00 a.m. Thomas selected Major General Oliver O. Howard's 4th Corps for the attack. Brigadier General John Newton's division of the 4th Corps would actually make the advance. Newton's command consisted of three brigades; all were commanded by brigadier generals. Nathan Kimball's brigade commanded the left flank of the division, with George Wagner's brigade in the center and Charles Harker's on the right. Newton received orders to situate his attack between Pigeon Hill and Cheatham's Hill.

Figure 2.9. Howard's Attack. Howard's sector of attack is marked by the red rectangle in Figure 1.6. (Map by Hal Jespersen www.civilwarmaps.com).

[38] Ibid., 102-104.

The terrain was unfavorable for the Federals. A portion of John Ward's Creek ran in between Federal and Confederate positions, leaving the Federals to slog through another heavily vegetated mess. The creek also lay in a ravine that was about 200 yards wide. Once across the creek and the open fields, the ground abruptly ascended within twenty yards of the Confederate line, defended by Confederates under the command of Major General Patrick Cleburne. Confederate fortifications were nearly impregnable. As one of Howard's staff officers exclaimed, "The country is so thickly wooded that it is impossible to tell anything about the enemy's works…before we get right upon them." Additionally, following the battle of Kennesaw Mountain, Sherman vividly recalled the construction methods and utility of the enemy's fortifications stretching south toward Johnston's left flank:

> The enemy's position was so very strong, and everywhere it was covered by intrenchments, that we found it as dangerous to assault as a permanent fort. The enemy and ourselves used the same form of rifle-trench, varied according to the nature of the ground: the trees and bushes were cut away for a hundred yards or more in the front, serving as an abatis or entanglement: the parapets varied from four to six feet high, the dirt taken from a ditch outside and from a covered way inside, and this parapet was surmounted by a 'head log,' composed of the trunk of a tree from twelve to twenty inches at the butt, lying along the interior crest of the parapet and resting in notches cut in other trunks which extended back, forming an inclined plane, in case the head-log should be knocked inward by a cannon hit.[39]

These formidable works awaited John Newton's division. Newton's assault began at 9:00 a.m. with skirmishers leading the way. Cleburne's Confederates initiated a terrible, thunderous fire with shot and shell as soon as Newton's men cleared Federal lines. Wagner's brigade quickly advanced to the abatis in front of the Confederate trenches which impeded its movement. An abatis is a fortification placed in front of a defender's trench line that serves as a barrier to oncoming attackers. An abatis is constructed with sharpened limbs and stakes that are usually driven into the base of the parapet of the earthworks. Wagner's soldiers frantically tried

[39] Sherman, *Memoirs,* 525-526.

to pull the stakes from the abatis in an attempt to create a pathway for fellow soldiers, but they were shot while doing so. Federal soldiers eventually squeezed through the fortification and plunged toward the Confederate trench line, only to be stopped again by murderous fire at close range. Kimball's brigade arrived in support of Wagner's left, but the destructive fire belching from Confederate rifles and cannons stopped Wagner's brigade as well. A colonel of the 36th Illinois Regiment of Kimball's brigade reported that his regiment was "swept by discharges of grape and canister" which made carrying Cleburne's works seem like "an impossibility on our part of the line."[40] The fighting intensified to such as horrific crescendo that one Rebel reported "I was glad to see the column retreat. It looked too much like cold blooded murder to kneel there and take dead aim on a man so near that you could see the color of his eyes and hair."[41] To the right of Wagner, Harker aimed his brigade at the point where Confederate Generals Cleburne's and Cheatham's brigade connected. Alfred Vaughan's brigade of Cheatham's division held the point along a ridgeline that curved westward toward a salient. Harker's men attacked the curve, therefore exposing his flanks to a crossfire. Harker and some of his men made it to the parapet where Harker was killed.[42] As the fighting neared the end for Newton's division, the exchange of fire became so hot that the wooden abatis and dry vegetation caught fire and the blaze threatened to engulf Federal dead and dying. Exclaiming that sight before him equated to butchery, Confederate Lieutenant Colonel William H. Martin called a truce so that the Federals

[40] Ibid., 111-112.
[41] Earl J. Hess, *Fighting for Atlanta: Tactics, Terrain, and Trenches in the Civil War (Chapel Hill: The University of North Carolina Press, 2018),* 119.
[42] Vermilya, *The Battle of Kennesaw Mountain,*117.

could remove the dead. After the truce concluded, the firing started again; but Newton's division ultimately failed to take the Confederate works.[43]

Figure 2.10. Lieutenant Colonel William H. Martin and the truce. Notice the Confederate trench line with soldiers leaning forward on the head log. Head logs protected defenders' heads while they fired through a gap between the top of the parapet and the bottom of the head log (Library of Congress).

Newton's attack has received much attention from military historians since the battle on June 27, 1864. Indeed, the Confederate earthworks were strong, but Newton's division failed in part because of how his division approached and assaulted the earthworks. Harker and Kimball received specific order to attack in columns — regiments stacked behind one another. In this way, a column displayed a shorter front; and if the head of the column successfully penetrated the enemy's lines, regiments in the rear acted as reinforcements surging the hole. However, this military formation proved to be a forlorn hope against well-fortified defensive positions. The

[43] Hess, *Kennesaw Mountain,* 110.

first line of soldiers in the columns essentially collapsed when they made contact with Cleburne's defenses. This collapse essentially forced the entire column to collapse and halt abruptly, leaving the soldiers in the rear of the column to halt as well with nowhere to go and nothing to do besides wait for the soldiers in the vanguard to make progress. Columns diminished the manpower needed across a wider front during the attack. Overall, the 4th Corps attack demonstrated that there were no weak points in the Confederate line.[44]

Confederate General Hardee's Corps held the area south of Cleburne's position and north of Kolb's Farm. Major General Benjamin F. Cheatham's division of Hardee's corps extended the line south of Cleburne. However, Confederate engineer Lt. Col. Stephen W. Presstman and his staff incorrectly laid the line across the ridge in Cheatham's sector. Presstman laid the line at night prior to the battle and accidentally placed the line a few yards further up the ridge at Cheatham's Hill than was necessary. By doing do, Confederate infantry would no longer be able to see the ground in front of them, which was now obscured by the true military crest in front of and down the slope of Cheatham's Hill. This mishap effectively created a "Dead Angle". For one, engineers created an "Angle" in the form of an inverted V that protruded forward of the main line when laying the line. When this occurs, and specifically due to its shape, an "Angle" is vulnerable to fire from both of its flanks. A "Dead Angle" is a sector that is inadequately covered by fire. Although the salient at Cheatham's Hill represented a liability, Cheatham's

[44] Ibid., 109-112

division adapted by focusing a large amount of firepower in front of the angle — a dead space that remained obscured.[45]

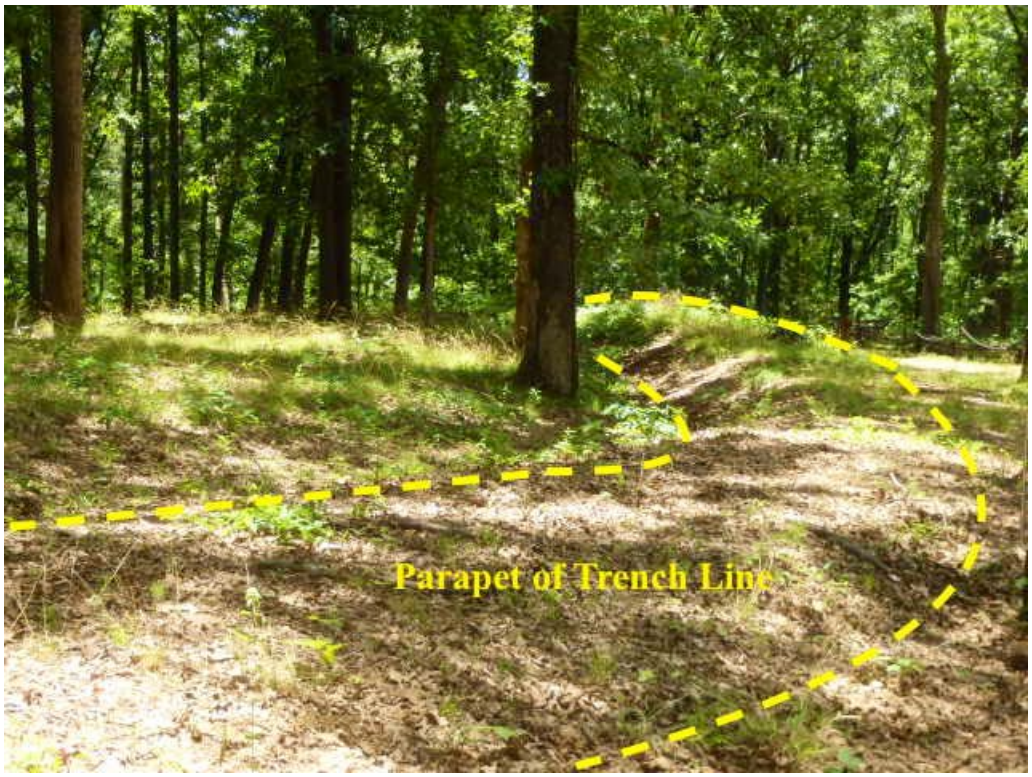

Figure 2.11. Infantry trench parapet at the 'Dead Angle' (Photo by Author).

The preparation of fortifications at Cheatham Hill required planning, skill, and back breaking work. On June 27, the Federals faced an elaborately designed system of very strong fortifications. The infantry trenches themselves, referred to as earthworks, displayed parapets constructed to seven feet tall and twelve feet thick (Figure 2.11), with head logs across the parapet and firing step at the bottom of the trench, referred to as a banquette. The trenches themselves were dug deeper than the height of the tallest man. The firing step allowed the defender to step up and fire beneath the head log and step back down in full cover to reload or move as needed. Fence rails were placed across the trench to catch a head log if it was knocked

[45] Hess, *Fighting for Atlanta,*99-10.

out of place. Cross ditches were also dug in the rear that provided shelter. Traverses were also constructed and connected with trenches. A traverse is essentially a mound of dirt that is placed perpendicular to the trench system, often located on the flanks, that inhibits attackers from firing down the entire line of men in the trench. This type of fortification was a necessity at the "Dead Angle" because its flanks were vulnerable to fire. The traverses at Cheatham Hill, however, were constructed within the trenches at intervals. This type of construction, referred to as in-trench traverses, had not been seen previously in the war (Figure 2.12).[46]

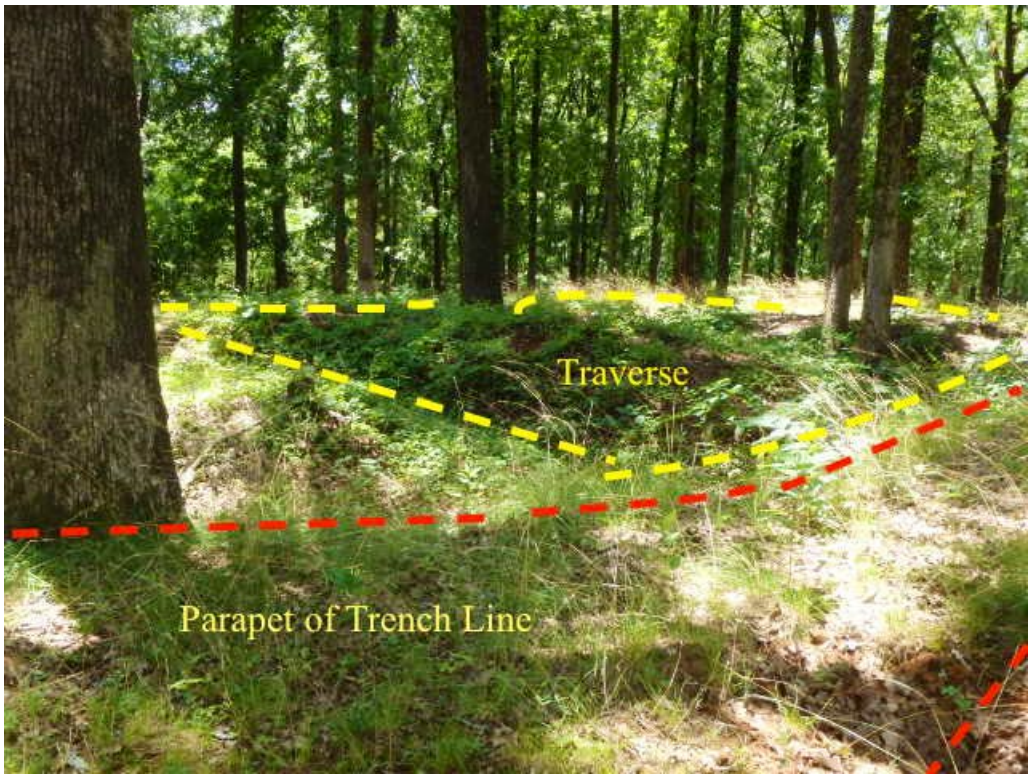

Figure 2.12. A traverse at Cheatham's Hill. The author is looking into the earthworks from the trench line's exterior perimeter. Notice how the traverse intersects the trench line perpendicularly (Photo by Author).

The Confederates also placed obstructions in front of the trenches to impede the Federal's progress. According to Sam Watkins of the 1st Tennessee Regiment entrenched at Cheatham's

[46] Ibid., 100.

Hill, "Previous to the day of the attack, the soldiers had cut down all the tress in their immediate front, throwing the tops downhill and sharpening the limbs of the same…this making an impenetrable abatis of vines and limbs locked together." Confederates placed the abatis about thirty yards in their front. This fortification would halt the enemy, providing excellent targets at close range.[47]

Figure 2.13. An example of abatis used during the American Civil War (American Battlefield Trust).

Beginning on June 21, the Confederate line, especially Cheatham's Hill, received a continuous bombardment. The Federals hoped that cannons along the Confederate line would respond and therefore could be targeted. At Cheatham Hill, the Confederates constructed artillery fortifications behind the infantry trenches higher up on the ridge. These types of fortification are referred to as redoubts, also earthworks. Cheatham ordered the cannons to be camouflaged and further ordered that the cannons not respond when fired upon. This tactic

[47] Sam R. Watkins, *Co. Aytch,* (New York: Simon and Schuster, 1990), 147.

essentially created the illusion that cannons were not placed in support at Cheatham Hill. In reality the Confederates had created a defensive position full of firepower.[48]

Figure 2.14. John Ward Creek at the bottom of the slope (Photo by Author).

Two Tennessee brigades commanded by Brigadier Generals Alfred T. Vaughan and George Maney occupied the Dead Angle and prepared for a fight. Opposite their position, the 14th Federal Corps prepared to launch a furious assault on Cheatham's Hill, as the 15th and 4th Corps faced devastation north along the Confederate line. Major Jefferson C. Davis of Major General John Palmer's 14th Corps received orders to lead the attack with two brigades amounting to 4,000 men. Colonel Dan McCook's brigade positioned itself on the left, its right flank opposite the angle at Cheatham's Hill. Colonel John Mitchell's brigade posted on McCook's right, his left opposite the angle. The Union line formed 600 yards west of Cheatham

[48] Hess, Kennesaw Mountain, 61.

Hill. As the assault began, McCook's and Mitchell's brigades descended a steep slope. At the bottom of the slope, the Federal brigades slogged through a branch of John Ward's Creek and began their ascent up a steep slope toward Cheatham's Hill (Figures 2.14 and 2.15).[49]

Figure 2.15. Federal perspective of the slope upward toward Cheatham's Hill (Photo by Author).

Figure 2.16. Perspective of the downward slope from Cheatham's Hill . This angle depicts the view from the military crest of the hill, forward of the Confederate fortifications (Photo by Author).

[49] Hess, *Fighting for Atlanta*, 120.

Figure 2.17. Palmer's attack. Palmer's sector of attack is marked by the black rectangle in Figure 1.6 (Map by Hal Jespersen www.civilwarmaps.com).

Once in view, however, the Federal onslaught received an immediate and terrorizing crossfire from Confederate rifles and artillery. McCook's men made it to the abatis in front of the Confederate earthworks, but his column collapsed. Once through the obstruction, McCook mounted the defenders' parapet where he was fatally wounded, later to die in his home state of Ohio. Mitchell's men met the same devastation as McCook's men. The right flank of Maney's Tennessee brigade held the angle with soldiers from the 1st and 4th Tennessee Regiments holding the position.[50] Private Sam Watkins of the 1st Tennessee vividly described the perilous fighting at Cheatham's Hill against Mitchell's men:

[50] Ibid., 120-122.

> Column after column of Federal soldiers were crowded upon that line…forty columns deep. It seemed impossible to check the onslaught…The sun beaming down on our uncovered heads, the thermometer being one hundred and ten degrees in the shade, and a solid line of blazing fire right from the muzzles of the Yankee guns being poured right into our very faces, singeing our hair and clothes, the hot blood of our dead and wounded spurting on us, the blinding smoke and stifling atmosphere filling our eyes and mouths, and the awful confusion causing the blood to gush out of our noses and ears.[51]

Mitchells' and McCook's brigades retreated beneath the military crest of the hill where they were obscured and began to dig in using whatever utensils they had. Work was slow because they had to lie down while digging. Men used bayonets, spoons, mess pans, and bare hands to construct their hasty earthworks. The two opposing lines were now so close that soldiers threw rocks at one another. As night fell, reinforcements arrived with proper digging utensils and the trapped Federals improved their position.[52]

Figure 2.18. A Union earthwork at Cheatham's Hill. Confederate fortifications are located in the area of the Illinois Monument (Photo by Author).

[51] *Sherman's Memoirs,* 145.
[52] Hess, *Fighting for Atlanta,* 122-124.

For nearly a week, both armies remained within a close distance, especially at Cheatham's Hill. Day by day, and inch by inch, Federal troops creeped closer to the Confederate lines. The plan was to dig the mine toward the angle over 100 feet away and blow it up. They nearly had it finished until Johnston began to evacuate his Kennesaw Line during the night of July 2. From June 28-29, both sides collected their dead as the stench sickened troops on both sides. Once the dead and wounded were taken care of, the fighting resumed. The Federals actually began lobbing hand grenades toward the Confederate trench line. As private Sam Watkins recalled, "They had a little shell called a hand grenade, but they would either stop short of us, or go over our heads, and were harmless.[53]

On July 2, Sherman began to move his entire army group toward Johnston's left flank. Sherman targeted Marietta as well as the Chattahoochee River. Johnston completely evacuated his army by July 3. By July 9, Johnston retreated south of the Chattahoochee, which he used as an obvious barrier to Sherman's advance toward Atlanta. Jefferson Davis relieved Johnston and replaced him with John Bell Hood on July 17. The battle of Kennesaw had ended, but the war and the Atlanta Campaign still required more lives and hard fighting before the conflict would end.[54] Despite the hard fighting at Kennesaw Mountain, Atlanta fell to Sherman in September 1864.

In summation of Sherman's perilous attack on June 27, 1864, it was a forlorn hope. The consensus among historians is that the attack was a mistake, with no realistic objective. Sherman operated with a high degree of caution throughout the Atlanta Campaign, and he did so on June 27. However, this may have cost him the battle, or at least any significant progress during the fighting. Sherman only utilized eight brigades out of fifty-four that were available. It is almost

[53] *Sherman's Memoirs*, 147.
[54] Vermilya, *The Battle of Kennesaw Mountain,* 166.

as if Sherman knew the attack would fail and sent a small number of men into the fray because he could afford to. Many men were lost but the numbers were insignificant to Sherman's massive army group and did not impact his ability or resources to wage war effectively. An assault may have been justified earlier when the Confederates were preparing their positions, but Sherman continued to bombard Johnston's lines beginning on June 19; in response, Johnston's army continued to improve its defensive positions.[55] The results of attack were not surprising to the participants. Federal troops advanced hundreds of yards across open terrain, in full view of the enemy, and into well-prepared defensive positions that were nearly impenetrable. Ample evidence suggests that Union attackers miscalculated the strength of the Rebel earthworks prior to the attack. Following the attack, Union generals Thomas and Howard reported that they had severely misjudged the Rebel defenses and found them to be "greater obstacles than they appeared to our glasses," and the fact that the Rebel parapets "were seven feet tall and nine feet thick" proved to be a "major factor in the repulse."[56] Colonel James T. Holmes of the 52nd Ohio Volunteer Infantry Regiment commented that the earthworks on Cheatham's Hill could "partially be seen" prior to the attack, also suggesting that the earthworks had been underestimated and poorly reconnoitered. [57] Lastly, a Union artilleryman commented on Confederate General Hood's earthworks that "he had no idea that Hood's troops were " so strongly entrenched till we seen for ourselves."[58] Ultimately, no attack made under similar circumstances succeeded throughout the Civil War, and there was no reason to believe that this one could have concluded any differently.[59] Kennesaw Mountain witnessed nearly 150,000

[55] Hess, *Kennesaw Mountain*, 225.
[56] Hess, *Fighting for Atlanta,* 125.
[57] Garth D. Bishop, ed., *Movements and Positions on the Battle of Kennesaw Mountain: The Memoir of James T. Holmes, 52nd Ohio Volunteer Infantry* (Jefferson: McFarland and Company, 2018), 105.
[58] Hess, *Fighting for Atlanta,* 136.
[59] Castel, *Decision in the West*, 321.

troops engaged in some form beginning in mid-June through July 3. The fighting stole 4,000 souls: 3,000 belonged to Sherman and the rest to Johnston.

