



# Stabilize Railroad Redoubt Earthworks and Texas Memorial Environmental Assessment



July 2017



# **PROJECT OVERVIEW**

## **INTRODUCTION**

The National Park Service (NPS) is proposing to mitigate continuing erosion and stabilize the bluff adjacent to the Texas Memorial (memorial) and Railroad Redoubt earthworks in Vicksburg National Military Park (the park). Stabilization is needed because of the ongoing loss of highly erodible soils. The bluff has eroded such that it is now dangerously close to the historic structures. This document complies with the National Environmental Policy Act of 1969, as amended.

## **PURPOSE OF AND NEED FOR THE ACTION**

The purpose of the project is to prevent further erosion and protect the memorial and adjacent fortification. Further erosion could damage historic resources and affect visitor safety and the operation of the Kansas City Southern rail line adjacent to the project area. The project area is approximately 316 feet long and between 15 and 24 feet high.

## **OVERVIEW OF THE ALTERNATIVES**

Two alternatives are addressed in this environmental assessment:

- Alternative 1: No Action
- Alternative 2: Stabilization with a Soil Pile Wall (Preferred Alternative)

## **HOW TO COMMENT**

NPS encourages agencies, non-governmental organizations, and the public to review and comment on the contents of this environmental assessment during a 30-day public review and comment period, using any one of several methods. The preferred method of providing comments is on the NPS planning website: <http://parkplanning.nps.gov/VICK>. You may also submit written comments to:

Bill Justice, Superintendent  
Vicksburg National Military Park  
Attn: Stabilization Environmental Assessment  
3201 Clay Street  
Vicksburg, MS 39183

Only written comments will be accepted. Please make sure that your written comments are transmitted or postmarked within 30 days of the posting of the notice of availability. Please be aware that your entire comment will become part of the public record. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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# **CHAPTER 1: PURPOSE AND NEED**

## **INTRODUCTION**

The National Park Service (NPS) is proposing to mitigate continuing erosion and stabilize the bluff adjacent to the Texas Memorial (the memorial) and Railroad Redoubt earthworks in Vicksburg National Military Park (the park). Stabilization is needed because of the ongoing loss of highly erodible soils. The bluff has eroded such that it is now dangerously close to the historic structures. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) “Regulations for Implementing the Procedural Provisions of NEPA” (40 Code of Federal Regulations [CFR] 1500–1508), NPS Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2011), and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) and implementing regulations, 36 CFR Part 800. The NEPA process for this project is being used to comply with Section 106 of the NHPA.

## **PURPOSE OF AND NEED FOR ACTION**

The purpose of the project is to prevent further erosion and protect the memorial and fortification. Further erosion could damage historic resources and affect visitor safety and the operation of the Kansas City Southern rail line adjacent to the project area. The project area is approximately 316 feet long and between 15 and 24 feet high.

## **PURPOSE AND SIGNIFICANCE OF THE PARK AND PROJECT BACKGROUND**

The park was established on February 21, 1899, to protect areas associated with the siege and defense of Vicksburg, Mississippi, which pitted Union forces commanded by Maj. Gen. Ulysses S. Grant against the defending Confederate forces commanded by Lt. Gen. John C. Pemberton. With the capture of New Orleans by Union Admiral David Farragut and Maj. Gen. Benjamin Butler on May 1, 1862, the heavily fortified Confederate position at Vicksburg posed the most significant remaining obstacle to Union control of the Mississippi River. The Union effort to take Vicksburg and neutralize its gun batteries began in May 1862 with a series of unsuccessful naval attacks led by Farragut and ended with Grant’s climactic siege of the city and its ultimate surrender to Union forces on July 4, 1863.

The park currently consists of 1,806 acres and protects most of the historic siege and defense lines associated with the final stage of the campaign. The entire battlefield area is listed in the National Register of Historic Places (NRHP). Also listed is the ironclad gunboat USS Cairo, the Shirley House (the only surviving antebellum structure in the park), and a number of major memorials and statues. Twenty-two state memorials are within park boundaries, of which 5 are state memorials on former park property and 1 is a state memorial on Grant’s Canal. The park maintains a 16-mile tour road that allows visitors to experience the Union siege and Confederate defensive lines via 15 designated tour stops. Nearly 1,400 monuments and markers, including 284 regimental monuments, 239 regimental markers, 95 relief portraits, and 62 busts honoring key commanders from both sides lie along this route, while 645 iron tablets and guideposts mark trench lines, battery, and infantry positions, and describe battle events. The park also maintains other interpretive exhibits to help visitors understand the significance and historic context of the campaign. A map of the park boundary and tour road are provided in figure 1.