CHAPTER 3

POST-CIVIL WAR PRESERVATION EFFORTS AT KENNESAW MOUNTAIN NATIONAL BATTLEFIELD PARK

Cobb County served as a distinct agricultural area throughout the 1860s. Farms, such as the Kolb Farm, were adorned with orchards, fields, and outbuildings that dotted the county's serene landscape. The slopes of Kennesaw Mountain and surrounding ridges remained forested. However, the bloody mayhem that characterized the siege of Kennesaw Mountain profoundly transformed the battlefield's landscape. Trees along the ridges were removed for hundreds of yards in many areas for the creation of fields of fire and earthworks. Soldiers cleared or thinned hilltops and the peaks of Big and Little Kennesaw in order to place artillery batteries.[60] Additionally, one Union soldier witnessed an artillery barrage that blew a gigantic hole in one side of Big Kennesaw Mountain.[61]

Following the battle, farming resumed on the battlefield. Cobb County's population increased between 1860 and 1900. During this time a positive correlation developed between the increased population density and farming intensity within the battlefield's landscape. Increased farming led to the diminishment of forested areas that existed during the battle in favor of cultivated fields. Farmers then maintained their fields by leveling and terracing the slopes to minimize erosion. Intensive farming practices, coupled with the expansion of farmers'

---

[60] Janney Wiss, Elstner Associates, Inc., contractor and John Milner Associates, Inc., subcontractor, "Kennesaw Mountain National Battlefield Park: Cultural Landscape Inventory," National Park Service (2009): 43, accessed June 1, 2019, https://irma.nps.gov/DataStore/Search/Quick. In subsequent citations Kennesaw battlefield will be referred to as KEMO (Kennesaw Mountain), as suggested by National Park Service publications and website.

[61] Lisa M. Brady, *War Upon the Land: Military Strategy and the Transformation of Southern Landscapes During the American Civil War* (Athens, GA: The University of Georgia Press, 2012), 2.

properties and newly-built access roads and farm buildings, led to the destruction of most of the Union earthworks because they existed in lower-lying, flatter areas. Confederate fortifications survived because they were situated along the ridgelines — higher elevated areas that discouraged intensive farming. As time passed, pines slowly replaced the abundance of hardwood trees that once dominated the Kennesaw ridge in 1864. Confederate fortifications that were originally constructed in open areas prior to and during the battle became obscured by this emerging secondary growth and other vegetation.[62]

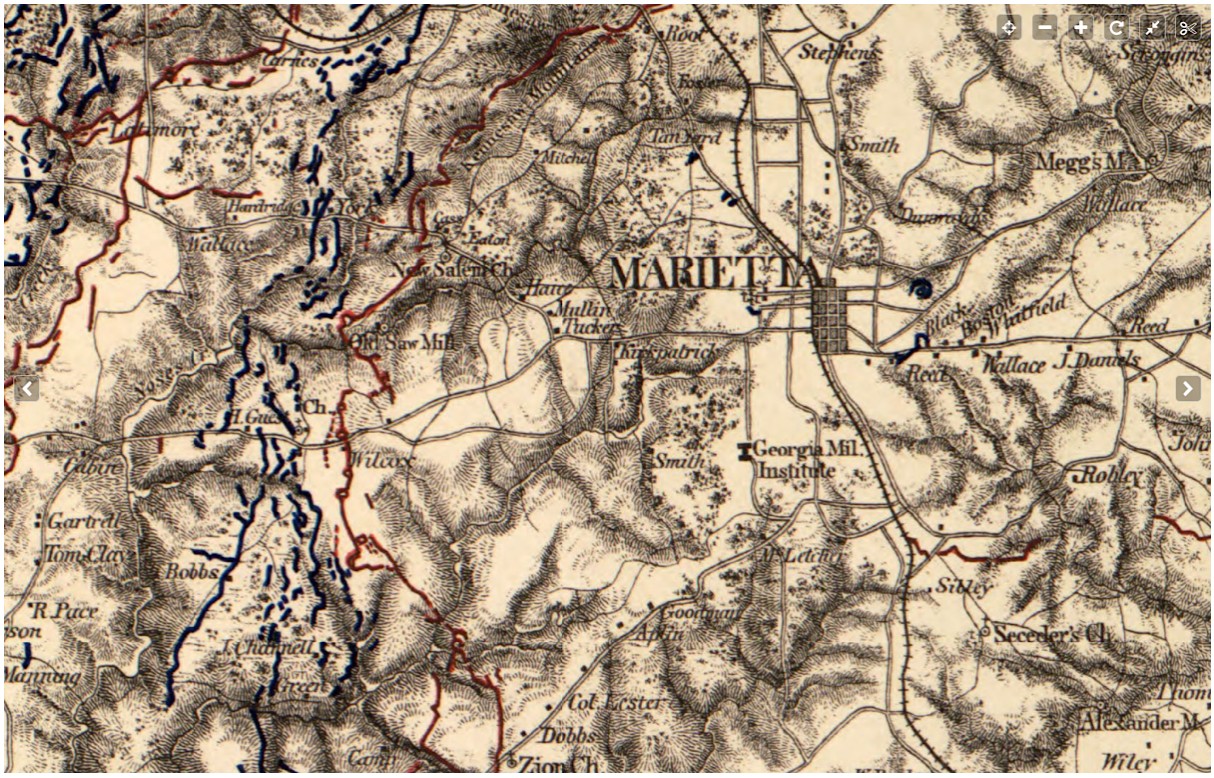

Figure 3.1. A map depicting opposing lines of earthworks at Kennesaw Mountain in June 1864. Red lines indicate Confederate earthworks and blue lines indicate Federal works. Shaded areas in the map indicate forested areas (mostly ridgelines) and lighter-colored areas indicate lower-lying flat land. Earthworks in lower-lying areas faced immediate danger after the battle because of intensive farming practices (Library of Congress).

[62] Wiss and Milner, "KEMO: Cultural Landscape Inventory," 36, 43-44.

Veterans of the battle began to revisit the battlefield during the 1890s and commented on the condition of the landscape and earthworks. Their reports confirmed the emergence of secondary growth associated with the battle's impact on the landscape as well as the continuation of farming practices. In one such report, Theodore D. Neighbor of the 52nd Ohio revisited the battlefield and commented on the "young saplings…growing up through the works." James T. Holmes, also a veteran of the 52nd Ohio, commented on the landscape below Cheatham's Hill as he observed that ground near Federal earthworks had been cleared due to cultivation. The forward Union earthworks on the slope of Cheatham's Hill maintained their integrity but showed evidence of plowing at their base. Although veterans reported the emergence of saplings in the earthworks in combination with characteristics of natural erosion, veterans were easily able to identify their position on the battlefield, whether that was within or amidst the earthworks that remained in the 1890s.[63]

The process of acquiring land for preservation at Kennesaw Mountain began in 1899, during the "Golden Age of Battlefield Preservation" that spanned the entire decade of the 1890s. It was during this decade that the federal government acquired land to commemorate the war and established five Civil War battlefields as national military parks. Battlefield preservation initially served as a conduit for national healing and post-war reconciliation as veterans of the war began to hold massive reunions at various Civil War battlefields.[64] Likewise, as veterans of the Battle of Kennesaw Mountain revisited the battlefield during the 1890s, they endeavored to commemorate Kennesaw as hallowed ground. Preservation efforts at Kennesaw Mountain battlefield began when survivors of Colonel Dan McCook's Third Brigade established the

[63] Earl J. Hess, *Kennesaw Mountain: Sherman, Johnston, and the Atlanta Campaign* (Chapel Hill: The University of North Carolina Press, 2013), 235-236.
[64] Georgie Boge and Margie Holder Boge, *Paving Over the Past: A History and Guide to Civil War Battlefield Preservation,* (Washington, D.C: Island Press, 1993) 6,16.

Colonel Dan McCook Brigade Association in memory of their commander. To commemorate McCook, the association endeavored to acquire the land at Cheatham's Hill where McCook was killed on June 27, 1864. In 1899, a veteran of the 86th Illinois Regiment, Lansing J. Dawdy, purchased a 60-acre trac of land that encompassed both Confederate and Union earthworks at Cheatham's Hill. On February 15, 1900, Dawdy conveyed the land to Martin Kingman and John McGinnis, who then transferred the 60 acres to the Colonel Daniel McCook Brigade Association on August 13, 1904. Kingman and McGinnis did so on behalf of the Kennesaw Mountain Battlefield Association, a non-profit organization, chartered under the laws of the state of Illinois, that tasked itself with commemorating the fighting at Cheatham's Hill by erecting a monument or monuments on the site. The association successfully unveiled the monument that currently stands at Cheatham's Hill on June 27, 1914, the 50th anniversary of the battle. In subsequent years, local citizens volunteered as stewards of the battlefield, which led to the appointment of the first caretaker, J.A. Jones, in 1922.[65]

As early preservation efforts at Kennesaw Mountain were underway, establishment of the first five Civil War battlefield parks – Chickamauga and Chattanooga, Shiloh, Gettysburg, and Vicksburg - set precedents at the national level for battlefield preservation. They are the following: 1) Federal acquisition of private lands for historic preservation was accepted as a public good. This meant that historic properties could be obtained through donation, purchase, or eminent domain. 2) The preservation of battlefields as they appeared during conflict emerged as a congressional interest. 3) The federal government formed three-man commissions operating under the authority of the secretary of war to manage each military park, and 4) Financial responsibility for the preservation of these early battlefields was divided between federal and

[65] Michael A. Capps, "KEMO: Administrative History," National Park Service (1994), accessed Sept. 1, 2019, https://irma.nps.gov/DataStore/DownloadFile/466599.

state governments. As early as 1912, Congress transferred the authority from individual battlefield park commissions to the secretary of war. In 1916, in order to create a single agency that could manage the already numerous, federally-owned lands, Congress created the National Park Service within the Department of the Interior by passage of the Organic Act of 1916; but not before the passage of the Antiquities Act of 1906 which was intended for the preservation of landscapes such as battlefields.[66] The Organic Act of 1916 provided for the future transfer of authority over battlefields to the National Park Service. The Act also set a precedent by creating the overarching policy that the National Park Service be entrusted "to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." Finally, on February 8, 1917, Congress passed the bill authorizing the Kennesaw National Battlefield Site.[67]

The battlefield preservation movement slowed during World War I but gained momentum after the conflict as patriotism and financial prosperity increased Americans' desire for additional military parks. However, veterans of the Civil War were rapidly aging and less able to participate in the vanguard for battlefield preservation across the nation.[68] As a result, Congress devised a plan that aligned with the popularity of the preservation movement while also preserving battlefields cheaply, otherwise known as the "Antietam Plan." As a preservation tactic, the Antietam Plan allowed for the preservation of the smallest amount of land possible that enabled the War Department to interpret the battle's primary action.

With the Antietam Plan in mind, in 1926, Congress authorized the War Department to implement a broad study that eventually developed a classification system of battlefields, with

---

[66] Boge, *Paving Over the Past,* 17, 23, 25.
[67] Capps, "KEMO: Administrative History."
[68] Timothy B. Smith, *The Golden Age of Battlefield Preservation: The Decade of the 1890s and the Establishment of America's First Five Military Parks* (Knoxville: The University of Tennessee Press, 2008) 211-212.

various classes denoting priorities. The War Department's final report placed Kennesaw Mountain specifically within classification IIa. This classification required the acquisition and marking of battle lines, which were already delineated by miles of earthworks that traversed Kennesaw's landscape.[69] As such, in 1926, the War Department acquired the Kennesaw National Battlefield Site which still consisted of the 60-acre tract at Cheatham's Hill. During the same year, Congress authorized an inspection of the Kennesaw Mountain battlefield to determine the feasibility of commemorating it by nominating the battlefield as a national military park. A three-man commission met at the battlefield and voted on Kennesaw Mountain's inclusion as a national military park. The commission also recommended that the park be at least 1,050 acres and include both Big and Little Kennesaw Mountains and the ridge, or saddle, that connected them. The commission arrived at its decision during a critical time as the post-war economic success of the 1920s influenced development in Cobb County which negatively impacted the Kennesaw National Battlefield Site; more than one hundred building lots emerged for sale on certain parts of Big Kennesaw Mountain's slope, and land tracts adjacent to Highway 41 were also valued for development.[70]

Just as areas of Kennesaw Battlefield attracted development, the Great Depression emerged in the late 1920s. By the 1930s, America had regressed into severe economic failure, but the federal government quickly generated a plan to maintain newly protected battlefields as a process of federal departmental reorganization. Thus, on June 10, 1933, President Roosevelt signed Executive Order 6166, which transferred national military parks, national battlefield sites, and national monuments from the War and Agricultural Departments to the Department of the

[69] Robert W. Blythe and Maureen A. Carroll and Steven H. Moffson, "KEMO: Historic Resource Study," IRMA Data Store, National Park Service (1995): 64, accessed Oct. 17, 2019, http://npshistory.com/publications/kemo/hrs.pdf.
[70] Capps, "KEMO: Administrative History."

Interior.[71] This meant that the Department of Interior had just assumed a myriad of historic areas, which placed a heavy burden on the National Park Service. On the other hand, battlefields such as Kennesaw Mountain benefitted from the New Deal relief and funding programs. As a result of the Service's involvement in the public works program, it received additional personnel and funding, which made it possible to maintain and improve the Service's preservation and interpretive programs. Moreover, under the Emergency Conservation Work Program, the National Park Service assumed the responsibility of directing the massive Civilian Conservation Corps (CCC) in the preservation, interpretation and development of the Service's units that had historical and archaeological values.[72]

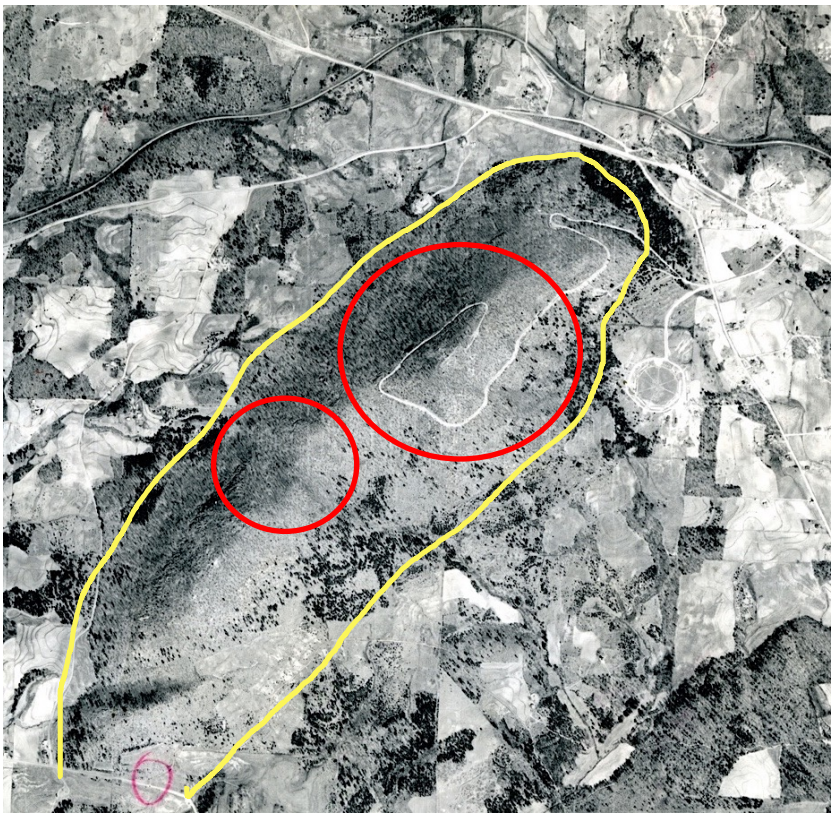

Figure 3.2. An aerial photograph from 1943 depicting Big and Little Kennesaw Mountains and the park's rural environment when the CCC ended its work. Approximate park boundary is shown in yellow. (University of Georgia Map and Government Information Library).

[71] Boge, *Paving Over the Past,* 28-29.

[72] Harlan D. Unrau and G. Frank Willis, " To Preserve the Nation's Past: The Growth of the National Park Service During the 1930s," *The Public Historian* 9, no. 2 (Spring 1987): 26, www.jstor.org/stable/3377328.

Figure 3.3. Works Progress Administration Workers quarrying rocks on Big Kennesaw Mountain for use in road construction at the park in 1935 (Digital Library of Georgia).

The CCC established Camp Brumby at Kennesaw Mountain in 1938 and it remained active until 1942. Most importantly, the CCC played a vital role in the battlefield's completion and transition from farmland to parkland. The Corps led the way in maintenance and improvements such as the expansion of roads, construction of maintenance buildings, and landscape improvements such as soil and water conservation programs as well as vegetation management projects. The CCC also focused on the earthworks at Cheatham's Hill through means of stabilization and interpretation. The Corps constructed a self-help information kiosk and trails that avoided the earthworks but circulated visitors throughout the battlefield site. Additionally, workers covered the earthworks, which had been previously swept clean of vegetation under the War Department's administration, with mulch and planted them with a combination of native and nonnative species. Workers also placed thousands of seedlings in the

area surrounding Cheatham's Hill.[73] By 1935, the fields had undergone rehabilitation measures that included plowing, harrowing, fertilization, and seeding, releasing the fields to a permanent stand of bermuda grass.[74]

During the 1930s, the National Park Service steered its focus toward the preservation of America's past, which swiftly led to the development of a comprehensive interpretive program that would be vital to telling the story of the nation's preserved past. Therefore, it was only fortuitous for the National Park Service and its battlefield sites that Verne Chatelain's work coincided with the early stewardship of the CCC. The National Park Service hired Chatelain in 1931 as the first National Park Service historian and placed him in charge of developing a systematic presentation of America's past. Chatelain advised the National Park Service that it should only focus on sites that outlined significant historical themes in America's past or where dramatic episodes had occurred. By 1937, Chatelain's proposal had become the foundation for the National Park Service's interpretive program.[75]

Chatelain's philosophies directly impacted interpretive efforts at Kennesaw National Battlefield soon after its admission into the National Park Service in 1933. The Civil Works Administration Program provided funding for one historical foreman and a few other employees for interpretive purposes at the battlefield, which still consisted of the 60 acres at Cheatham's Hill. This early interpretive program focused on Cheatham's Hill but also incorporated other aspects of the battle in surrounding areas. The program then sought to advertise the interpretive program at Kennesaw Mountain through media and walking tours. By the late 1930s, the program expanded to include focus areas such as the museum, the peak of Big Kennesaw, and a

[73] Blythe and Maureen and Moffson, "KEMO: Historic Resource Study," 71-72.
[74] Capps, "KEMO: Administrative History."
[75] J. Christian Spielvogel, *Interpreting Sacred Ground: The Rhetoric of National Civil War Parks and Battlefields* (Tuscaloosa: The University of Alabama Press, 2013) 17-18.

much larger provenance that encompassed Cheatham's Hill and Pigeon Hill. At Cheatham's Hill and Little Kennesaw Mountain, the staff created trailside exhibits along with a registration desk at Cheatham's Hill that became so successful that other battlefields contemplated using the same implementation. Prior to World War II, the battlefield planned to expand its interpretive program further, but the war stifled the plans, and public funding was required by 1948 to keep up with interpretive demands. Following World War II and the Korean War, subsequent interpretive efforts continued into the 1960s in the form of audio-visual devices and two tour areas of the battlefield.[76]

In 1935, federal legislation, in conjunction with the Historic Sites Act, established Kennesaw Mountain National Battlefield Park. The Historic Sites Act, pioneered by Roosevelt, embraced historic preservation as official policy. The Act stated that "It is hereby declared that it is a national policy to preserve for public use historic sites, buildings and objects of national significance for the inspiration and benefit of the people of the United States." The Act went beyond the federal government's current role to acquire property by also making it a policy to preserve and protect property while providing for educational and technical assistance for preservation needs. The Act also mandated that the Department of Interior conduct a national survey of historic sites and buildings.[77] The intent of the 1935 legislation, as it pertained to Kennesaw, was to expand the park to include Big and Little Kennesaw and other parts of the battlefield; the battlefield at this time still consisted only of the original 60 acres at Cheatham's Hill. As stated previously, parts of Kennesaw Mountain battlefield were already threatened by housing development and land speculation. However, the Secretary of the Interior was

[76] Capps, "KEMO: Administrative History."
[77] Boge, *Paving Over the Past,* 28.

authorized to accept land donations or declare eminent domain if necessary. The process of acquiring additional land at the battlefield began in 1936 but the process met with immediate difficulties. Purchases were limited to areas of the most significance while also being the least expensive, but landowners were holding out for higher property values. From 1939 to 1941, however, with additional funding by Congress and use of condemnation, the park's size increased nearly to its current size. By 1941, the final condemnation suit was settled when an additional 290 acres were procured, which included federal earthworks, which increased the size of the park to nearly 3,000 acres.[78]

Preservation activities slowed at Kennesaw Mountain battlefield during World War II and the subsequent Korean War. The CCC disbanded during the early stages of World War II as the youth of America entered military service, while federal officials diverted funding elsewhere during both war efforts. Although preservation efforts at the battlefield decreased, both wars incensed patriotism, and visitors once again flocked to national parks during the 1950s. The parks, however, underwent an extended period of deferred maintenance and backlogged improvement projects, resulting in the federal government's Mission 66 program. The Mission 66 program, beginning in 1955 and ending in 1966, was a ten-year rehabilitation program aimed at improving facilities, staffing and resource preservation. The program also resulted in the significant increase of park historians.[79] Effects of the program resulted in road improvements, trail expansion, landscaping, and building construction at Kennesaw Mountain.[80]

The conclusion of the Mission 66 program resulted in seminal changes for the National Park Service, federal agencies, and the preservation of America's past. In 1966, the National

[78] Capps, "KEMO: Administrative History."
[79] National Park Service, "Mission 66," accessed Sept. 15, 2019, https://www.nps.gov/glac/learn/historyculture/mission-66.htm.
[80] Capps, "KEMO: Administrative History."

Historic Preservation Act established a detailed federal program for historic preservation. Among other things, the Act created the National Register of Historic Places and established the criteria by which properties are to be evaluated for listing in the National Register, managed by the National Park Service. Additionally, the Act requires federal agencies to establish historic preservation and planning programs to identify, evaluate, and protect their historic resources. Kennesaw Mountain National Battlefield underwent its nomination for the National Register in 1966. For this to happen, the battlefield's integrity and significance underwent analysis. Integrity is the ability of a property to convey its significance. The seven aspects of integrity are location, design, setting, materials, workmanship, feeling, and association. Likewise, there are four criteria for evaluating significance: A) Association with events that have made a significant contribution to the broad patterns of our history. B) Association with the lives of persons significant in our past. C) Embodiment of distinctive characteristics of a type, period, or method of construction, or represent, the work of a master, or possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction and D) Having yielded, or likely to yield, information important in prehistory or history (for archaeological purposes). It should be noted here that a historic resource can display significance in one or many categories simultaneously, while also possessing several aspects of integrity. The 1966 National Register nomination affirmed that Kennesaw National Battlefield Park is the only National Park Service property that commemorates the Atlanta Campaign, and the battlefield met criterion for significance because Kennesaw's earthworks serve as tangible links to the past within the landscape. Therefore, earthworks, as tangible links to the past, had to retain aspects of integrity, as they did in 1966, in the form of location, design, setting, materials,

feeling, and association. As for their contribution to significance, they satisfied requirements for significance in all categories, A through D.[81]

The National Historic Preservation Act would not stand alone. The Act was closely followed by the National Environmental Policy Act in 1969, otherwise referred to as NEPA. NEPA is both a cultural resource management law as much as it is a natural resource management law. It requires federal agencies to manage their impacts on the human environment, or the natural and physical environment as impacted by the human environment. Section 101 establishes national policy, stating that it is the continuing policy of the federal government to cooperate with state and local governments, as well as public and private institutions, to create and maintain conditions in which man and nature can exist in productive harmony. Section 101(b) charges, among other things, that the federal government has a responsibility to assure for all Americans "aesthetically and culturally pleasing surroundings…and preserve important historic, cultural, and natural aspects of our national heritage."[82]

NEPA and the National Historic Preservation Act had their advantages and disadvantages for the National Park Service. Advantageous to the Service were new policies that provided a more acute focus and direction for management and preservation of historic resources. In general, a policy is a guiding principle or procedure that sets the framework and provides direction for management decisions. Policies are guided by and consistent with the U.S. Constitution, public laws, executive proclamations and orders, and regulations and directives from higher authorities. The National Park Service then translates these sources of guidance into

[81] Charles L. Vial and E. Paul Engstrom, "KEMO National Register Nomination," prepared for the National Park Service (1966), accessed Oct. 1, 2019, https://npgallery.nps.gov/pdfhost/docs/NRHP/Text/66000063.pdf.
[82] Thomas F. King, *Cultural Resource Laws and Practice,* 4th ed. (Lanham, MD: Altamira Press, 2013) 55-56.

cohesive directions.[83] This being said, Kennesaw Mountain National Battlefield Park's nemesis has always been its location. By the 1960s, due to continued population growth in the Cobb County area, the edges of the park were defined by clusters of homes.[84] Additionally, at least by 1966, inholdings — private property within the battlefield's boundary that is not owned or directly managed by the National Park Service — amounted to 800 acres.[85] With these immediate issues at hand, it would be very difficult for Kennesaw Mountain battlefield to assure Americans "aesthetically and culturally pleasing surroundings," as specified by NEPA. To date, however, Kennesaw Mountain National Battlefield Park has met this arduous task with success, although a continued struggle, given its unique position as the largest contiguous green space in the metro Atlanta area.

The National Environmental Policy Act aroused intrigue for the development of environmental education within the National Park Service system. In 1968, the biggest change in Kennesaw's interpretive program occurred. The National Park Service began a working relationship with the Educational Consulting Service on National Environmental Education Development materials for schools, intended to raise environmental awareness in schools and park interpretive programs. The program allowed participants to learn about subjects such as reforestation and ecology.[86]

Leading into the 1980s, the earthworks at Kennesaw showed obvious signs of erosion caused by both invasive vegetation and human interaction. These maintenance issues coincided with the arrival of energy crisis in the 1970s as park visitors were less likely to travel long

---

[83] National Park Service, Polices and Guidance, accessed Oct. 1, 2019, https://www.nps.gov/policy/DOrders/thingstoknow.htm.

[84] Capps, "KEMO Administrative History."

[85] Vial and Engstrom, "KEMO National Register Nomination."

[86] Capps, "KEMO Administrative History."

distances to parks elsewhere. In 1979, conservation groups conducted surveys that pressured Congress into forcing the National Park Service to identify problems with the parks. The surveys culminated into a 1980 State of the Parks Report that identified problems with park resources. The parks then responded by completing and issuing a general management plan for each park.[87] Kennesaw battlefield, too, began to reflect the overall awareness of the National Park Service's need for a planned approach to cultural resource management. Kennesaw Mountain National Battlefield Park's General Management Plan, published in 1983, identified the issues associated with increased population growth in Cobb County and the effect it would have on its cultural and natural resources, more specifically, earthworks. According to the plan, "visitors have trampled the vegetative cover on some of the park's earthworks resulting in localized erosion," leading the park to ameliorate the threats to the earthworks through monitoring and appropriate stabilization. With its new management plan in place, the park-initiated stabilization and restoration measures for the earthworks, which coincided with the increase in cultural and natural resource awareness during this particular era. The park had already begun to implement its then-developing management strategy as evidenced by the earthworks at Big Kennesaw, Pigeon Hill, and Cheatham's Hill that were fertilized and reseeded, followed by additional work in 1984 that included ongoing maintenance on the Big Kennesaw artillery redoubts in addition to tree removal.[88] Moreover, Kennesaw battlefield continued with its interpretive program that combined environmental education with thematic interpretation in a way that focused on the daily life of the Civil War soldier. This was

[87] The Conservation Foundation, *National Parks for a New Generation: Visions, Realities, Prospects* (Washington, D.C.: The Conservation Foundation, 1985) 116-134.
[88] National Park Service, " KEMO General Management Plan and Environmental Assessment," IRMA Data Store (1983) 1, 8, 12, accessed Oct. 10, 2019, https://www.nps.gov/kemo/learn/management/upload/KEMO_General-Management-Plan_1983-2.pdf.

accomplished primarily by diverting the living history program away from the visitor center to Cheatham's Hill, where the earthworks continued to play a prominent role in the interpretation of the battle.[89]

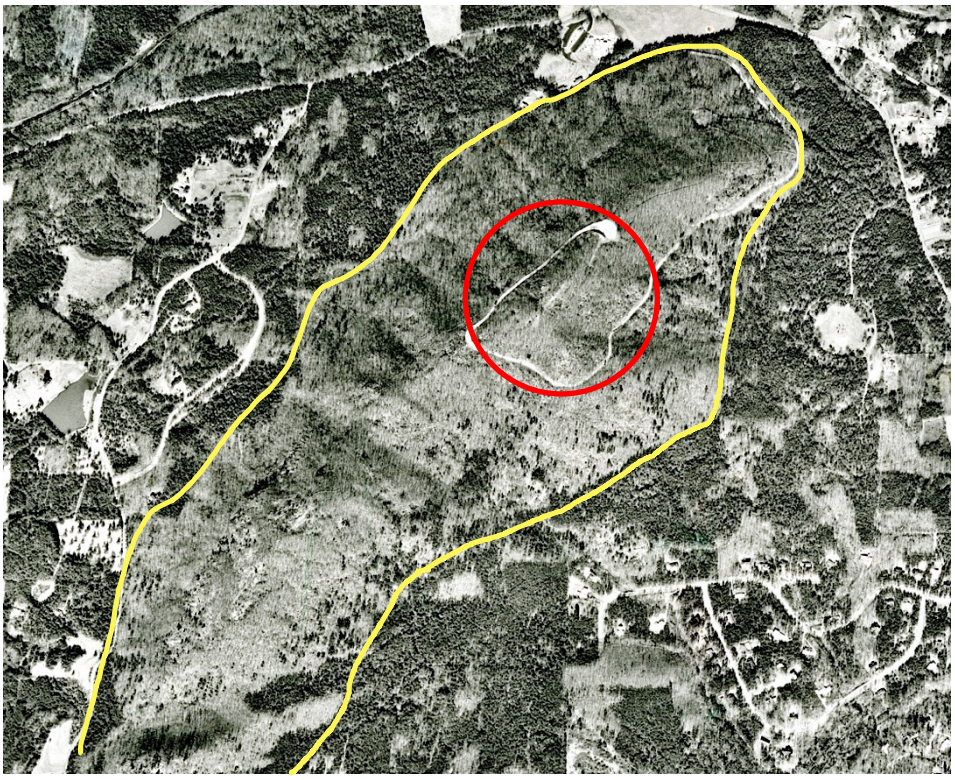

Figure 3.4. An aerial photograph from 1972 depicting Big and Little Kennesaw Mountains at the north end of the park. The road that ascends Big Kennesaw can clearly be seen. The photograph illustrates the emergence of thick forestation within the park by the 1970s and the growth of Marietta toward the park as seen in the lower right of the photo (University of Georgia Map and Government Information Library).

When national parks completed their general management plans in the 1980s, broad and acute issues related to cultural and natural resources were identified within each park. Kennesaw battlefield's primary issue was and continues to be its location within Cobb County and the area's associated population density. When the battlefield published its management plan in 1983, the number of visitors to the battlefield that year totaled at approximately 946, 672 visitors,

[89] Capps, "KEMO Administrative History."

which directly impacted the sustainable quality of the park's resources.[90] The battlefield would now have to maintain and monitor its cultural and natural resources while also monitoring and accommodating visitors. With funding and staff stretched thin, and judging by Kennesaw's management plan, it does not appear that the management plan could harness these combined issues. With increasing numbers of visitors at Civil War battlefields, coupled with destructive commercial and residential development, the continued loss of these battlefields' integrity warranted a national response on their behalf.

Many Civil War battlefields, including Kennesaw Mountain, were once located in rural areas, but suburban growth and infrastructural development since the war severely damaged the integrity of battlefield land across the nation. By the early 1990s, the nation recognized this as a serious problem that quickly gained the attention of Congress. In 1991, in coordination with the Secretary of the Interior, Congress appointed a 15-member committee — the Civil War Sites Advisory Commission (CWSAC) — whose job it was to identify significant Civil War sites, determine their condition, assess threats to their integrity, and offer alternative for their preservation and interpretation. CWSAC listed Kennesaw Mountain National Battlefield Park as a Priority 1 battlefield which is a battlefield that displayed a critical need for coordinated nationwide action by the year 2000. The commission found that Kennesaw battlefield retained fair integrity with a high level of threat. Although the National Park Service retained and managed most of the battlefield, as it still does, small portions of the battlefield, including earthworks, continue to exist beyond the current boundary on land that is privately owned and probably not salvageable at all. CWSAC's recommendations for continued preservation encompassed the partnership and coordinated effort between federal, state and local

[90] National Park Service, "Annual Park Recreation Visitation (1934-Last Calendar Year)," NPS Stats and Park Reports, IRMA Data Store, accessed Oct. 5, 2019, https://irma.nps.gov/Stats/Reports/Park/KEMO.

governments, and the public to develop a national, comprehensive battlefield preservation plan. The Committee reported that, in the U.S., historic preservation "has tended to focus on sites, buildings, and historic districts of more modest size than most Civil War battlefields," meaning that battlefields as cultural landscapes had more-than-likely experienced neglect by state and local historic preservation programs and committees.[91] With this being said, the management and preservation of cultural landscapes, such as battlefields, would finally be addressed at the federal level indefinitely through the Department of Interior.

It was not coincidental, then, that the *Secretary of the Interior's Standards for the Treatment of Historic Properties* were revised in 1992 to include landscapes and the reduction from seven to four treatments: preservation, rehabilitation, restoration, and reconstruction. *The Guidelines for the Treatment of Cultural Landscapes* developed as a result of the revisions and illustrate how these treatments should be applied to cultural landscapes in ways that meets the Standards. The Guidelines remain essential to developing a preservation plan process for all cultural landscapes. The general outline for a preservation plan, a directed by the Secretary, is as follows: historical research; inventory and documentation of existing conditions; evaluation of integrity and significance; development of a cultural landscape preservation approach and treatment plan; and the development of a cultural landscape management plan and strategy for ongoing maintenance.[92] These Standards and Guidelines arrived at the precise time to be implemented at Kennesaw Mountain National Battlefield Park moving into the twenty-first century.

---

[91] National Park Service, "Civil War Sites Advisory Commission Report on the Nation's Civil War Battlefields," 38,49, accessed Oct. 10, 2019, http://npshistory.com/publications/battlefield/cwsac/report.pdf.

[92] National Park Service, Secretary of the Interior's Guidelines for Preservation Planning and the Treatment of Cultural landscapes, accessed Oct. 7, 2019, https://www.nps.gov/Tps/standards/four-treatments/landscape-guidelines/preservation_planning.htm.

Between 1992 and 2006, lands classified as forest or wetlands decreased from 60% to 30%, whereas lands classified as residential or those classified as commercial/industrial/transportation increased from 26.6% to 38.5%. From 1992 to 2010, the human population increased by 70% in the watershed upstream from the battlefield and 52% in the area surrounding the park.[93] In 2005, the Civil War Trust listed Kennesaw Mountain National Battlefield as one of America's most endangered Civil War battlefields. As recently as 2008, the Trust's annual list of endangered battlefields has Kennesaw battlefield listed as at-risk.[94] With the increase in development around the park, and the heavy volume of annual visitors, the integrity of the park's historic resources began to deteriorate.

To address the problem, in 2013 Kennesaw battlefield completed and issued its Cultural Landscape Report (CLR). The purpose of a CLR is to inventory and evaluate park resources, to consider improvements to these the condition of park resources, and implementation of strategic planning efforts. The goal of the CLR at Kennesaw Mountain was to assess the condition of the battlefield landscape, which would then allow the implementation of special treatment recommendations and strategies. The Secretary's Guidelines and Standards for preservation planning, as aforementioned, formed the basis of the CLR, which is comprised of three parts: Site physical history, a Treatment plan, and an Earthworks Management Plan.[95]

According to Kennesaw's CLR, in 2010, the earthworks were assessed as being in good condition. Threats to their condition included looting and theft, inadequate preservation or

[93] National Park Service, "KEMO State of the Park Report," IRMA Data Store (2013): Executive Summary (V), 15, accessed Oct, 10, 2019, https://irma.nps.gov/DataStore/DownloadFile/546103.
[94] National Park Service, Kennesaw Mountain National Battlefield Acquires Key Land Tract, accessed, Sept. 7, 2019, https://www.nps.gov/kemo/learn/news/kennesaw-mountain-national-battlefield-acquires-key-land-tract.htm.
[95] Wiss, Janney, Elstner Associates, Inc., contractor and John Milner Associates, Inc., Subcontractor, " KEMO Cultural Landscape Report," National Park Service (2013) 4,9,10, IRMA Date Store, accessed May 5, 2019, https://irma.nps.gov/DataStore/DownloadFile/551165.

rehabilitation activities, vegetation, visitation, gravity, storm water erosion, and post-war farming practices.[96] The management plan for earthworks included the identification of specific locations for visitor access, strategies for interpretation and applied themes, and the condition that earthworks should be managed in. Similar to landscape preservation overall, the Secretary's Guidelines and Standards formed the basis of the Plan. In addition, the EMP recognized the need for park staff to be able to identify the form, function and character of earthworks so that more current conditions could be better understood in the field. Second, proper identification of the earthworks could also be used to support recommendations for sustainment and protection. Also, proper identification could support interpretive programs associated with earthworks.[97] Today, Kennesaw Mountain National Battlefield Park continues to successfully use this plan for managing the earthworks.

With the new framework for preservation planning and management came the broader role for interpretation at Kennesaw battlefield. The battlefield issued its Long-Range Interpretive Plan in 2013, which assists the General Management Plan and describes the experience of visitors and related goals and recommends ways to achieve these goals through interpretive media, education programs and personal services. Kennesaw's LRIP is deliberate in acknowledging the fact that battlefield preservation and interpretation are inextricable; both are the purpose the Kennesaw Mountain National Battlefield Park. The LRIP applies a strict focus on the battlefield's earthworks as a basis for the park's interpretive themes that include education the public about the battle and its relationship with the Atlanta Campaign and the entirety of the Civil War. Additionally, the preservation of earthworks at Kennesaw also illustrates and broadens the role of slavery during the war because slaves assisted in fortification construction,

[96] Ibid., 268.
[97] National Park Service, "Earthworks Management Plan," in "KEMO Cultural Landscape Report," B-45.

therefore generating an ethnographic link to the earthworks.[98] The LRIP also makes it clear that the battlefield is significant in many ways because of the 11 miles of earthworks that are preserved. By preserving the earthworks, the battlefield remains, and can be interpreted as, a field lab for military defensive fortifications and associated offensive and defensive strategies pertaining to earthworks during the American Civil War. [99]

Conclusion

Summarily, one of the goals of this chapter was to assess the broader scope of battlefield preservation overall, and then narrow the focus to earthworks within the chronological narrative. As cultural and natural resources, earthworks at Kennesaw, in some instances, were victimized by changes in the landscape following the Civil War. For example, they were destroyed by intensive farming techniques, which only intensified because of the increased migration of farmers to the Cobb County area beginning in the late nineteenth-century. Subsequent changes at the national level, mostly concerning legislation, allowed the acquisition of battlefield land containing earthworks at Kennesaw, therefore also acquiring earthworks for their own protection. Early interpretive programs at Kennesaw began at the earthworks at Cheatham's Hill, which continues to be one of the main focus areas for the visitor's understanding of preservation and interpretation at Kennesaw Mountain Battlefield. In this way, continued preservation allowed the development of interpretive programs over time.

Documentation of post-Civil War preservation efforts at Kennesaw Battlefield has created a narrative in which earthworks can be understood as complex resources, beyond only

---

[98] Harpers Ferry Interpretive Design Center and Kennesaw Mountain National Battlefield Park and the Southeast Regional Office., "KEMO Long Range Interpretive Plan," National Park Service (2010) Introduction, 10, 17, IRMA Data Store, accessed May 23, 2019, http://ehap.hss.kennesaw.edu/sites/commons.kennesaw.edu.ehap/files/kemo_lrip_copy.pdf.
[99] Ibid., 11.

historicizing preservation efforts over time. While this historical narrative has been very useful in understanding changes to earthworks and the battlefield's landscape over time, the narrative also reveals earthworks as cultural resources, natural resources, historic resources, archaeological resources, and architectural resources within an even more complex cultural landscape. And even more complex is the fact that they have to be interpreted as such. To be clear, because the National Park Service has done such a harrowing job at preserving the earthworks, given its very limited funding, the fortifications continue to exist as evidence of human manipulation of the ecosystem during the battle, giving credence to the battlefield as a significant historic landscape, a cultural landscape. It should also be reiterated that existing earthworks beyond the current National Park Service boundary are salvageable, but barely. Kennesaw Mountain National Battlefield Park is the largest contiguous green space in the metro Atlanta area, but development has consumed the land on the park's border, and with it, earthworks. Additionally, within the past decade, the increase in the visiting population to the park positively correlates with the slow destruction of the earthworks. Thus, Kennesaw's historic resources are being destroyed from within the park as well. As a more recent solution to the problem, Kennesaw has implemented a $5 parking fee per vehicle. A portion of this fee will go directly toward sustaining the earthworks. The fight for earthworks sustainability continues. They are not forgotten.