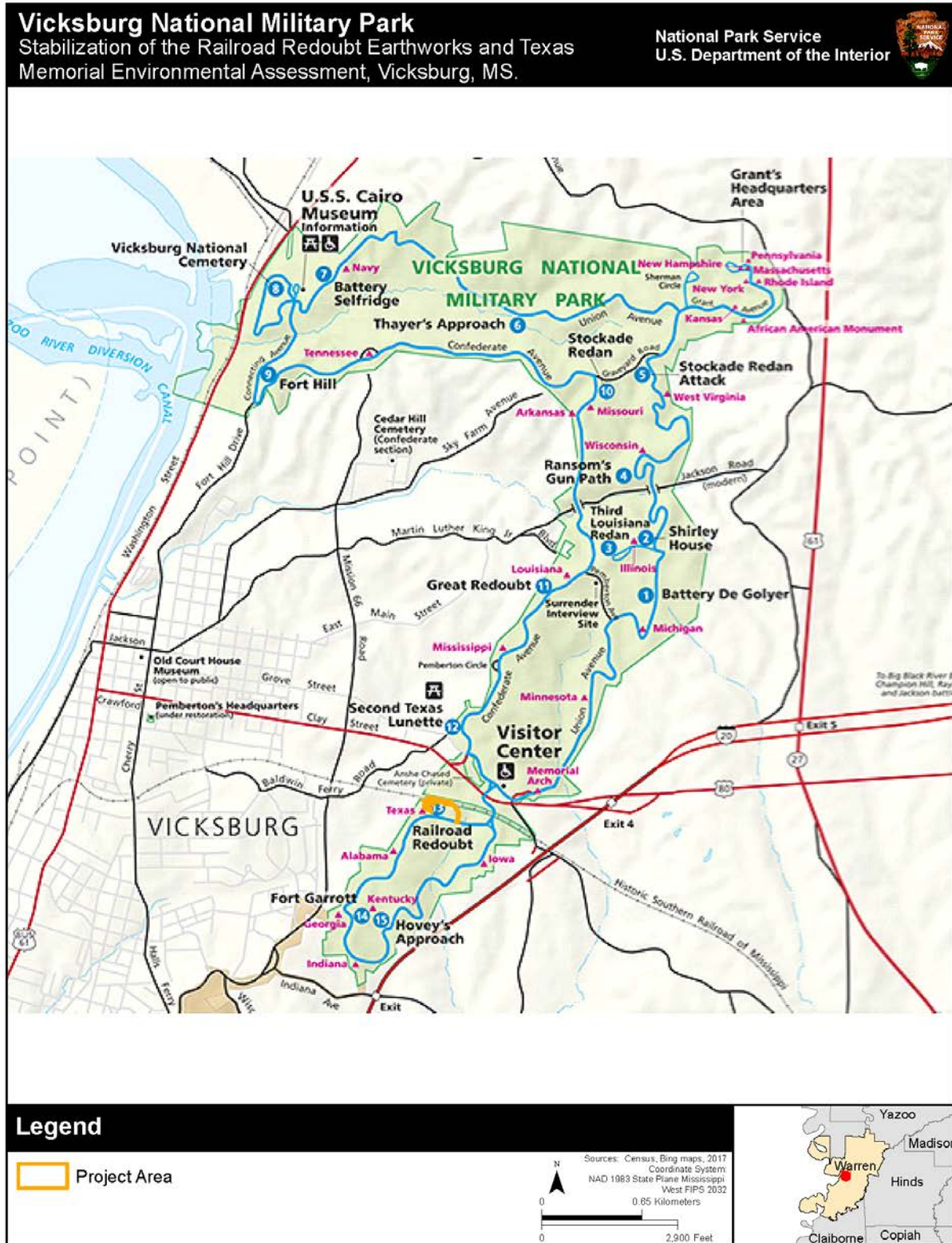