CHAPTER 4

CURRENT NATIONAL AND INTERNATIONAL METHODS AND TECHNIQUES EMPLOYED FOR THE PRESREVATION OF EARTHEN MILITARY FORTIFICATIONS

The purpose of this chapter is to provide a comparative overview of best practices globally for the protection and management of earthworks. Earthworks have been recognized nationally and internationally as finite resources and have received increased attention on a global scale over the past few decades. Although international resources are used here, the National Park Service's work is also relied upon, as the Park Service has been internationally recognized nationally and internationally as the leader in earthworks preservation scholarship. While plenty of material produced by the National Park Service has been relied upon here, the focus is not on Kennesaw Mountain National Battlefield Park. The goal is to acquire resources that represent a diversity of views from a diversity of angles that can be brought together in a way that improves the field of earthworks preservation.

National and International Guidelines

There are two international charters specifically related to the preservation of earthworks: *The Vimy Declaration for the Conservation of Battlefield Terrain* and *Charter of Fortifications and Related Heritage; Guidelines for Protection, Conservation and Interpretation.* Both documents are foundational for understanding that earthworks are threatened internationally and offer broad-based methods and concepts for their continued preservation. At both the national and international level, the National Park Service's *Guide to Sustainable Military Earthworks*

Management is by far the most intricate and explanative source that underpins current earthworks preservation guidelines.

Charter of Fortifications and Related Heritage

The International Council on Fortifications and Military Heritage (ICOFORT) serves as the advisory ICOMOS (International Council on Monuments and Sites) committee on fortifications. ICOMOS members established ICOFORT in 2005. After the committee's establishment, ICOFORT produced its *Charter of Fortifications and Related Heritage* over a ten-year period, concluding with the initial draft in 2017. The objectives of the charter "are to establish basic principles for interventions and methods of research that are specific to the conservation, protection and value of fortifications and surrounding military cultural landscapes."[100]

ICOFORT bases its objectives on a few governing principles that are true for earthworks everywhere. Firstly, ICOFORT correlates the pervasiveness of earthworks with human history as humans have been engaged in warfare for thousands of years; thus, the need for fortifications for protection from other humans. Secondly, through the understanding that humans designed and constructed said fortifications, ICOFORT asserts that fortifications are cultural resources that continue to connect humanity with its past through preservation. Thirdly, because earthworks are defensive fortifications, they have intrinsic problems which are wholly or partly distinct from other types of heritage. These problems arise, "perhaps more than other categories and types of heritage," from earthworks' history, meaning, and strategic rationales for their design and location. Knowledge of these values are essential to their preservation and protection. According to ICOFORT, "the lack of knowledge of the formal and functional characteristics of

[100] ICOFORT, "*Charter of Fortifications and Related Heritage: Guidelines for Protection, Conservation and Interpretation*," accessed November 1, 2019, https://www.icofort.org/copia-executive-committee.

the fortification can be much greater than for other types of heritage structures. Therefore, fortifications and related defensive heritage need to be studied and documented by people with appropriate skills and expertise." Once professionals identify the original form and function of the earthwork, as well as its physical morphology over time, ICOFORT's charter suggests broad-based, preservation methods that must originate from a Master Conservation Plan.[101]

The chief goal of the Master Conservation Plan is the retention of integrity and significance by using the least-destructive methods of preservation possible. The Master Conservation Plan should entail essential elements of preservation such as identification, morphology, assessment of current conditions, monitoring, and a protection and management plan. Although ICOFORT's suggestions for earthworks preservation reflect basic preservation concepts with little emphasis on physical preservation techniques, its *Charter of Fortifications and Related Heritage* is a useful document for the introductory understanding that earthworks are endangered all over the world and it is humanity's job to preserve them as cultural resources.[102]

Vimy Declaration for the Conservation of Battlefield Terrain

Prepared in most part by a collection of preservation organizations such as Parks Canada National Historic Sites, Veterans Affairs Canada, and the National Park Service as a consultant, the *Vimy Declaration for the Conservation of Battlefield Terrain* is a prominent document that addresses earthworks and corresponding fundamental preservation concepts and methods that have been successfully implemented at two World War I battlefields: Vimy Ridge and Beaumont-Hamel. The charter's suggested methods and preservation concepts are derived from the observation that earthworks are finite resources within a battlefield's landscape.

[101] Ibid.
[102] Ibid.

Additionally, battlefields containing earthworks retain their "integrity when evidence of the battle or of preparation for it is legible, coherent and protected…when significant features are retained."[103]

The charter defines conservation treatment as an "intervention to conserve, stabilize, protect or otherwise delay the loss of battlefield terrain," with the primary objective of treatment being the preservation of battlefield resources for future generations. Very similar to ICOFORT's charter, the Vimy charter discusses the need for the creation of management plans supervised by knowledgeable professionals. These management plans must fundamentally include historic research, condition assessment, planning, and monitoring. Vimy's charter is of particular interest because of its focus on sustainability of conservation treatments. All conservation treatments have to be sustainable as resources used during any treatment must also be available in the future for long-term protection. Treatments should also be applied according to a planning process, or similar to ICOFORT's charter, a master conversation plan. If not, features of earthworks might have to be reconstructed in the future which concludes in the loss of integrity of the structure as well as the entire battlefield. However, if repairs are to be made to earthworks, they should be done so in a way that does not compromise the integrity of adjacent resources or in ways that use the least intrusive methods to prevent damage during treatment. In addition, professionals should be knowledgeable of an earthwork's authentic form and function, so as to not make repairs to component of an earthworks that already maintain integrity and significance. [104]

[103] Veterans Affairs Canada, *The Vimy Declaration for the Conservation of Battlefield Terrain,* accessed January 20, 2019, https://www.veterans.gc.ca/eng/remembrance/memorials/overseas/first-world-war/france/vimy/declaration.
[104]Ibid.

The Vimy Declaration for the Conservation of Battlefield Terrain suggests broad-based preservation fundamentals for earthworks preservation. These fundamentals, however, transpired into physical, effective preservation measures at Vimy and Beaumont-Hamel battlefields with the use of timber board walks and viewing platforms that allow visitors to interact with, and interpret, earthworks without accelerating erosion. With these battlefields as examples, it can be concluded that basic preservations concepts related to earthworks, although stated broadly in the charter, can be applied to site-specific conditions in ways that creatively alleviate current problems with earthworks at the national and international level.

Guide to Sustainable Military Earthworks Management

The importance of the National Park Service's *Guide to Sustainable Military Earthworks Management* cannot be overstated. The guide is currently the most essential preservation piece for earthworks nationally and has been consulted many times internationally for earthworks preservation including the creation of the *Vimy Declaration* and ongoing projects such as those at Hadrian's Wall in England. The most unique and helpful characteristic of the guide is that it offers guidelines that pertain to physically preserving earthworks. The guidelines include managing soil erosion for earthworks maintained under grass cover and forest cover, preservation techniques such as resource monitoring and interpretation, and best sustainable practices for earthworks preservation, just to name a few. One of the more crucial characteristics of the guide is that it addresses specific conditions for earthworks under grass cover and forest cover. Said conditions range from poor to fair to good and are especially useful for establishing initial baselines for current conditions of earthworks as part of an annual resource management program that accommodates an overall preservation plan for a park or site.

The international charters introduced share commonalities in their concern for stopping or slowing damage done to earthworks. As both charters have suggested, retention of an earthwork's original form and function are vital to the preservation process because these physical features are directly related to an earthwork's integrity and significance. When earthworks are authentic and have integrity, communities all over the world place value in these resources because of a cultural attachment to the fortifications. When an earthwork's form and function become obscured anywhere in the world, a myriad of current research identifies erosion as the primary culprit. Unique implements such as timber boardwalks and viewing platforms currently in use at Vimy Ridge and Beaumont-Hamel battlefields in France have been successful in combating erosion caused by human interaction.[105] But the process of erosion, and solutions related to erosion, are complex for a variety of reasons. This is where essential preservation resources such as the National Park Service's *Guide to Sustainable Military Earthworks Management* becomes useful and is used judiciously for this chapter.

Introduction to Erosion Management

Erosion is the primary destructive force of earthen military fortifications around the world. Erosion is a natural process that occurs when an erosive force exceeds the soil's ability to resist the erosive force. If soil resistance is exceeded, soils can be removed and transported elsewhere. Therefore, the only methods to reduce erosion are reduction in erosive forces, an increase in resisting forces, or the combination of the two.[106] Erosive forces that impact military earthworks can be placed into two categories: biotic and abiotic. Biotic forces are those that are living: plants, humans, animals, and organisms. Abiotic factors are non-living forces, such as

[105] Natalie Bull and David Panton,"Drafting the Vimy Charter for Conservation of Battlefield Terrain," *The Journal of Preservation Technology* 31, no. 4 (2000): 9-10, accessed July 22, 2019, www.jstor.org/stable/1504672.
[106] United States Department of Agriculture,"Erosion Control Treatment Selection Guide," accessed November 15, 2019, 1, https://www.fs.fed.us/t-d/pubs/pdf/hi_res/06771203hi.pdf.

wind, rain, climate, and temperature.[107] The abiotic and biotic factors introduced here represent a multitude of factors that are difficult to completely control. Because of this, the erosion process cannot be entirely stopped, but it can very well be mitigated in such ways that the erosion process is slowed. This section will focus more on the abiotic processes. Succeeding sections will apply more focus on the biotic processes, but a brief introduction was called for here.

The process of erosion is unquestionably slowed when military earthworks are covered by some type of vegetation. Vegetation always offers some level of protection from biotic and abiotic forces. There are four types of vegetation that can generally be found growing within, on top of, or in the vicinity of an earthwork: grasses, herbs (herbaceous plants), woody plants and shrubs, and trees. Grasses are quick growing, quick to regrow, and can offer dense protective cover. Grasses are also helpful because their root systems, although shallow, are complex and dense, which can mitigate surficial erosion. Herbaceous plants can grow annually or perennially and have little or no woody tissue. They, too, have shallow, dense root systems, but herbs tend to grow close to the ground and provide a dense cover. Woody plants have perennial woody stems and support vegetative growth. Shrubs are defined as low-growing woody plants with multiple stems. In some cases, shrubs may be preferred over trees because of their ease of maintenance or in areas where visibility is essential. Trees are perennial woody plants with a distinct stem and crows. Depending on the type of soil, tree roots can grow up to several meters deep and wider. Trees, then, are very capable of reinforcing soils on slopes, but become subject

[107] Joanne E. Norris, Alexia Stokes, Slobodan B. Mickovski, Erik Cammeraat, Rens Van Beek, Bruce C. Nicoll, and Alexis Achim, eds., *Slope Stability and Erosion Control: Ecotechnological Solutions,* (Dordrecht: Springer, 2008), 70-74, accessed November 7, 2019, Springer Link, https://link-springer-com.proxy-remote.galib.uga.edu/book/10.1007%2F978-1-4020-6676-4.

to windthrow, an unwanted process where a tree is pushed over by wind and the tree trunk upturns the soil around it.[108]

Vegetation is crucial to an earthwork in two ways main ways: Presence of vegetation can mitigate the erosion process caused by abiotic or biotic forces, or a dearth in vegetation can allow for greatly increased rates of erosion caused by these forces. This relationship between vegetation and abiotic forces can best be explained and understood with a foundational knowledge of ground and water bioengineering and their effect on slope stability. Ground bioengineering and water bioengineering are the two terms used to describe the structured use of vegetation when it is used to enhance the performance of slopes or earth structures. These methods are becoming increasingly useful throughout the world as both an effective and economical means of stabilizing unstable slopes.[109] Because military earthworks can consist of multiple slopes, the erosion of materials downward is simply made easier with gravity. Therefore, much of the research that follows in this section is comprised of not only explaining the vital relationship between vegetation and abiotic forces but also how this relationship is perpetuated on slopes which are the most crucial components of an earthwork during erosion.

The most culpable abiotic forces to affect soil erosion are water, wind, temperature, and climate. First, it is best to begin with a fundamental understanding of the relationship between vegetation and its mitigating role with water erosion. Plants enhance slope stability because of their root systems and foliage. Roots act like tensile elements that can reinforce soil stability much like an anchor that holds soil in place. Plants hydrologically increase slope stability by regulating the moisture level of soils they are growing in a dual process: transpiration and

[108] Ibid., 67.
[109] David H. Barker, Alex J. Watson, Samran Sombatpanit, Ben Northcutt, Amado R. Maglinao, with assistance from Tony M. Ang, eds., *Ground and Water Bioengineering for erosion Control and Slope Stabilization* (Enfield: Science Publishers, Inc., 2004), 1, 171-172.

evaporation. During transpiration, water is transferred from the soil through the roots and released into the atmosphere through the leaf. During evaporation, a plant's foliage will intercept rainfall which reduces the amount of water available for soil infiltration.[110] Rainfall that has been intercepted will then evaporate into the atmosphere. Any water that is not captured by vegetation is then passed to the surface, especially if the storage capacity of the plant is exceeded due to continuous waterflow. Rainfall that is not intercepted at the canopy level, must be intercepted by undergrowth and litter that cover the soil. Removal of vegetation in this scenario can increase water infiltration of the soil and exceed the soil's ability to store it, allowing water to travel to greater depths and possibly lead to landslides.[111] This, of course, can also depend on the type of soil infiltrated by water. "Soil erodibility" is the susceptibility of a soil to be eroded. Soils with faster infiltration rates combined with a healthy amount of organic matter and complex root structures tend to have a greater resistance to erosion. Loam-textured soils tend to be less erodible than silt, sand, and clay textured soils.[112] For example, sandy clay loam has a medium to high surface erosion potential but is very supportive of vegetation establishment. On the other hand, pure clay has a low to medium surface erosion potential and fair to good support of vegetation establishment. Clay is a denser soil, though, and if too hard, can impede root growth.[113]

A more specific and notable type of water erosion that military earthworks will most likely encounter is interrill erosion. Interrill erosion is composed of two parts: splash erosion and sheet erosion; splash erosion being the more common type. Splash erosion occurs when water droplets impact bare soil and dislodge soil particles. If bare soil is left unattended, splash erosion

[110] Ibid., 2-3.
[111] Joanne E. Norris and eds., *Slope Stability and Erosion Control,* 72.
[112] Ibid., 49.
[113] United States Department of Agriculture,"Erosion Control Treatment Selection Guide," 7-8.

will result in the formation of a "crust" seal, also called surface sealing, which will cause soil to become impermeable and inhibit vegetation establishment. The second type of interrill erosion is "sheet erosion", caused by shallow surface flow over soil. If water flow is continuous and unmonitored, splash erosion can turn into sheet erosion. Overall, the severity of interrill erosion depends on soil erodibility, slope length and angle, storm duration, rate of snowmelt, and vegetative cover.[114] Because water is such a primary factor in erodibility, it can be thought of as an "activator" of erosion, and even dense clay is not safe from it. If clay is exposed to continuous rainfall, it can liquify and wash away, and even shrink and expand.[115]

Climate, temperature and wind also impact soils on earthen fortifications. Wind is the more obvious abiotic factor. If bare soil is exposed, wind can remove soil particles. Climate and temperature can be a bit more complex. As far as temperature is concerned, vegetation establishment is more consistent with long growing seasons and low freeze/thaw frequency. Although snow or ice melt can increase vegetative establishment through increased soil moisture, snow and ice can increase weight, which can then increase water runoff and erosion while melting.[116]

The abiotic forces described above affect vegetation, especially on slopes. Vegetation growing on slopes can respond physically to these forces. When abiotic stressors, such as wind loading, erosion, debris flow, and runoff, are applied to vegetation, modifications in the vegetation's growth process might occur. This process is referred to as 'thigmomorphogenesis.' The way in which a tree or plant responds to this process will have consequences for the subsequent growth and anchorage to a slope. When a woody plant or tree is subjected to abiotic

[114] Ibid., 3.
[115] Louise Cooke, *Conservation Approaches to Earthen Architecture in Archaeological Contexts,* BAR International Series 2147, (Oxford: Archaeopress, 2010), 33.
[116] United States Department of Agriculture, "Erosion Control Treatment Selection Guide," 36.

stress, a specific strain is the result. The two types of strain are elastic and plastic, which can manifest in a plant's stem, branches and root structure. Elasticity occurs when a plant is subjected to an abiotic stress and returns to its original condition, or reversible condition. Plasticity, on the other hand, occurs when an abiotic stress is so severe that a plant cannot return to its original state and irreversible damage is the result.[117]

Vegetation on slopes can respond differently to specific abiotic stressors. When a plant experiences wind force, the plant can respond by strengthening its stem, changing its root system, and reducing its own crown surface area. These responses result in breakage resistance, a decrease drag coefficient, and elastic strain. When a plant experiences surface runoff, the plant will respond with changes in its surface root structure, resulting in a weaker root system and a plant potentially washing away from the slope of an earthwork. During the erosion process a plant will reduce its root reinforcement which subsequently creates fewer roots to anchor the soil.[118] Judging by these results plants are less likely to stay put if subjected to constant water runoff or erosion in general. This would mean that plants on slopes are more likely to disengage themselves from a proverbial 'up-hill-battle.'

Geotextiles for Erosion Management

Geotextiles are synthetic or natural fibers that are woven, felted, or molded into sheets, with varying porosities, or levels of porousness. They are often used in soil conservation, civil engineering projects, and to address problems with archaeological site conservation. More importantly, geotextiles can be used to reinforce slopes on archaeological surfaces. An earthwork would suffice as an archaeological surface. Once applied to a surface, geotextiles provide erosion control, improve drainage, and protect against root damage. Geotextiles can also

[117] Joanne E. Norris and eds., *Slope Stability and Erosion Control,* 68.
[118] Ibid., 70.

combat abiotic forces such as wind and water because they protect against raindrop erosion, reduce volume of water runoff, and reduce wind erosion. However, geotextiles also have weaknesses: They are prone to damage caused by animals and humans and susceptible to UV damage.[119]

The United States Department of Agriculture recommends the use of various types of geotextiles (Table 1). For further description of each individual geotextile described in the table, rolled erosion control products (RECP) are flexible organic or synthetic nets, mats or rolls that are rolled out to reduce soil erosion. Mulch control nets (MCN) are woven natural fiber meshes used as a temporary degradable RECP to anchor loose fiber mulches. Open weave textiles (OWT) are temporary degradable RECPs composed of processed natural or polymer yarns woven into a matrix, used to provide erosion control and facilitate vegetation establishment. Erosion control blankets (ECB) are temporary degradable RECPs composed of processed natural or polymer fibers mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment. Turf reinforcement mats (TRM) are rolled erosion control products composed entirely or mostly of nondegradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness.[120]

[119] Kevin L. Jones and New Zealand Department of Conservation and New Zealand Historic Places Trust, *Caring for Archaeological Sites: Practical Guidelines for Protecting and Managing Archaeological Sites in New Zealand* (Wellington: Science and Technical Pub. Dept. of Conservation, 2007), 57-60, accessed January 21, 2019, https://trove.nla.gov.au/work/34990215?selectedversion=NBD42335324.

[120] United States Department of Agriculture, "Erosion Control Treatment Selection Guide," 16.

Table 1: Geotextiles and Their Uses

Name	Description	Uses	Advantages	Limitations
Rolled Erosion Control Products	Organic/synthetic mats that are rolled out	-Immediate surface protection. -Steep slopes with low to moderate flow	-Detains runoff -Reduces water erosion -Increases water infiltration	-More costly than other textiles -May allow soil erosion underneath textile -Soil surface must be graded before application
Mulch Control Nets	Degradable, woven natural fiber mesh used to anchor loose fiber mulches	Anchors mulch to slope	-Improves erosion control only when combined with mulch -Improves loose mulch performance for moderately steep slopes -UV (ultraviolet) rays stabilized	May entrap small animals. birds and reptiles
Open Weave Textiles	Temporary, degradable natural or polymer yarn woven into a matrix	-Erosion control -Vegetation establishment -Can be used with mulch or by itself	Used as facing for vegetated textiles that can be photodegradable or UV stabilized	Used as facing for vegetated textiles that can be photodegradable or UV stabilized
Erosion Control Blankets	Temporary, degradable process natural or polymer fibers that that are bound together to form a continuous matrix	-Erosion control -Facilitates vegetation -Use on sites requiring long-lasting erosion control	-Up to 90% erosion reduction -Retains seed and soil	-Expensive - May entrap small animals. birds and reptile

Turf Reinforcement Mats	Made of nondegradable elements, including wire mesh, in which material of product forms a 3-dimensional, thick matrix	Steep slopes where plants need extra-long reinforcement	-Accelerates germination -Permanent reinforcement of roots -Immediate erosion protection	-Requires smooth surface before implementation -May have higher initial erosion rates than bare ground if backfilled

Introduction to Invasive Species

According to the National Park Service, native species are defined as all species that have occurred, now occur, or may occur as a result of natural processes on lands designated as units of the national park system. Conversely, the National Park Service defines invasive species, also referenced as exotic, nonnative, and/or alien, as those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities. Because invasive species did not evolve in concert with other species native to the place, the exotic species is not considered a natural component of the natural ecosystem of a place. [121]

Invasive species fall into two main categories: innocuous and disruptive. Innocuous species do not invade native ecosystems without human disturbance and tend not to expand as to compete with or destroy native species. Disruptive species, on the other hand, can displace or decrease habitats, alter ecological processes, have the potential to be poisonous to humans and animals, and can harbor plant and animal diseases.[122]

According to the National Park Service, disruptive invasive species are especially dangerous in a park-like setting because they can deteriorate historic resources through extreme

[121] National Park Service, "KEMO Cultural Landscape Report," (2013) EMP B-72, IRMA Data Store, accessed May 5, 2019, https://irma.nps.gov/DataStore/DownloadFile/551165.
[122] Ibid.

growth rates. This is true for earthworks. Invasive species have the potential to cover large areas of earthworks quickly, which creates the illusion that they are sufficient as protective cover for an earthwork's surface. However, invasive species can have superficial rooting systems that do not reinforce soil stability on earthworks and can also compete with underlying protective, vegetative cover for nutrients, water and sunlight; this competition can lead to displacement or elimination of an earthwork's surficial protective cover. [123]

Invasive species common to battlefields in the southeastern United States include Japanese honeysuckle (Figure 4.1), autumn olive (Figure 4.2), Chinese privet (Figure 4.3), kudzu (Figure 4.4), and garlic mustard (Figure 4.5), just to name a few. These examples, as well as the myriad of others, have a wide tolerance to shade, drought, fluctuating soil conditions, and flooding. The National Park Service strongly suggests that the most effective management strategy for invasive species is to eliminate them when spotted or in their earliest stages of development with the use of herbicides. Herbicides are useful because they eliminate invasive species and deter re-sprouting.[124] Mowing regimes can also be effective against invasive species such as plants with vines, Japanese honeysuckle for example.[125]

Trees grow on earthworks as well. Species of trees can also meet criteria to be invasive, but the subject has yet to materialize as a component of earthworks preservation in any resource, national or international, used in this thesis. Research associated with earthworks preservation overwhelming shows that grasses, herbaceous plants, and shrubs are considered to be the main types of invasive vegetation that damage earthworks.

---

[123] The National Park Service, "KEMO Cultural Landscape Report," EMP B-73
[124] Ibid.
[125] National Park Service, *Guide to Sustainable Military Earthworks Management*, accessed November 22, 2019, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/index.htm.

The following illustrations represent a few invasive species common to battlefields in the southeastern United States:

Figure 4.1. *Lonicera japonica* (Japanese Honeysuckle) (United States Department of Agriculture).

Figure 4.2. *Eleaeagnus umbellata* (Autumn Olive) (United States Department of Agriculture).

Figure 4.3. *Ligustrum sinense* (Chinese Privet) (United States Department of Agriculture).

Figure 4.4. *Pueraria montana* (Kudzu) (United States Department of Agriculture).

Figure 4.5. *Alliaria petiolate* (Garlic Mustard) (United States Department of Agriculture).

Managing Earthworks in Open Conditions

Figure 4.6. Example of an earthwork under grass cover in open conditions at Kennesaw Mountain National Battlefield Park (Photo by Author).

The National Park Service suggests that earthen military fortifications located in open conditions are to be managed under vegetative cover as their primary source of protection from humans and abiotic forces such as wind and rain. Selection of proper vegetative cover requires assessment of site-specific conditions that can dictate which types of vegetation can be used successfully on earthworks. The National Park Service suggests specific criteria be met when determining proper vegetative cover: site specific solutions, vegetation management objectives, and feasibility of vegetation alternatives.

Site specific solutions should respond to factors in the fortification's natural environment that could support vegetation establishment; these factors can include availability of sunlight, soil type, soil fertility, soil depth, drainage, and even slope angle of the fortification. Once these vital factors have undergone examination, park professionals can then select vegetative cover

that will successfully serve as a protective cover, can be maintained on a regular, annual interval, and can also meet sustainability requirements, whatever the requirements might be for a specific park or site. [126]

Vegetation management criteria are also selective as they must also be conducive to local conditions. First, non-invasive plants should be selected as vegetative cover. Vegetative cover should also be selected based upon its period of establishment. A period of establishment is the span of time it takes for the selected plant cover to germinate. Plants that germinate and establish quickly are preferred options for protecting a fortification against erosion. Additionally, the feasibility of selecting vegetation accounts for maintenance costs, plant diseases in the area that might adversely affect establishment, any regulations on plants being introduced to an area, and access to the ground cover for management purposes. If possible, it is best to select vegetative cover that requires low maintenance and is sustainable for future use. Sustainable vegetative cover is ideally one that requires a low input of resources to maintain and support management goals.[127]

Once vegetative cover is established, it must then be maintained. The use of controlled burns is an option for maintaining vegetative cover on earthworks. Controlled burns are beneficial because they return nutrients to the soil, which supports growth and seed production, and if timed properly, can deter cool season, woody plant species that might be invasive. Spring is a beneficial season for controlled burns because charred earth absorbs more sunlight, which allows for earlier soil warming. An added benefit to controlled burns is that mowing machinery would not be required to interact with the earthwork. However, the National Park Service has

[126] National Park Service, "Selecting Vegetative Cover for Earthworks," accessed November 10, 2019, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/case_studies/earthwrkvegselection.doc.
[127] Ibid.

found that burning will remove leaf litter on steep slopes. A remedy for this problem is the application of native straw, wheat or hay after a burn. Burn projects must be monitored and controlled by professionals.[128] Under certain circumstances, prescribed burning may not be an option. Burning can depend on certain weather conditions and proximity to major roads, housing and private property.[129]

Mowing is also a popular option for maintenance of vegetative cover on earthworks. Reasons for mowing include retention of aesthetics and accomplishment of site-specific, mission-related objectives of a particular park or site. Parks that manage earthworks under grass cover understand that these resources are to be interpreted, and to do this, parks emphasize the profile of the earthwork by cutting the grass a few times a year as a management regime. This technique better allows visitors to understand the form and function of an earthwork for interpretive purposes and therefore fulfills a park's mission objective. However, if not monitored, mowing can negatively impact an earthwork by striking the fortification or by cutting the vegetation so low as to remove the protective cover, which can increase the chance of erosion. Additionally, removal of more than 50% of the leaf surface of grasses can decrease root growth and lead to plant death. To mitigate these negative impacts, grass height should be maintained at no lower than six inches from the surface of the earthwork. In some instances, an earthwork maintained under grass cover might also receive additional protective leaf litter from nearby trees. To ensure leaf surface as a continued protective cover, the National Park Service suggests that mowing occur in late winter or early spring. This allows for grass clippings to produce a protective litter layer with the dual purpose of allowing a protective leaf litter barrier

[128] The National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.
[129] Dave Shockley, "Earthwork Management at Petersburg National Battlefield," (The National Park Service, 2000), 34, accessed November 30, 2019, https://www.nps.gov/pete/learn/management/upload/Earthworks-Manual-2.pdf.

to form during the fall season. The Park Service discourages mowing after mid-July that encourages native species establishment; this allows for the full development of a plant's leaves and stalks by October.[130]

Mowing techniques and regimes are also used to deter visitors from interacting with earthworks. As recommended by the National Park Service, earthworks maintained strictly under grass cover should be mowed twice a year. This is also recommended so grasses grow taller and eventually fall over, with the result being additional padding from harmful, visitor interaction. This method also discourages looting because thick, protective matting may serve as an unwanted obstacle for hand-held tools used for digging. Mowing heights also discourage human interaction because visitors are less likely to interact with resources that are maintained under taller, shabby grass. Therefore, grassy areas that surround an earthwork should be kept shorter as to create a visual difference between the earthwork and circulation paths. Visitors are more likely to adhere to areas with shorter grass.[131]

Once earthworks undergo routine maintenance under a planned, annual schedule, the fortifications will meet one of three conditions: poor, fair, or good, according to the National Park Service's *Guide to Sustainable Military Earthworks Management.* Characteristics of earthworks in poor condition include evidence of exposed soil, noncontinuous ground cover, animal burrows, holes, and uncontrolled invasive species populations. Characteristics of an earthwork in fair condition include a non-dominate mix of grasses, herbaceous and woody plants,. As a solution, unwanted species should be removed, and herbaceous plants and sustainable grasses should be reestablished as the dominant species. Characteristics of

[130] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.
[131] Shaun Eyring and Lucy Lawliss, "Preserving Battlefield Terrain: Technologies for Earthworks Management," *The Journal of Preservation Technology* 31, no. 4 (2000): 18, www. Jstor.org/stable/1504672.

earthworks in good condition include sustainable grass-dominated cover with herbaceous plants and native grasses as the dominant species, exposed soil that measures less than 3" x 3", and control of invasive species and animal burrows, if applicable. For clarification, animal burrows are not always problematic, but they can contribute to soil erosion if they burrow in an earthwork because they turn up soil that can be washed away by rain. Therefore, a dearth in, or excess of burrows, can be an influential component when assessing an earthwork's current condition. Lastly, earthworks in good condition are consistently maintained under a regulated monitoring program that inhibits tree and shrub growth.[132]

Managing Earthworks in Forested Conditions

Earthworks are also maintained in forested conditions. It has become critical to answer the following question, as the author has received this question by many: "Why does the National Park Service allow earthworks to be subjected to forested conditions?" The answer is that many parks cannot actively maintain large battlefield landscapes all the time; therefore, earthworks that were located in historically open areas have now been obscured by forest succession over time. Forested conditions have their advantages, however; the National Park Service suggests that earthworks in forested conditions usually retain sharper profiles and the most legible features.[133] This observation presents a dilemma for the National Park Service that is paradoxical. According to the Park Service, the management of earthworks in forested conditions "does not satisfy the National Park Service's objectives for interpretation, visitor safety, or visitor access." But the hard reality is that finite funding for parks, low staffing numbers, the inability to continuously provide maintenance for battlefields that consist of

[132] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.
[133] Eyring and Lawliss, "Preserving Battlefield Terrain: Technologies for Earthworks Management," 14.

thousands of acres, and the fact that earthworks maintained in forest conditions automatically receive a level of maintenance produced by reoccurring leaf litter and duff, protection in forested conditions is acceptable to the National Park Service.[134]

Figure 4.7. An example of an earthwork maintained in forested conditions at Kennesaw Mountain National Battlefield Park (Photo by Author).

Although trees are useful for the production of the hefty amount of protective leaf litter for earthworks on the forest floor, trees offer more disadvantages than they do advantages. Windthrown trees are especially dangerous to the integrity of fortifications. Windthrow occurs when trees are blown over by heavy winds. This event has the potential to harm visitors, pierce earthworks with fallen limbs, and cause uprooting, which pulls up large balls of earth from the earthwork and its interior, which can destroy an entire earthwork or at least leave room for

[134] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.

massive erosion. Trees subject to windthrow generally have shallow root systems in rocky or wet soils, are leaning, and located in slope grade changes that support water runoff. Weak root systems, either due to pathogens or age, for example, contribute to windthrow approximately seventy-five percent of the time. Older trees are often susceptible to windthrow as well because of their height to crown ratio; in other words, the lower portion of the tree cannot support the upper, heavier portion with a burgeoning canopy.[135] The position of a tree on an earthwork is also a factor in windthrow because position can determine direction and strength of root systems. For example, trees that grow on the tops of earthworks are supported by weaker root systems.[136] On the other hand, trees that grow on an earthwork's slope, where roots can grow in multiple directions, are the least susceptible to windthrow.[137] In the southeastern United States, pine trees, as a species, are more susceptible to windthrow. The most desirable species that are more resistant are oaks, hickories, maples, American beech, and hemlock.[138]

Trees in danger of windthrow, or have experienced windthrow, can be managed. As a general guideline, trees that are larger than 12 inches in diameter at breast height should be removed immediately. The removal process requires the tree stem to be cut flush with the grade of the earthwork. Before the tree is felled, though, removal of tree branches that might impale the earthworks below is critical. This practice prevents any crewmen from being injured and minimizes destruction to earthworks. If possible, cranes should be used to lift trees and branches from earthworks. If heavy machinery cannot be used, due to site specific conditions, a fallen tree

[135] National Park Service, "KEMO Cultural Landscape Report," EMP B-72-75.
[136] Shockley, "Earthwork Management at Petersburg National Battlefield," 26.
[137] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.
[138] Eyring and Lawliss, "Preserving Battlefield Terrain: Technologies for Earthworks Management," 16.

could be removed piecemeal with chainsaws and chippers. However, fallen limbs, no matter their weight, should not be dragged across earthworks.[139]

Figure 4.8. An example of a windthrown tree (United States Department of Agriculture - Forest Service).

Tree and vegetation thinning are also required for interpretive purposes by the National Park Service. The National Park Service developed this technique to deter visitors from straying away from designated trails in forested areas and interacting with earthworks maintained in forested conditions. According to the National Park Service, visitors are more likely to maintain their distance from earthworks under forested conditions if views are less obscured. Mitigation of this issue requires that views to the earthworks be carefully determined to require the fewest number of tree removals; thinning must be monitored so as not to significantly decrease the amount of leaf litter and duff available for earthworks; and thinning should be successful enough

[139] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.

as to provide better views for visitors. In general, the Park Service suggests that thinning vegetation for interpretive purposes begin with the removal of trees from earthworks, followed by selectively removing understory trees and shrubs.[140]

Long-term maintenance regimes for forested conditions are based upon vigilance. Observable conditions for tree uprooting include tree size, crown size, position in slope, soil depth and wetness, and tree rooting habits.[141] Invasive species continue to be an issue for earthworks in forested conditions because they can compete with shrubs and trees that provide a protective layer of leaf litter. Also, invasive species can cover very large areas quickly and obscure places where soil might be eroding.[142] As aforementioned, it is best to eliminate invasive species on sight. If erosion is an issue for any reason, geotextiles may also be applied as a solution.

According to the National Park Service's *Guide to Sustainable Military Earthworks Management,* the quality of maintenance will produce one of three conditions for earthworks maintained in forested conditions: poor, fair, or good. These conditions are strictly attributed to the physical condition of the earthwork, not the condition of the surrounding forest. Earthworks in poor condition will exhibit trees larger than 12" DBH, a non-existent duff layer and groundcover that consists of grasses and invasive species. Additionally, animal and human damage will also be evident. Earthworks in fair condition are represented by thin forest cover where most trees are under 12" in diameter at breast height and a minimal understory exists. Invasive species might also be present. Earthworks in fair condition might also exhibit bare

[140] Eyring and Lawliss, "Preserving Battlefield Terrain: Technologies for Earthworks Management," 16.
[141] Ibid.
[142] National Park Service, *Guide to Sustainable Military Earthworks Management*, https://www.nps.gov/tps/how-to-preserve/currents/earthworks/introduction.htm.

spots where soil is exposed as well as a very thin duff layer. Earthworks maintained in good condition under forest cover exist in a fully stocked native forest with trees that range in age and are under 12" in diameter at breast height. A thick duff layer will also be present with minimal bare spots. Lastly, evidence of animal burrows, invasive species, and humans have all been identified and controlled.[143]

Preservation Planning and Sustainability

Although specific management strategies are site specific, the National Park Service recommends fundamentals guidelines be applied to every situation or location in which earthworks exist. These fundamental guidelines begin with historic research. Historic research is critical because it informs the preservation planning process by contextualizing the significance of earthen fortifications within a historical event. Also, a chronological history of the earthworks can expose changes to the fortifications over time. By doing so, locations of earthworks that no longer exist or any modifications to earthworks can be documented. The second step involves an assessment of current conditions that should include location, complexity, physical context, and condition. Once current conditions have been assessed, the third step in planning is management planning, treatment, and implementation of the plan. Finally, resource monitoring is essential as the final guideline. Resource monitoring establishes a baseline condition and measures the success of a management strategy. Monitoring is also beneficial because it advances the science of earthworks management by testing and discovering successful practices that can then be translated to various other sites.[144]

The primary objective of treatment will be the conservation of battlefield terrain for future generations, according the *Vimy Declaration for the Conservation of Battlefield*

[143] Ibid.
[144] Ibid.

Terrain.[145] According to the *Vimy Declaration*, all conservation treatments must be sustainable. Sustainability refers to a pattern of resource use that balances human fulfillment with the use of finite resources so they can be passed on to future generations.[146] Any management plan must ensure that resources for conservation are available for the future.[147] One of the chief goals of sustainability, according to the National Park service, is to require less human intervention with earthworks. Examples of successful sustainable practices include minimal maintenance interventions that require mechanized equipment, use of native species for ground cover, and reduction in laborious practices of plant establishment by hand; hydroseeding is a successful method for seed planting that has supplanted unwanted human interaction with an earthwork during the vegetation establishment process.[148]

Conclusion

There was but one goal for this chapter: to incorporate and connect both national and international current, best practices for the preservation of earthworks. In doing so, it is the author's conclusion that preservation techniques are very similar nationally and internationally, with little to no differences. A reason for this conclusion could be the National Park Service's posture as a chief consultant and influential entity for preservation internationally. For example, the committee that crafted the *Vimy Declaration* relied upon the National Park Service as a consultant. A summary of the current, best practices for erosion mitigation is provided by the following illustration:

---

[145] Veterans Affairs Canada, *Vimy Charter for the Conservation of Battlefield Terrain,* https://www.veterans.gc.ca/eng/remembrance/memorials/overseas/first-world-war/france/vimy/declaration.
[146] Gamini Wijesuriya, Jane Thompson, and Christopher Young, *Managing World Cultural Heritage: World Heritage Resource Manual,* (Paris: UNESCO, 2013), 19, accessed November 5, 2019, https://whc.unesco.org/en/news/1078.
[147] Natalie Bull and David Panton,"Drafting the Vimy Charter for Conservation of Battlefield Terrain," *The Journal of Preservation Technology* 31, no. 4 (2000): 9-10, accessed July 22, 2019, www.jstor.org/stable/1504672.
[148] National Park Service *Guide to Sustainable Military Earthworks Management.*

Table 2: Summary of Best Practices for Mitigation Against Chief Factors of Erosion

Human Interaction	Abiotic Forces/ Wind and Rain	Invasive Species
-Ensure protective, vegetative cover on earthworks -Consider relationship between interpretive goals for earthworks and height of vegetation. Vegetation height can attract or deter visitor interaction with earthworks. -Implementation of a monitoring program to ensure continuous protective cover and documentation of interaction	-Ensure protective, vegetative cover on earthworks -Use of geotextiles for the purpose of retaining protective cover on earthworks -Implementation of a monitoring program to ensure protective cover and also to monitor trees growing on or around earthworks for potential windthrow	-Application of herbicides -Cutting and removal -Burning (if feasible) -Mowing -Implementation of a monitoring program that identifies, eliminates, and documents direction of spread or extent of community of species -A GPS is a helpful tool for documenting location and spread

Additionally, inclusion of international sources for this chapter has illuminated the unexpected fact that earthworks are valued resources around the world. Earthworks have been linked to sense of place, community and national values, and sense of belonging. Because of the unification that communities and people experience because of their cultural attachments to earthen fortifications, philosophies have been developed in terms of cultural principles and practices that drive conservation, preservation and sustainability. From this united human drive to preserve, physical applications and techniques for the management and protection of earthworks have been developed. And they appear to be united and ubiquitous around the globe. Subtle modifications in techniques or methods might apply due to differing conditions internationally, but it has been made apparent that the world thinks alike when protecting these precious resources.

CHAPTER 5

CASE STUDIES: CURRENT CONDITIONS

Three locations of earthworks have been selected as case studies for this chapter: Little Kennesaw Mountain, the 24-Gun Battery, and Big Kennesaw Mountain. The author observed one primary factor of erosion at each location with the exception of the earthworks on Big Kennesaw Mountain as described below. Currently, the earthworks atop Little Kennesaw Mountain exhibit signs of human-induced erosion. Earthworks located at the 24-Gun Battery site display signs of abiotic erosion. Lastly, garlic mustard as an invasive species can be found on the slopes of Big Kennesaw Mountain. Garlic Mustard has yet to affect the earthworks atop the mountain; however, given that the invasive species is so noxious, is quick to spread, and grows within a certain proximity of the earthworks, the National Park Service remains concerned about the species and volunteers for the park continue to monitor and eliminate the species on an annual basis.