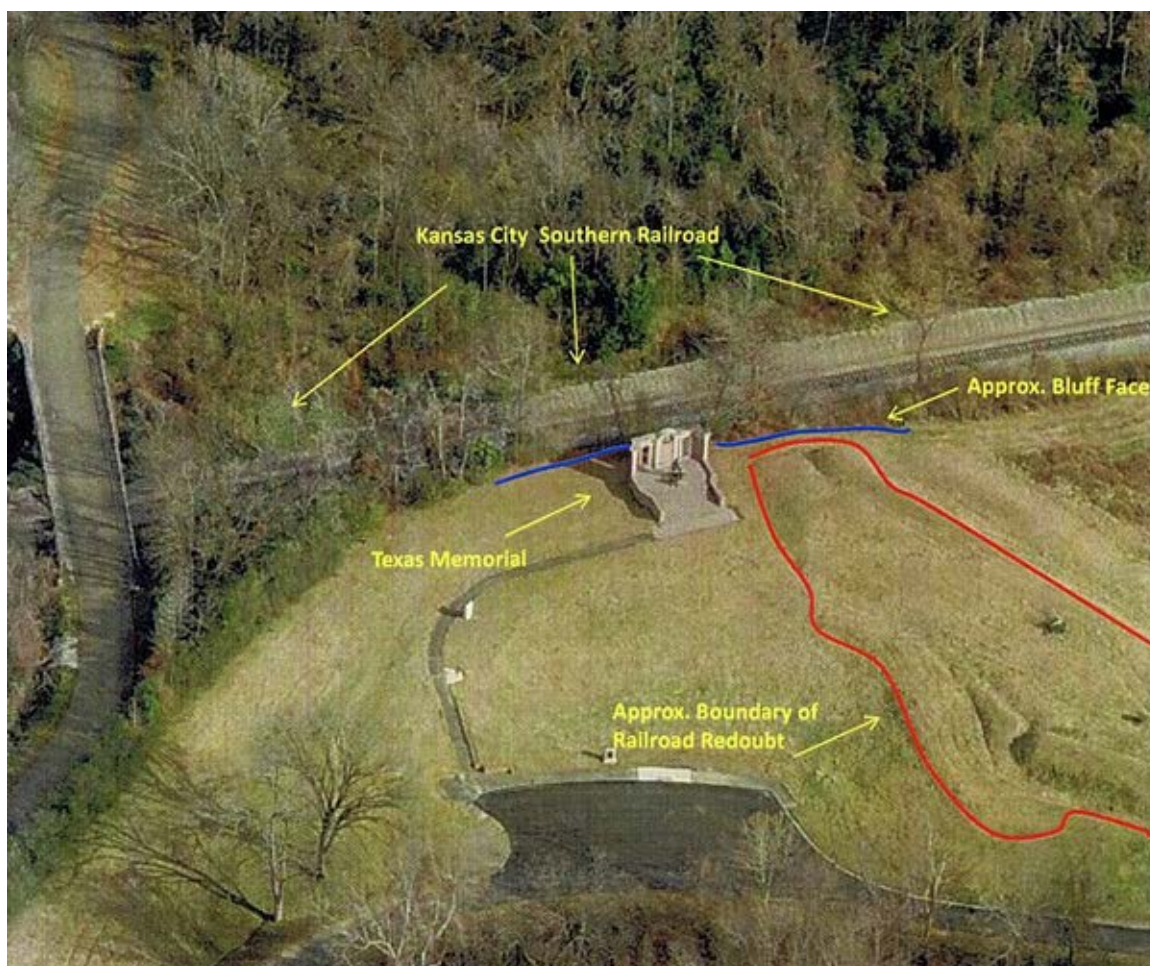