Conclusions for these case studies can be applied throughout the park for earthworks under grass-cover and those under forested conditions. All three factors of erosion – human interaction, abiotic forces, and invasive species – can be observed in concert together throughout the battlefield, in addition to the earthworks investigated for this chapter. The objective for this chapter, however, is to investigate one process of erosion for each location in order to provide a more acute focus on causes of erosion at the park and current conditions of each location. The current conditions of the earthworks have been assessed based on the National Park Service's *Guide to Sustainable Military Earthworks Management*.

Human-Induced Erosion and Earthworks on Little Kennesaw Mountain

Little Kennesaw Mountain is located south of Big Kennesaw Mountain at the northern end of the park. A topographical 'saddle' connects the two mountains. A walking trail begins at the peak of Big Kennesaw Mountain and follows the contoured ridge of the saddle south toward the peak of Little Kennesaw Mountain. The trail continues over Little Kennesaw's peak and follows an additional saddle south to Pigeon Hill and terminates at Burnt Hickory Road. This walking trail is one of the more popular trails because it allows visitors to traverse the north end of the park while observing earthworks situated along the trail.

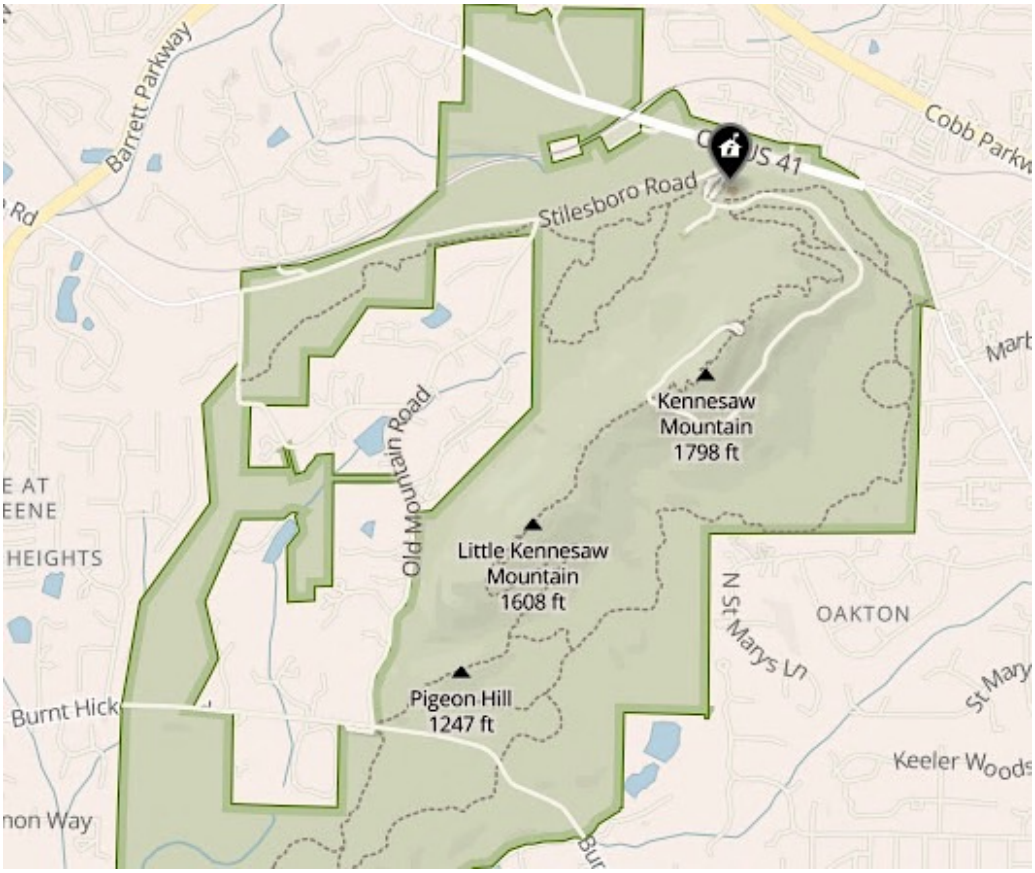

Figure 5.1. This map depicts the northern section of the park in which Little Kennesaw Mountain is centrally located. Dashed lines illustrate walking trails and white lines illustrate roads. (Kennesaw Mountain National Battlefield Park).

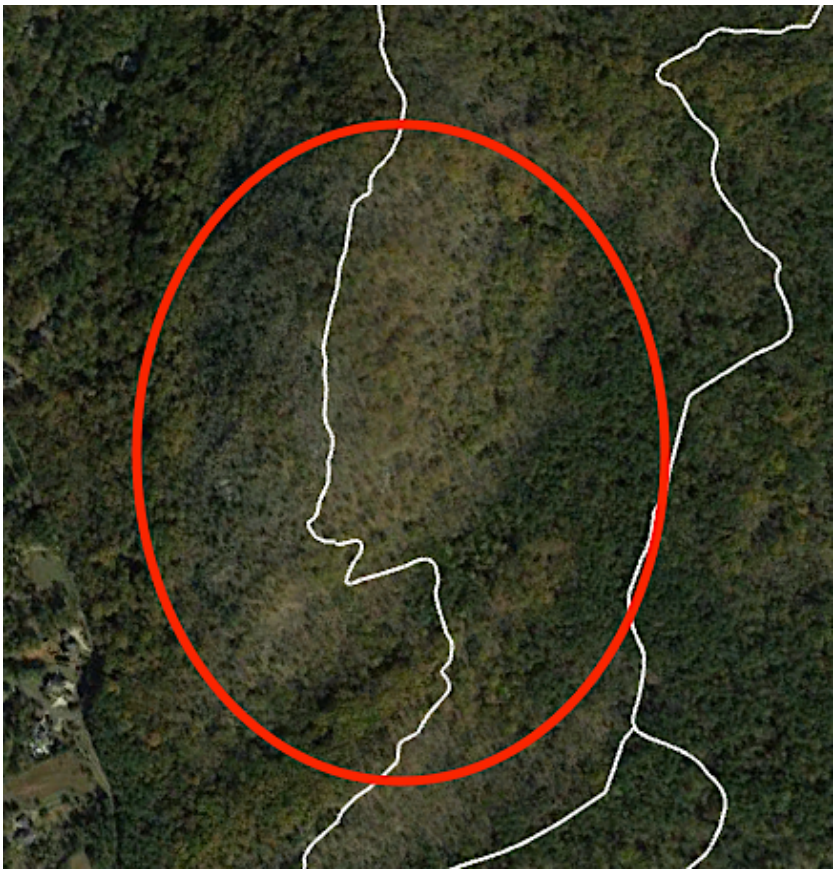

Figure 5.2. This illustration depicts the NPS walking trail, from satellite view, that traverses Little Kennesaw Mountain and its peak (Kennesaw Mountain National Battlefield Park).

Visible earthworks in the form of artillery redoubts, accompanied by cannons, are located near the peak of Little Kennesaw Mountain, and face west (Figures 5.3 and 5.4). The earthworks appear to consist of one continuous parapet that is approximately two to four feet in height with allotted sections for each cannon emplacement. The 'sections' appear to be delineated by traverses, creating the appearance that multiple redoubts are present. The walking trail is situated just behind the earthworks in close proximity. The earthworks are not protected by any physical barriers that deter visitors' interaction, and visitors most certainly interact with the earthworks at the location, as will be illustrated. The trail follows a ridge that is thickly lined with vegetation and trees. During the summer months, the earthworks are covered with

lemongrass, which recedes during the winter months into a thinly dispersed mat. During the fall and winter months, the earthworks rely on leaf litter from surrounding trees as protection.

Figure 5.3. View of the parapet looking north (Photo by Author January 2020)

Figure 5.4. View of the parapet looking south (Photo by Author January 2020).

Other than the fact that the walking trail escorts visitors past the earthworks, which is the interpretive purpose of the trail, and this section of the trail is essentially the halfway point of the trail for the north end of the park, visitors are attracted to this location for one reason: The park has created a resting station at the earthworks, complete with a bench for sitting and interpretive signage (Figure 5.5). Scores of visitors utilize the bench as they take a break from the trail's rigorous terrain. Because of these amenities, and the fact that cannons and earthworks are located at this spot, visitors treat this section of the trail as a rendezvous spot as well as a resting place before continuing on the trail. The author observed these activities at every weekend visit during the summer months of 2019.

Figure 5.5. This photograph illustrates the rendezvous point along the trail atop Little Kennesaw Mountain. Notice the cannons on the left and resting bench on the right that so many visitors use (Photo by Author January 2020).

Because of the popularity of this location, and because the earthworks lack protective, physical barriers from the public, visitors choose to interact with the earthworks by climbing on

them (Figures 5.7 – 5.9). The topography of Little Kennesaw Mountain is also an issue that invites human interaction. The earthworks are located on a ridge that serves as a platform from which to view the vast, panoramic area below the mountain. During the spring and summer months, the vegetation on and around the earthworks grows to a height that obscures visitors' views of the panorama. The grass cover is supposed to remain long and grow to the height at which it simply falls over, creating a protective barrier for the earthworks, and the park does this well with fescue grasses. However, even with grass that has fallen over on itself, it has done so atop the high parapet that joins the cannon emplacements. When this condition is combined with taller vegetation in front of and beyond the parapet, the visitor's view of the panorama is totally obscured. This prompts visitors to climb the earthworks so they can view the surrounding area from a height greater than that of the vegetation (Figures 5.6 and 5.7).

Figure 5.6. A photograph illustrating the height of vegetation on one of the earthworks. Beyond the vegetation lies a panoramic view of the surrounding area, but the view is obscured, prompting visitors to climb the earthworks. The matted grass below and to the left of the cannon tube is evidence of this (Photo by Author Summer 2019).

Figure 5.7. The grass on all sides of this cannon is matted, evidence of visitor interaction with the earthwork in front of the cannon (Photo by Author Summer 2019).

Figure 5.8. Evidence of Human foot traffic on an earthwork's slope (Photo by Author Summer 2019).

Figure 5.9. Evidence of human traffic on an earthwork's slope (Photo by Author Summer 2019).

Further observation suggests that grass cover has the additional advantage of indicating human interaction. Areas of grass that have been matted or mangled, or areas of grass that display linearity, such an obvious foot path, are sure signs of biotic interaction. The author has concluded that once a footpath is created, visitors typically follow the same linear path, or desire path, through vegetation. In one instance, visitors created a feint desire path that ascends the middle of an earthwork (Figures 5.8 and 5.9). When slopes are involved, and grasses are thick and matted down, any visitor attempting to ascend the slope could experience slippage, which effectively tears the grass from the soil, uprooting soil with it. According to the process of thigmomorphogenesis, vegetation can respond to biotic interaction by physically strengthening itself, but a plant remains a plant and can easily be destroyed. This situation may appear to be acute, but one can only wonder how long this has happened at Little Kennesaw.

As observed during January of 2020, the earthworks atop Little Kennesaw Mountain rely on leaf litter from surrounding trees for protection as directed by National Park Service policy. However, an issue exists. Wind often blows the leaves completely off and away from the earthworks or down the slopes where the leaves simply sit in mass. Any leaf litter layer that clings to the slopes appears to be very thin and will eventually be blown away. Through observation, it appears that ridges associated with an earthwork's profile, be it a traverse or a superior slope, are the first components of a fortification's profile to lose leaf litter because they are narrow ridges simply supported by sloping ground. Altogether, portions of individual earthworks atop Little Kennesaw are either thinly protected, not protected, or are in immediate danger of losing their protective leaf litter with a hard gust of wind. Additionally, earthworks atop Little Kennesaw are located on an elevated ridge that is quite narrow. This inherent position exposes leaf litter on earthworks because there are no natural barriers to harsh winds; for

example, a thickly wooded tree line along the trail that might block wind. Either way, visitors can damage the Little Kennesaw's earthworks in all three situations.

Figure 5.10. Leaf litter can be seen on the slopes of the earthwork but has been somewhat removed from the superior slope (Photo by Author January 2020).

The vegetation that obscured the view from the ridgeline during the summer months has receded for the winter months, enabling the visitor to gain a fair perspective of the panoramic view below from behind the earthworks along the walking trail. However, closer examination shows that visitors continue to climb the earthworks. Because grass cover has receded to surface level for the winter months, the author observed a foot path that ascends one of the traverses that separates two of the redoubts, as illustrated in Figures 5.11 and 5.12. There may be an explanation for this type of interaction with this specific component of the earthwork: With the earthworks devoid of vegetation, the slopes of the earthworks appear steeper during the winter; unlike the summer months when the earthworks are heavily vegetated. An earthwork under heavy vegetative cover can create the illusion that an earthwork's profile is more robust than it

actually appears to be, and the slopes do not appear to be very steep. However, during a recent winter analysis, it appears that to avoid ascension of the steep, interior slope of the earthwork, a visitor, or visitors, ascended the earthwork by following the gradual rise of the traverse to the superior slope (top) of the fortification, as illustrated by Figure 5.13.

Figure 5.11. A view of the earthworks looking north. Notice the lack of leaf litter on the top of the parapet and traverse that separates the two cannons closest to the camera. Visitors are using this traverse for a walking path (Photo by Author January 2020).

Figure 5.12. Foot traffic ascending a traverse toward the superior slope of the earthwork (Photo by Author January 2020).

Figure 5.13. Illustrated here is foot traffic on the superior slope of the earthwork from the previous photograph. The grass is matted (Photo by Author January 2020).

Current Conditions

Observations made during the summer of 2019 and winter of 2020 guide the author's conclusion that human interaction with these earthworks accelerates the erosive process because human foot traffic can rip away vegetative cover and soil with it. Foot traffic can accelerate erosion during the winter months because protective cover is sparse in density and thin. Given these observations, erosion appears to be minimal because there are no observable signs of changes in the earthworks' profile or integrity over the past several months. However, given years to come, there would be no reason for human interaction to discontinue, and there is no evidence to suggest that it ever discontinued. Small amounts of damage over a long period of time can lead to larger problems in the future, especially if the earthworks are not rigorously monitored.

The earthworks atop Little Kennesaw Mountain exist in two conditions simultaneously: under grass cover and forested conditions. The spring and summer months suggest that the earthworks located atop Little Kennesaw Mountain meet the National Park Service standards for earthworks preservation as existing in good condition under grass cover. They exhibit a sustainable grass-dominated cover with no evidence of invasive species, animal burrows, or holes, with minimal bare spots. Human interaction is evident, but the thickness of the grass cover offers the most protection possible in open conditions. During the late fall and winter months, these same earthworks depend on leaf litter for their protection which is produced from surrounding trees. In applying National Park Service standards to these earthworks under forested conditions during the fall and winter months, these earthworks exist in fair condition. This is mainly because of a very thin duff layer and areas of exposed soil that are present. Human damage is also evident.

Abiotic Forces and Sherman's 24-Gun Battery Site

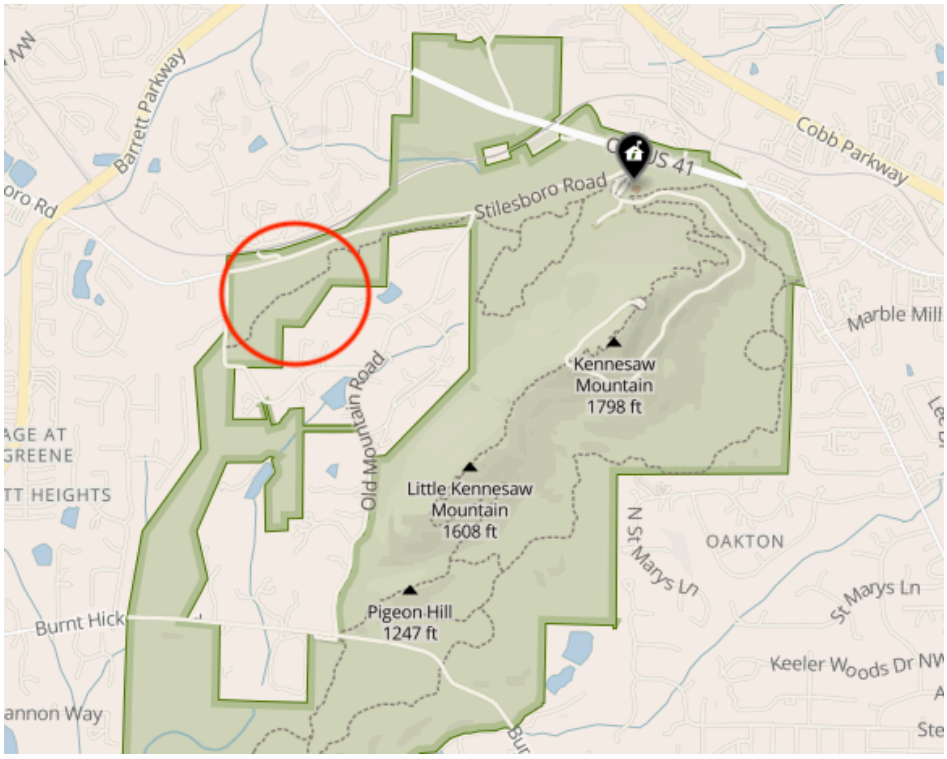

Figure 5.14. The red circle indicates the position of the 24-Gun Battery, west of Big and Little Kennesaw Mountains (Kennesaw Mountain National Battlefield Park).

Sherman's 24-Gun Battery is located near Gilbert Road west of Big and Little Kennesaw Mountains (Figure 5.14). The site is completely forested and exhibits numerous artillery redoubts, many of which display cannons that face east toward Big and Little Kennesaw Mountains. The earthworks were constructed in a relatively straight line on a north/south axis, slightly behind the natural crest of a low-lying ridge. The earthworks' parapets are approximately four-feet tall and approximately spaced eight to fourteen feet apart.

Figure 5.15. An earthwork maintained in forested conditions at the 24-Gun Battery site (Photo by Author Summer 2019).

As mentioned in the previous chapter, abiotic forces are non-living forces such as rain, wind, and climate that can facilitate the erosion process. Earthworks are especially susceptible to abiotic damage if they lack protective cover or exhibit spots of bare soil. If this is the case, splash and wind erosion will become the immediate culprits of erosion as these forces will simply dislodge soil particles and carry them down an earthwork's slope. If bare spots are left

unattended, splash erosion will effectively create a crust seal over the spot; the result will be a hardened soil surface that can prohibit vegetation establishment. Windthrown trees are also of importance because they can damage or impale earthworks when felled; not to mention the damage done to cannons or humans in an unfortunate situation.

Earthworks that make up the 24-Gun Battery exist entirely in a deciduous, forested condition. This means that they rely on leaf litter and duff for protection. Little to no vegetation grows on the earthworks because of the lack of sunlight in such a heavily forested area. These earthworks experience the same disadvantage as those atop Little Kennesaw Mountain: The leaf litter is very thin and is simply blown or washed off the earthworks down their slope. The site is located near the crest of a ridge which, although low-lying, rises above the surrounding terrain. Because of the earthworks' location on this ridge, they are more susceptible to wind gusts that simply remove the leaf litter away from the superior slope of an earthwork, exposing bare soil, as illustrated in Figure 5.16.

Figure 5.16. An earthwork without leaf litter at the 24-Gun Battery. Wind has blown the leaves away from the parapet, only to leave exposed soil (Photo by Author Summer 2019).

Bare spots of soil exist on every earthwork at the 24-Gun Battery site. In many cases, bare soil makes up large sections of each individual earthwork. The earthworks, similar to all others at the battlefield, were constructed of a loamy clay. The exposed clay is very dense and appears to adhere well, especially after experiencing rain fall. Judging by the appearance of the exposed soil on the earthworks, the effect of abiotic forces upon the fortifications appears to be minimal because clay adheres so well over time. But one cannot tell how abiotic forces have shaped the profile of an earthwork into its present contours over time. What is certain, however, is that exposed clay in the South will dry and crack and become brittle during the summer months. Once this happens, the clay will appear as a thin layer of top-soil and can then be washed or blown away.

Figure 5.17. A large bare spot. The surface appears to have a thin crust seal which can inhibit vegetation establishment (Photo by Author Summer 2019).

Figure 5.18. This picture illustrates the interior slope of a parapet that is completely bare (Photo by Author Summer 2019).

Figure 5.19. Side view depicting the interior and superior slope of a bare parapet (Photo by Author January 2020).

Figure 5.20. Exterior, superior and interior slopes of an earthwork. Notice how the leaves have been removed to the bottom of the slopes (Photo by Author January 2020).

Figure 5.21. A few trees in an earthwork that exceed the NPS's recommended 12" diameter guideline (Photo by Author January 2020).

The appearance of the site suggests that the Park Service has given much thought to trees that have grown or are currently growing on or around the earthworks. There are no trees growing on or through the superior slope of the earthworks. There are, however, trees that have grown through the interior and exterior slope of the earthworks. Trees such as these are beneficial to slope stability because their roots are able to grow in several directions, which reinforces the soil (Figure 5.23). On the other hand, trees growing on slopes are especially susceptible to windthrow. It is also Park Service policy that trees in earthworks not exceed 12" diameter at breast height (Figure 5.21). It is clear that many of the trees observed surpass this allowed measurement. However, there are no examples of windthrow at the site. There is plenty of evidence at the site to suggest that the Park Service has been proactive in removing trees adjacent to earthworks that could potentially threaten the resources in the very future (see Figure 5.22). There is also an example of a particular tree that was knocked down by wind but did not damage any earthworks (see Figure 5.24).

Figure 5.22. An example of precautionary measures taken by the National Park Service. There are many examples like this at the site (Photo by Author 2020).

Figure 5.23. A large tree has rooted itself on the slope of a parapet (Photo by Author January 2020).

Figure 5.24. A fallen tree abutting an earthwork to the right (Photo by Author January 2020).

Current Conditions

Application of National Park Service standards suggest that the earthworks located at the 24-Gun Battery site are in fair condition. Many of the trees in the earthworks exceed the 12" dimeter at breast height guideline. Minimal understory plants hardly exist on the earthworks and invasive species do not appear to pose any threat. The chief issue with these earthworks is the thinness of the duff and leaf litter layer and exposed bare soil. To be clear, every earthwork at the site receives a plentiful amount of leaf litter. However, the litter is easily removed by wind and hard rains; and because of the weak vegetative growth at the site, once the litter is removed, large sections of bare soil are exposed on the earthworks. Summarily, each earthwork experiences minimal protection from abiotic and biotic forces. Park staff and the Kennesaw

Mountain Trail Club have taken precautionary measures to ensure that trees are monitored for windthrow. This includes proactive measures such as cutting down trees where applicable.

Garlic Mustard as an Invasive Species

Figure 5.25. Garlic mustard growing on a slope of Big Kennesaw Mountain (Courtesy of Cam Graham).

Garlic mustard is an aggressive invasive species that can be located at the northern end of the park on Big and Little Kennesaw Mountains, especially along or within 100 yards of the mountains' ridges along their slopes. At present, the National Park Service and invasive species specialist at the park, Danny Leigh, have reported that garlic mustard is not growing on the earthworks on Big and Little Kennesaw Mountains.[149] However, garlic mustard can spread

[149] Cam Graham, e-mail message to author, February 6, 2020.

quickly, and if not properly monitored, earthworks located on Big and Little Kennesaw Mountains will most certainly be invaded.

Introduced during the 1800s for medicinal and culinary purposes, garlic mustard is an invasive species that is a cool-season biennial herb and grows in extensive colonies and can be found mostly under forest canopies. It has broad, pointy leaves in its first year and a long stem with clusters of four white petals its second year. Garlic mustard can disperse its seed for up to ten meters and can lie dormant for two to six years before germination.[150]

As an invasive species, garlic mustard can facilitate damage to earthworks, but understanding how can be tricky. Garlic mustard grows in very thick patches, both in the sunlight and in shade, and these patches can cover an earthwork, offering cover and protection, or so it may seem. As garlic mustard grows, its leaves broaden, choking sunlight from protective grasses below; therefore, an earthwork might appear to be well protected by the species, but bare soil is exposed below the leafy plant on the surface of an earthwork. In addition to the negative effects of the plant's leaf system on lower-lying vegetative cover, garlic mustard also produces allelopathic compounds that inhibit seed germination of adjacent species, in addition to the plant's secretion of the chemical sinigrin. According to Richard Lankau, assistant professor of plant biology at the University of Georgia, sinigrin is a chemical compound that kills essential fungi for plant nutrient absorption, and garlic mustard tends to release more of the compound where more native grasses are present.[151]

---

[150] USDA, *A Management Guide for Invasive Plants in Southern Forests,* 99.

[151] University of Georgia Center for Invasive Species and Ecosystem Health and the USDA, "Garlic Mustard," Invasives.org, accessed February 3, 2020, https://www.invasive.org/browse/subinfo.cfm?sub=3005. Also see University of Georgia, "Study Provides First Evidence of Coevolution Between Invasive, Native Species," UGA Today, https://news.uga.edu/coevolution-between-invasive-native-species-062812/.

Garlic mustard that grows on slopes of an earthwork is a special concern. For one, invasive species can have shallow root systems which do not reinforce soil very well on slopes; slopes being the medium of which dislodged soil particles travel downward toward the base of the fortification. Secondly, garlic mustard is not welcome in a park setting because of its ability to wage chemical warfare with sinigrin, in addition to negative attributes aforementioned. Thirdly, thigmomorphogenesis can be an issue in a park setting because vegetation attached to slopes can physically react to abiotic and biotic forces. If vegetation, natural or invasive, experiences continuous exposure to abiotic forces such as water runoff, plants can weaken their root systems, allowing themselves to be removed so they can relocate elsewhere away from their previous stressful area. This is one of the many reasons why invasives should be eliminated when discovered.

Figure 5.26. An earthwork atop Big Kennesaw Mountain that could potentially be affected by garlic mustard in the future (Photo by Author 2019).

Current Conditions

The National Park Service, volunteers, and the Kennesaw Mountain Trail Club continue to mitigate the spread of garlic mustard through the continuance of the park's garlic mustard control program. This program entails a yearly "Garlic Mustard Pull" in which volunteers pull every plant they can find followed by the application of herbicides by the Park Service. It should be noted here that 'pulling' invasive plants from earthworks is not a recommended practice and not inferred in the "Garlic Mustard Pull" program. Invasive species that might grow on earthworks are treated with herbicides, not pulled. Events for the 'pull' program occur on one day out of every three to five years in order to also eliminate garlic mustard seeds.[152] Thus far, the program has been very successful. When the program is inactive for a period of time, members of the Kennesaw Mountain Trail Club continue to locate and treat invasive species all over the battlefield. In addition, the Southeast Coast Invasive Plant Management Team program, as part of the Biological Resources Division of the National Park Service, assists with invasive species at the park once a week every spring on an annual basis. Strategies of the management team used to treat invasive species at parks include inventory and monitoring, prevention, early detection, and treatment and control through the use of herbicides.[153]

Conclusion

Of the three factors of erosion investigated, human-induced erosion is the most damaging to earthworks and most notable at Kennesaw Mountain National Battlefield Park. Apart from its brazen presence on the earthworks atop Little Kennesaw Mountain, human-induced erosion can

[152] Kennesaw Mountain Trail Club, Invasive Plants at Kennesaw Mountain, accessed February 14, 2020, http://www.kennesawmountaintrailclub.org/plants.php.
[153] National Park Service, Southeast Coast Invasive Plant Management Team, accessed February 14, 2020, http://www.kennesawmountaintrailclub.org/plants.php.

be considered an epidemic at the park. Having said this, Little Kennesaw Mountain is located at the north end of the park which is well within the park's core area. Most visitors to the park interact in some way with this area. Earthworks at other locations within this area of the park exhibit evidence of human interaction as well; so does Cheatham's Hill and other primary visitor locations located away from the park's core area.

Erosion caused by abiotic forces and invasive species is present to a much lesser degree than human-induced erosion. It is true that these factors of erosion exist, but the fact that the earthworks were constructed of loamy clay has been an essential component to their survival because this type of clay adheres very well and appears to be somewhat resistant to erosion. Moreover, park staff and the Kennesaw Mountain Trail Club do an excellent job of eliminating invasive species or at least monitoring them so to control spreading. The Trail Club hosts workdays in which invasive species are treated with herbicides.

Abiotic forces and invasive species at Kennesaw do not appear to noticeably damage the earthworks, given the author's observations over the span of almost one year of field visitation. In order to properly analyze the effects of these factors of erosion over time, an initial investigation of the earthworks would have to be conducted in order for a baseline of current conditions to be set. According to the National Park Service's *Guide to Sustainable Military Earthworks Management,* once a baseline of current conditions is set, a monitoring program is needed to evaluate the progression of erosion on an annual basis.

CHAPTER 6

CASE STUDIES RECOMMENDATIONS

Recommendations for the earthworks that were inspected in the previous chapter are based upon three important documents: Kennesaw National Battlefield Park's Earthworks Management Plan (EMP); The *Vimy Charter for Conservation of Battlefield Terrain;* and 3) Chapter 3 of this thesis. Kennesaw's Earthworks Management Plan is an effective, comprehensive earthworks preservation document that details, current conditions, issues, and recommendations for future preservation of the earthworks at the battlefield. The author's research for Chapter 3 aligns with and reflects fundamental preservation methods and techniques found in Kennesaw's EMP and vice versa. Because current conditions of a few groups of earthworks in this chapter differ from the conditions that were reported several years ago when the National Park Service published its EMP, it is necessary to now introduce the Earthworks Management Plan. Altogether, the resources have greatly assisted in providing answers for the author's initial research question: How are current preservation methods being utilized, or how could they be utilized if the future, to address unique issues regarding the earthworks at Kennesaw Mountain National Battlefield Park?

Little Kennesaw Mountain

Human-induced erosion is the most noticeable type of erosion for the earthworks at Kennesaw Mountain National Battlefield Park. If earthworks are covered by grasses or leaf litter and duff, as they should be, human-induced damage is not only mitigated, it is also detectable, as shown in the pictures associated with the earthworks located atop Little Kennesaw Mountain in

chapter 4. However, given the visual evidence, it is not enough these earthworks remain under grass and leaf cover for protection. Visitors continue to interact with these earthworks under both types of cover to such a degree that even sections of cover are destroyed, rendering both grass and leaf litter useless. These findings contradict the park's conclusions for these same earthworks as stated by the park's EMP. Between 2009 and 2013 (the time frame in which the EMP underwent development) it was reported that visitors infrequently engaged with this section of the walking trail that traverses Little Kennesaw Mountain, suggesting a low volume of visitors to this section of the walking trail, therefore the earthworks did not present any visual evidence of human interaction.[154] However, at present, it appears that the situation has degraded. Visitors are clearly interacting with the earthworks because the walking trail is located in close proximity to the fortifications, and there are no physical barriers or signage that impede physical interaction with these resources.

It is highly recommended that the park construct a wooden, physical barrier, in the form of a railed fence behind every artillery fortification atop Little Kennesaw Mountain. This has already been accomplished at other locations on the battlefield to include Big Kennesaw Mountain. It appears that the protected earthworks atop Big Kennesaw suffered from the same circumstances as Little Kennesaw now does; the issue being that the walking path abutted the fortifications on Big Kennesaw Mountain. To ensure that visitors are less likely to hurdle the future barrier at Little Kennesaw, it is best to reduce the height of the vegetation in front of the earthworks; this is so visitors can view the lower-lying surrounding area from the trail, instead of mounting the earthworks for a better view. Signage may also be helpful at this location because it can impart pertinent, educational messages about why the earthworks are now located behind

[154] The National Park Service, "Earthworks Management Plan," in "KEMO Cultural Landscape Report," B-77.

barriers for preservation purposes. Signage alone, without physical barriers, certainly does not guarantee less human interaction with the earthworks. A physical barrier also might not deter human interaction, but visitors might have the tendency to respond more fully to a physical barrier than signage. Erosion control netting may also be useful at this location to trap leaf litter on the earthwork during the winter, especially on components of the earthworks such as the superior slope of the parapet and traverses, which are narrow, elongated areas of the parapet that quickly lose leaf litter because of winds sweeping the peak and narrow ridges associated with Little Kennesaw. If physical barriers are present, geotextile netting may not be needed right away, but the area should continue to be monitored for the success or failure of the physical barrier. If there are signs that the barriers have failed, netting must absolutely be applied during the winter as the warm season grasses have gone dormant.

Figure 6.1. A railed fence applied to earthworks atop Big Kennesaw Mountain for protection from visitors. Notice the proximity of the visitors' path in relation to the earthworks (Photo by Author Summer 2019).

Figure 6.2. An example of signage at Cheatham's Hill. Although such signage is educational, visitors do not always comply (Photo by Author Summer 2019).

24-Gun Battery Site

The 24-Gun Battery site is in need of much assistance. Erosion control netting is needed to trap leaf litter on each earthwork. This will remedy current and future bare spots. On the other hand, shade-tolerant grasses, such as fescue, could also be helpful at this location, and are probably preferred for interpretive reasons. This could possibly eliminate the need for netting.

Secondly, this site could be used as a prime example for allowing visitor interaction with the earthworks instead of deterring it. The current railed fences used as physical barriers do not appear to be effective. Although some visitors might abide by their message, others may not, and there is plenty of evidence to suggest that visitors are at least approaching the earthworks. With this in mind, the fences are not protecting the parapets of the earthworks. To continue to allow visitor interpretation of the earthworks in a way that is also preservation-oriented, timber

boardwalks may be constructed that straddle the fortifications, allowing the visitor to ascend one slope of the parapet and down the other. The bottom of the boardwalks should be as flat as possible; this will ensure that weight compression caused by visitors will spread evenly over the device and the earthwork. Boardwalks send the message that visitors are allowed to interact with the earthworks and where to do so. Signage can also be effective for preservation and work conjointly here because as it can address the visitor and the reason for the boardwalks.[155]

The battlefield continues to do a good job at removing hazard trees from within and outside of earthworks, or at least keep these trees to a minimum in the earthworks through which they grow. At the 24-Gun Battery site, the site is contained and manageable enough to begin removal of trees from the earthwork's slopes. Although these trees can be beneficial on slopes and help reinforce the soil, many of the trees are larger in diameter than the recommended maximum diameter deemed by the National Park Service. If trees are to be felled at the site, they should do so in an easterly direction, away from the visitors' trail and earthworks. From a financial perspective, however, it is understandable that the battlefield cannot tackle every single tree that might be spotted growing throughout the eleven miles of earthworks at the battlefield. But if not, they must be continuously monitored; if not by battlefield staff, then by trained volunteers or members of the Kennesaw Mountain Trail Club.

In addition, if contractors are hired to cut down trees, it must be made clear prior to the task that they should so in accordance with National Park Service guidelines as described in the *Guide to Sustainable Military Earthworks Management.* To ensure that workers comply with the guidelines, volunteers or park staff should monitor work conducted by contractors and document progress through photography. If this is not possible, contractors should, at the least, sign an

[155] Bull and Panton, "Drafting the Vimy Charter for Conservation of Battlefield Terrain," 8.

agreement that they have received a briefing, or are able to display knowledge of, National Park Service guidelines for tree removal.

Big Kennesaw Mountain

Garlic mustard is an invasive species that will continue to be an issue for Big and Little Kennesaw Mountains because garlic mustard threatens biodiversity and the earthworks in these areas. The key to controlling garlic mustard is its elimination and a program that monitors the area to assess additional growth or spread. Garlic mustard is currently being successfully eliminated and controlled on an annual basis by various volunteer organizations, such as the Kennesaw Mountain Trail Club.

Any recommendations that might be given for the control of garlic mustard cannot supersede what is already being successfully done at the park. But there are a few additional points that can be made about garlic mustard, or any invasive species, that might prove effective for the future. First, the continuation of education for volunteers and visitors should prove helpful. The issuance of pamphlets or brochures by park staff and volunteers might prove helpful for visitors. Visitors become volunteers, and it would not hurt to have more eyes peeled for invasive species.

Secondly, areas in which garlic mustard exists should continue to be monitored by GPS. This method is already in place, but a recent trip to the battlefield in search of bamboo and privet emphasized the use of GPS to monitor the spread of these species. This technique can be useful in monitoring the spread of garlic mustard toward the earthworks on the peaks of the mountains.

Thirdly, it is not impossible or improbable that garlic mustard will spread to earthworks on the mountains' peaks. Garlic mustard as a plant releases a voluminous amount of seeds during its life cycle and seeds can scatter by biotic and abiotic processes. Therefore, it may be

helpful to have a plan ready for garlic mustard's invasion of earthworks. Whatever plan is agreed upon by park staff and volunteers will no doubt be effective for eliminating garlic mustard, but the plan should be one in which garlic mustard is treated without compromising the integrity or condition of the earthworks. This means that the minimum amount of people should physically interact with the earthworks while treating garlic mustard; the spraying of herbicides, the most common and preferred treatment for invasive vegetation at Kennesaw Battlefield, will have to be controlled as to not eliminate any protective grasses that cover the earthwork; and, if practicable, if and when a volunteer might have to climb an earthwork to apply a herbicide, it should be done in dry conditions as to prevent any slippage along the slope of the earthwork as well as maximize the effectiveness of the herbicide.

Competing Goals Between Interpretation, Preservation, and Recommendations

Observation of Kennesaw Battlefield's earthworks over the past year leads to the conclusion that the park has arrived at a crux between weighing the benefits of preservation versus the interpretation of the earthworks and vice versa. This has happened for a one main reason. The park is overwhelmed by over two million visitors annually and visitors are the primary source of damage to the earthworks. The visitors to the park, mostly recreationalists, have proven not be passionate stewards of the earthworks. Visitors neglect to pay attention to instructive interpretive material, such as signage that asks visitors to refrain from physical interaction with earthworks, and preservation practices, such as wooden barriers that are meant to protect earthworks, that become invisible to visitors. As such, the battlefield appears to be in constant flux with how to successfully ameliorate this issue between good preservation practices and interpretive success in a way that both educates the visitor while fulfilling the full extent of the park's preservation and interpretive goals

The recommendations that have been made offer alternative, yet current, practices that have been successful for earthworks at other battlefields. However, recommendations made by the author for preservation and interpretive improvements actually illuminate the conflict between the park's interpretive and preservation goals. The following table illustrates these competing goals and has been constructed based on guidance provided by Cam Graham, park volunteer and interpretive guide at the park. The table specifically focuses on the earthworks investigated as case studies, with the exception of those located on Big Kennesaw Mountain that face the potential threat of garlic mustard. The earthworks at that location mostly require monitoring as the chief preservation practice as of now.

Table 3: Competing Goals Between Interpretation and Preservation of Earthworks at Kennesaw Mountain National Battlefield Park

		Location of Earthworks			
		Little Kennesaw Mountain		24-Gun Battery	
		Interpretation	Preservation	Interpretation	Preservation
Components	Access/ Circulation	Trails designed to carry visitors past earthworks	-Close proximity of trail to unprotected earthworks invites unwanted physical interaction -Trail cannot be relocated.	Trail is located far from earthworks. Earthworks are clearly visible from the trail.	Visitors create desire paths that divert from the designated walking trail in order to gain a closer look at the earthworks
	Vegetation	-Mowed grass reveals profile of earthwork and is best for interpretation -Disadvantage of mowed grass is that visitors are likely to be attracted to earthwork	- Grass cover on Little Kennesaw earthworks grows tall to deter visitor interaction – ineffective here -Thick vegetation in front of earthworks obscures line-of-sight to areas beyond. Visitors climb earthworks	-Trees are thinned so as not to obscure visitors' line-of-sight from the walking trail to the earthworks. This technique is designed to deter visitors from straying from designated trails in order to interpret earthworks.	-Earthworks rely on leaf litter for protection. -Visitor interaction, wind and rain remove leaf litter. - Tree growth through slopes reinforces slopes. -Windthrow a potential issue.

			to gain view as a result	-Trees are removed from earthworks and surrounding area. Earthworks' profiles are more clearly revealed.	
	Barriers	Can interfere with earthworks' integral characteristics such as setting and feeling	-Very high volume of visitors to this location of earthworks. -Needed to prohibit human interaction with earthworks.	Can interfere with earthwork's integral characteristics such as setting and feeling	-Current wooden barriers are ineffective and do not entirely surround earthworks. -Barriers designed to protect cannons from human interaction and send message to visitors to refrain from interaction.
	Signage	Existing signage explains the historical significance of earthworks	-Existing signage does not address need for preservation - Signage should identify resources, identify the visitor as steward of resource, and provide reason for preservation	Existing signage explains the historical significance of earthworks	-Existing signage does not address need for preservation -Signage should identify resources, identify the visitor as steward of resource, and provide reason for preservation
	Geotextiles	Potential to interfere with integral characteristics of earthworks such as feeling, setting and materials	-Needed for the retention of leaf litter as protective cover -Netting is recommended	Potential to interfere with integral characteristics of earthworks such as feeling, setting and materials	-Needed for the retention of leaf litter as protective cover. -Netting is recommended -Materials must be available in the future
	Boardwalks	Not recommended. Barriers should first be implemented	Not recommended. Barriers should first be implemented.	Potential to interfere with integral characteristics of earthworks such as feeling, setting and materials	-Allows for human interaction with earthworks while mitigating erosion -Materials must be available in the future
	Viewing Platforms	Not recommended due to lack of space on trail	Not recommended due to lack of space on trail	Potential to allow visitors a more comprehensive view of the earthworks' significance of placement and location	-Potential of platform to attract visitors and deter human interaction with earthworks -Does not guarantee less visitor interaction with earthworks

Sustainability of Recommendations

The mission of the National Park Service is to "preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations." Thus, the park's mission is one of sustainability, meaning that the Park Service should only use recommendations based on resources that are currently available and can also be available for the future use as well.[156] But budgets and allotted funding from the Secretary of the Interior can fluctuate, so materials that might be available now might not be available if the future. This means possible improvements such as timber boardwalks or viewing platforms mentioned previously cannot undergo the continuous maintenance routine needed to repair or replace wood, nails, etc. in the future. If resources for earthworks improvement are currently available, management will require stewardship of both these materials and the earthworks in addition to political, social and economic support for the future. According to the National Park Service, good stewardship and continued support foster resilience resources; resilience being the "capacity to withstand change or recover from unexpected impacts quickly."[157] Kennesaw Mountain National Battlefield Park currently employs elements of resilience and sustainability with stewardship, political, social, and economic support. Stewardship and social support definitely stem from park volunteers and organizations such as the Kennesaw Mountain Trail Club in doing what they can to preserve earthworks at the battlefield. Recently, the park initiated its own economic support program with a $5 parking fee that fill a wide range of needs such as earthworks preservation and job creation. Political support comes in the form of annual allotted funding for the battlefield and any

[156] Bull and Panton,"Drafting the Vimy Charter for Conservation of Battlefield Terrain," 9-10.
[157] National Park Service, Resilient Systems and Cultural Landscape Management, accessed February 19, 2020, https://www.nps.gov/subjects/culturallandscapes/resilientsystems_management.htm.

battlefield boundary expansions that would allow the National Park Service to manage resources once located beyond the boundary of the battlefield.

Conclusion

Three case studies were created to illustrate the three chief factors of erosion that impact earthworks at Kennesaw Mountain National Battlefield Park. The author based the location of these case studies at the northern end of the park for two reasons: this area of the park is the core visitation area and this area of the park provides abundant parking which allowed consistent access to the selected earthworks. These case studies were selected as products of a methodical, three-step process. The first step involved a survey of literature regarding current critical issues associated with earthworks and their preservation. Secondly, research has illustrated the point that erosion is the critical issue in preservation and can be caused and accelerated by three main factors such as human interaction, invasive species, and wind and rain. Thirdly, the author selected groups of earthworks for study that corresponded to one of the three chief factors of erosion.

Although only three sites of the battlefield were investigated, conclusions and recommendations presented here can be applied, in some way, to all earthworks at the battlefield. Of the three chief factors of erosion, it is the author's observations that human-induced erosion is by far the most widespread and harmful factor. All three locations investigated have been damaged by visitors. This is partly due to the densely urbanized area of Cobb County and the fact that the battlefield is the largest contiguous green space in the metro Atlanta area. This could account for the differentiation in findings between the author's assessment of the earthworks located on Little Kennesaw Mountain and Kennesaw Mountain Battlefield's

earthworks management plan; the increase in visitation to this location of the battlefield over a seven-year time span could be due to population increase in the county.

Kennesaw's earthworks management plan is site specific but is based upon fundamental methods used for earthworks preservation at all battlefields within the National Park Service system. According to Kennesaw's EMP, earthworks currently maintained under forest cover retain aspects of their historical integrity, such as clarity of form, better than earthworks under grass cover. It is true that grass cover has its disadvantages such as faster rates of erosion, ability to be trampled, and its ability to attract visitors.[158] However, as can be seen at the 24-Gun Battery location, earthworks maintained in forested conditions can suffer greatly from human interaction as well. Although these earthworks are located away from the core visitation area of the battlefield, they still received a high volume of visitors, maybe more than expected, for such a location. They have surprisingly retained their historic integrity over time, but this could be due to the fact that large rocks were also used in their construction.

It is the author's observation that earthworks maintained under forest cover at Kennesaw battlefield retain excellent integrity for two reasons: location and distance from walking trails. Earthworks located south of Burnt Hickory Road along Noses Creek trail retain excellent historic integrity. This could be because of less visitation to that area due to their location far from the core visitation area of the battlefield, and it could also be because the earthworks, especially infantry trenches, are located quite a distance from the trail, and visitors are either not aware of them or simply do not want to trek through the woods to visit them, although they can clearly be seen from the trail. In addition, earthworks maintained under forest cover in the core area of the park, especially infantry trenches located at Big and Little Kennesaw Mountains, retain a great

[158] The National Park Service, "Earthworks Management Plan," in "KEMO Cultural Landscape Report," B-74.

deal of integrity because they are located away from the walking trails and along sharply ascending or descending slopes. At the 24-Gun Battery area, however, visitors must only interact with a soft, gradual slope that leads to the earthworks; not to mention that cannons are present at the fortifications, often a sign that something of importance lies ahead. Apart from the impacts of visitors to the area, it is clear that these earthworks have not properly retained their leaf litter, which could be the result of the earthworks' location near the crest of the ridge and subject to wind.

Current issues related to earthworks located on Little Kennesaw and the 24-Gun Battery site lead to one of the more important aspects of recommendations: monitoring. The population of visitors to the park continues to grow at a rapid pace and is directly correlated with the continued destruction of earthworks throughout the park. Thus, monitoring is required to continuously assess the condition and integrity of the earthworks. Examples of monitoring include maintaining protective vegetative cover by various means on earthworks as well as documenting the locations and spread of invasive species followed by quick elimination with herbicides on Big Kennesaw Mountain. The role of monitoring should be, and currently is, carried out by the Kennesaw Mountain Trail Club through designated workdays, continued education, and in working closely with battlefield staff to ensure preservation, preservation planning, and guidelines are met, or even changed, to adapt to a changing landscape and park.

Final Thoughts

In closing this thesis, the author would like to reiterate the fact that earthworks, as cultural, natural, historical, archaeological, and architectural resources are finite resources. Once they are gone they are gone forever, and with their decay Kennesaw Mountain Battlefield loses a little bit of its integrity and significance as a Civil War resource. Current pressures on the

battlefield are limitless in their scope and size and its these pressures that cause damage to earthworks or deter attention from them. The voluminous number of visitors to the park every year, for example, is directly related to earthworks destruction, and visitor issues merely scratch the surface of preservation of the battlefield as a cultural landscape. In some ways, battlefield preservation is a never-ending fight that ironically serves as something like a second Civil War. It is hoped that this thesis is able to benefit the battlefield in some way that at least mitigates damage to earthworks and expands upon the meaning of stewardship at Kennesaw Mountain National Battlefield Park.

REFERENCES

Barker, David H., and Alex J. Watson and Samran Sombatpanit and Ben Northcutt and Amado R. Maglinao, with assistance from Tony M. Ang, eds. *Ground and Water Bioengineering for Erosion Control and Slope Stabilization.* Enfield: Science Publishers, Inc., 2004.

Bishop, Garth D.,ed. *Movements and Positions on the Battle of Kennesaw Mountain: The Memoir of James T. Holmes, 52nd Ohio Volunteer Infantry.* Jefferson: McFarland and Company, 2018.

Blythe, Robert W., and Maureen A. Carroll and Steven H. Moffson. "KEMO: Historic Resource Study." IRMA Data Store. National Park Service (1995). Accessed Oct. 17, 2019. http://npshistory.com/publications/kemo/hrs.pdf.

Boge, Georgie, and Margie Holder Boge. *Paving Over the Past: A History and Guide to Civil War Battlefield Preservation.* Washington, D.C: Island Press, 1993.

Brady, Lisa M. *War Upon the Land: Military Strategy and the Transformation of Southern Landscapes During the American Civil War.* Athens: The University of Georgia Press, 2012.

Bull, Natalie and David Panton. "Drafting the Vimy Charter for Conservation of Battlefield Terrain." *The Journal of Preservation Technology* 31, no. 4 (2000): 9-10. www.jstor.org/stable/1504672.

Capps, Michael A. "KEMO: Administrative History." IRMA Data Store. National Park Service (1994). Accessed Sept. 1, 2019. https://irma.nps.gov/DataStore/DownloadFile/466599.

Castel, Albert. *Decision in the West: The Atlanta Campaign of 1864.* Lawrence: University Press of Kansas, 1992.

Cooke, Louise. *Conservation Approaches to Earthen Architecture in Archaeological Contexts.* BAR International Series 2147. Oxford: Archaeopress, 2010.

Eyring, Shaun and Lucy Lawliss. "Preserving Battlefield Terrain: Technologies for Earthworks Management." *The Journal of Preservation Technology* 31, no. 4 (2000): 18. www.Jstor.org/stable/1504672.

Graham, Cam. E-mail message to author, February 6, 2020.

Harpers Ferry Interpretive Design Center and Kennesaw Mountain National Battlefield Park and the Southeast Regional Office."KEMO Long Range Interpretive Plan." (2010). IRMA Data Store. Accessed May 23, 2019. https://irma.nps.gov/Datastore/Search/Quick.

Hess, Earl J. *Field Armies and Fortifications in the Civil War: The Eastern Campaigns, 1861-1864.* Chapel Hill: University of North Carolina Press, 2005.

Hess, Earl J. *Fighting for Atlanta: Tactics, Terrain, and Trenches in the Civil War.* Chapel Hill: The University of North Carolina Press, 2018.

Hess, Earl J. *Kennesaw Mountain: Sherman, Johnston, and the Atlanta Campaign.* Chapel Hill: The University of North Carolina Press, 2013.

ICOFORT. "*Charter of Fortifications and Related Heritage: Guidelines for Protection, Conservation and Interpretation*." Accessed November 1, 2019. https://www.icofort.org/copia-executive-committee.

Jones, Kevin L., and New Zealand Department of Conservation and New Zealand Historic Places Trust. *Caring for Archaeological Sites: Practical Guidelines for Protecting and Managing Archaeological Sites in New Zealand* (Wellington: Science and Technical Pub.

Dept. of Conservation, 2007), 57-60. Accessed January 21, 2019. https://trove.nla.gov.au/work/34990215?selectedversion=NBD42335324.

Kennesaw Mountain Trail Club. Invasive Plants at Kennesaw Mountain. Accessed February 14, 2020. http://www.kennesawmountaintrailclub.org/plants.php.

King, Thomas F. *Cultural Resource Laws and Practice.* 4th ed. Lanham, MD: Altamira Press, 2013.

Mahan, Dennis Hart. *A Treatise on Field Fortification: Containing Instructions on the Methods of Laying Out, Constructing, Defending, and Attacking Intrenchments, With the General Outlines Also of the Arrangement, the Attack and Defence of Permanent Fortification.* (Org, Published by the US War Department, 1836), Preface VII, https://babel.hathitrust.org/cgi/pt?id=uc1.$b182096&view=1up&seq=9.

McMurry, Richard M. *Atlanta 1864: Last Chance for the Confederacy.* Lincoln and London: University of Nebraska Press, 2000.

National Park Service. "Annual Park Recreation Visitation (1934-Last Calendar Year)." NPS Stats and Park Reports. IRMA Data Store. Accessed Oct. 5, 2019. https://irma.nps.gov/Stats/Reports/Park/KEMO.

National Park Service. "Civil War Sites Advisory Commission Report on the Nation's Civil War Battlefields." Accessed Oct. 10, 2019. http://npshistory.com/publications/battlefield/cwsac/report.pdf.

National Park Service. *Guide to Sustainable Military Earthworks Management*. Accessed November 22, 2019. https://www.nps.gov/tps/how-to-preserve/currents/earthworks/index.htm.

National Park Service. " KEMO General Management Plan and Environmental Assessment."

(1983). Accessed Oct. 10, 2019. https://www.nps.gov/kemo/learn/management/upload/KEMO_General-Management-Plan_1983-2.pdf.

National Park Service. "KEMO State of the Park Report." IRMA Data Store (2013): Executive Summary (V). Accessed Oct 10, 2019. https://irma.nps.gov/DataStore/DownloadFile/546103.

National Park Service. "Kennesaw Mountain National Battlefield Acquires Key Land Tract." Accessed Sept. 7, 2019. https://www.nps.gov/kemo/learn/news/kennesaw-mountain-national-battlefield-acquires-key-land-tract.htm.

National Park Service. "Mission 66." Accessed Sept. 15, 2019. https://www.nps.gov/glac/learn/historyculture/mission-66.htm.

National Park Service. Polices and Guidance. Accessed Oct. 1, 2019. https://www.nps.gov/policy/DOrders/thingstoknow.htm.

National Park Service. Resilient Systems and Cultural Landscape Management. Accessed February 19, 2020. https://www.nps.gov/subjects/culturallandscapes/resilientsystems_management.htm.

National Park Service. Secretary of the Interior's Guidelines for Preservation Planning and the Treatment of Cultural landscapes. Accessed Oct. 7, 2019. https://www.nps.gov/Tps/standards/four-treatments/landscape-guidelines/preservation_planning.htm.

National Park Service. "Selecting Vegetative Cover for Earthworks." Accessed November 10, 2019. https://www.nps.gov/tps/how-to-preserve/currents/earthworks/case_studies/earthwrkvegselection.doc.

National Park Service. Southeast Coast Invasive Plant Management Team. Accessed February 14, 2020. http://www.kennesawmountaintrailclub.org/plants.php.

Norris, Joanne E., and Alexia Stokes and Slobodan B. Mickovski and Erik Cammeraat and Rens Van Beek and Bruce C. Nicoll and Alexis Achim, eds. *Slope Stability and Erosion Control: Ecotechnological Solutions.* Dordrecht: Springer, 2008. Accessed November 7, 2019. Springer Link, https://link-springer-com.proxy-remote.galib.uga.edu/book/10.1007%2F978-1-4020-6676-4.

Royster, Charles, ed. *Sherman: Memoirs of General W.T. Sherman.* New York: Literary Classics of the United States, 1990.

Shockley, Dave. "*Earthwork Management at Petersburg National Battlefield*." National Park Service (2000), 34. Accessed November 30, 2019. https://www.nps.gov/pete/learn/management/upload/Earthworks-Manual-2.pdf.

Smith, Timothy B. *The Golden Age of Battlefield Preservation: The Decade of the 1890s and the Establishment of America's First Five Military Parks.* Knoxville: The University of Tennessee Press, 2008.

Spielvogel, Christian J. *Interpreting Sacred Ground: The Rhetoric of National Civil War Parks and Battlefields.* Tuscaloosa: The University of Alabama Press, 2013.

The Conservation Foundation. *National Parks for a New Generation: Visions, Realities, Prospects.* Washington, D.C.: The Conservation Foundation, 1985.

USDA, *A Management Guide for Invasive Plants in Southern Forests,* 99.

United States Department of Agriculture. *Erosion Control Treatment Selection Guide*. Accessed November 15, 2019, 1. https://www.fs.fed.us/t-d/pubs/pdf/hi_res/06771203hi.pdf.

Unrau, Harlan D., and G. Frank Willis. " To Preserve the Nation's Past: The Growth of the

National Park Service During the 1930s." *The Public Historian* 9, no. 2 (Spring 1987). www.jstor.org/stable/3377328.

Vermilya, Daniel J. *The Battle of Kennesaw Mountain.* Civil War Sesquicentennial Series. Charleston: The History Press, 2014.

Veterans Affairs Canada. *The Vimy Declaration for the Conservation of Battlefield Terrain.* Accessed January 20, 2019. https://www.veterans.gc.ca/eng/remembrance/memorials/overseas/first-world-war/france/vimy/declaration.

Vial, Charles L., and E. Paul Engstrom. "KEMO National Register Nomination." Prepared for the National Park Service (1966). Accessed Oct. 1, 2019. https://npgallery.nps.gov/pdfhost/docs/NRHP/Text/66000063.pdf.

Sam R. Watkins, *Co. Aytch,* (New York: Simon and Schuster, 1990), 147.

Wijesuriya, Gamini and Jane Thompson and Christopher Young. *Managing World Cultural Heritage: World Heritage Resource Manual.* Paris: UNESCO (2019): 19. Accessed November 5, 2019. https://whc.unesco.org/en/news/1078.

Wiss, Janney, Elstner Associates, Inc., contractor and John Milner Associates, Inc., Subcontractor. "Kennesaw Mountain National Battlefield Park: Cultural Landscape Inventory." IRMA Data Store. National Park Service (2009) Accessed June 1, 2019. https://irma.nps.gov/DataStore/Search/Quick.

Wiss, Janney, Elstner Associates, Inc., contractor and John Milner Associates, Inc., Subcontractor." KEMO Cultural Landscape Report." National Park Service (2013). IRMA Date Store. Accessed May 5, 2019. https://irma.nps.gov/DataStore/DownloadFile/551165.

http://ehap.hss.kennesaw.edu/sites/commons.kennesaw.edu.ehap/files/kemo_lrip_copy.pdf.

DIGITAL IMAGES

American Battlefield Trust. "Abatis." https://www.battlefields.org/atom/19202. Accessed March 1, 2020.

Barnard, George N. "Kennesaw Mountain." Photograph. New York: Press of Wynkoop & Hallenbeck, 1866. From Digital Library of Georgia: *New Georgia Encyclopedia.* https://dlg.usg.edu/record/nge_ngen_m-2006 (accessed May 25, 2019).

Getchell, Maurice, photographer. "WPA Relief Labor." Photograph. Atlanta: Gay Bolling Shepperson Photographs, Atlanta History Center, ca. 1935. From Digital Library of Georgia, Gay Bolling Shepperson Photograph Collection, 1933-1945 (bulk 1935-1937). https://dlg.usg.edu/record/geh_shepperson_64, (accessed October 19, 2019).

Graham, Cam. Photo of Garlic Mustard. March 4, 2020.

Jespersen, Hal. "Maps by Hal Jespersen, www.cwmaps.com." http://www.cwmaps.com/freemaps.html. Accessed February 25, 2020.

Maps Illustrating Gen'l Sherman's "March to the Sea" and Through the Carolinas and Virginia. Map. Ca. 1865. Battlefield of Kolb's Farm and Vicinity June 22, 1864. Map. From Library of Congress, *Map Collections.* http://hdl.loc.gov/loc.gmd/g3871sm.gcw0077000a, (accessed May 25, 2019).

Map of the Atlanta Campaign. Map. Western and Atlantic Railroad Company (contributor). Buffalo: Matthews, Northrup & Co., 1887.. From Library of Congress, *Map Collections.* https://www.loc.gov/item/2008628276/ (accessed June 9, 2019).

National Park Service. Kennesaw Mountain Google Earth Map. Accessed January 2020. https://www.nps.gov/kemo/planyourvisit/maps.htm.

National Park Service. Northern Section Map. Accessed January 15, 2020. https://www.nps.gov/kemo/planyourvisit/maps.htm.

Park Aerial Surveys Inc. Map. 1:20,000. Box: Cobb Co. (13067) -1972. Photo A-20 13067 172-133. U.S. Department of Agriculture Agricultural Stabilization and Conservation Service, 1972. University of Georgia Map and Government Library.

U.S. Department of Agriculture National Invasive Species Information Center. Autumn Olive. Accessed December 5, 2019. https://www.invasivespeciesinfo.gov/profile/autumn-olive.

U.S. Department of Agriculture National Invasive Species Information Center. Chinese Privet. Accessed December 5, 2019. https://www.invasivespeciesinfo.gov/profile/chinese-privet.

U.S. Department of Agriculture National Invasive Species Information Center. Garlic Mustard. Accessed December 5, 2019. https://www.invasivespeciesinfo.gov/profile/garlic-mustard.

U.S. Department of Agriculture National Invasive Species Information Center. Kudzu. Accessed December 5, 2019. https://www.invasivespeciesinfo.gov/profile/kudzu.

U.S. Department of Agriculture National Invasive Species Information Center. Japanese Honeysuckle. Accessed December 5, 2019. https://www.invasivespeciesinfo.gov/profile/japanese-honeysuckle.

U.S. Department of Agriculture Forest Service. Noninfectious Disorders and Windthrow. Accessed December 1, 2019. https://www.fs.fed.us/r3/resources/health/field-guide/nid/windthrow.shtml.

U.S. Engineer Department. *Military Maps.* Atlanta Campaign, Includes Pine, Lost, and Kennesaw Mountains; Smyrna Campground. Map. Washington: U.S. Engineer

Department, 1879. From Library of Congress, Library of Congress Geography and Map Division. http://hdl.loc.gov/loc.gmd/g3701sm.gcw0092000, (accessed October 3, 2019).

"View on the Battlefields of Kenesaw (i.e. Kennesaw), Ga." Photograph. Photographed between 1861 and 1865, printed between 1880 and 1889. From Library of Congress: Library of Congress Prints and Photographs Division. https://www.loc.gov/item/2012646936/ (accessed May 25, 2019).

Woltz Studios, LTD., Aerial Surveys. Map. 1:20,000. Box: Cobb Co. (JL)-1943. Photos JL-1C-13 and JL-2C-123. United States Department of Agriculture Agricultural Adjustment Administration Southern Division, 1943. University of Georgia Map and Government Information Library.

Wounded Taken From Out the Fire – Left of Kennesaw. Artist Alfred R. Waud as contributor. Illustration. Ca. June 27, 1864. From Library of Congress Prints and Photographs Division. https://www.loc.gov/item/2004660010/ (accessed May 25, 2019)