FIGURE 1. PROJECT AREA

The Texas Memorial is one of the 22 state memorials inside the park. It is located above an eroding bluff, adjacent to the Kansas City Southern rail line. The Railroad Redoubt was a Confederate earthen fortification built to protect the Southern Railroad of Mississippi, a vital entrance to the city. The fortification and the memorial are threatened by chronic erosion of the bluff, located just north of the two features. Figure 2 provides the locations of the memorial, Railroad Redoubt, and rail line.

The bluff face has been steadily lost through the years. The area's unique loess soils are particularly erodible whenever disturbed, and erosion in the project area is exacerbated by tree fall along the bluff line. Park staff estimate an average loss of up to 6 inches of bluff face annually. The bluff line is currently between 15 and 17 feet from the Railroad Redoubt and the memorial, and park officials are concerned about the possibility of the earthwork and memorial collapsing onto the railroad tracks.



**FIGURE 2. PROJECT AREA FEATURES**

## **ISSUES AND IMPACT TOPICS**

Issues describe problems or concerns associated with current impacts from environmental conditions as well as problems that may arise from the implementation of any of the alternatives. The issues and concerns identified during scoping were grouped into impact topics that are discussed in “Chapter 3: Affected Environment” and are analyzed in “Chapter 4: Environmental Consequences.” NPS staff



identified the following potential issues associated with the proposed stabilization during internal and public scoping and agency consultation.

### **Cultural Resources**

The NHPA (16 United States Code [USC] 470 et seq.), NEPA, the Organic Act, NPS *Management Policies 2006* (NPS 2006), Director's Order 12, and NPS-28, *Cultural Resources Management Guideline* require the consideration of impacts on any cultural resources that might be affected by an undertaking. The NHPA, in particular, requires the consideration of effects on cultural resources either listed in, or eligible to be listed in, the NRHP. Cultural resources include archeological resources, cultural landscapes, historic structures and districts, ethnographic resources, objects and museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens), and traditional cultural properties.

Ground-disturbing activities from implementation of the proposed stabilization project could affect cultural resources located in the project area. In particular, stabilization of the bluff could directly affect the Texas Memorial and the Railroad Redoubt and one iron tablet/trench marker. Finally, the entire park is part of the Vicksburg Cultural Landscape. As a result, cultural resources are fully analyzed in this EA.

### **Wetlands**

The project area includes a palustrine wetland. Construction equipment would need to travel through the wetland area to access the area for proposed stabilization, resulting in direct impacts on the wetland. Because impacts on wetlands could occur, this resource area is addressed as an impact topic in this EA.

### **Soils**

Stabilization of the bluff would have direct impacts on soil and erosion in the project area. As a result, this resource area is addressed as an impact topic in this EA.

### **Vegetation**

Actions directly related to the stabilization would require vegetation clearing or trimming and tree removal; however, the amount of vegetation clearing would be limited to the extent possible. Additionally, one state-listed vegetation species exists in the project area across most of the upland grassy area at the top of the bluff. Because impacts on vegetation would occur, this resource area is addressed as an impact topic in this EA.

### **Visitor Use and Experience**

Construction associated with the stabilization of the bluff would affect visitor use and experience by requiring closure of the memorial and Railroad Redoubt; therefore, this impact topic is analyzed in the EA.

## **IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS**

According to Director's Order 12 and its accompanying handbook (NPS 2015), analysis in an EA should focus on significant issues (i.e., pivotal issues or issues of critical importance) and only discuss insignificant issues briefly. As a general rule, issues should be retained for consideration and discussed in detail if:

- the environmental impacts associated with the issue are central to the proposal or of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue.

The following issues and topics did not meet the above criteria because they are not potentially significant, not critical to choosing between alternatives, and are not controversial. Therefore, they were eliminated from further analysis in this EA. A brief rationale for dismissal is provided for each topic.

### **Air Quality**

The 1963 Clean Air Act, as amended (42 USC 7401 et seq.), requires federal land managers to protect air quality in national parks. The project site is located in Warren County, which is in attainment for all criteria pollutants. During construction, dust and vehicle emissions related to construction activities and transport of construction materials and personnel may temporarily affect local air quality. Air movement would rapidly dissipate hydrocarbons, nitrogen oxide, and sulfur dioxide emissions because air stagnation is uncommon at the project site. Overall, degradation to local air quality would be slight and temporary as a result of dust generated from construction activities, but these effects would be localized and minimal. The proposed project would not affect the park's current level of air quality; therefore, this impact topic was dismissed from further analysis.

### **Water Quality**

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters; enhance the quality of water resources; and prevent, control, and abate water pollution. *NPS Management Policies 2006* (NPS 2006) provide direction for the preservation, use, and quality of water originating, flowing through, or adjacent to park boundaries. The construction method included in the action alternative was chosen because it would require minimal soil disturbance and excavation. Stabilization of the bluff would reduce soil erosion and sedimentation in the long term. Because the proposed project would not adversely affect the quantity of stormwater runoff or water quality, this impact topic was dismissed from further analysis.

### **Wildlife and Wildlife Habitat**

No rare, threatened, or endangered wildlife species or habitat are known to exist in the vicinity in of the project area. In a letter dated February 17, 2017, the U.S. Fish and Wildlife Service (USFWS) confirmed that while the project area is within the range of the northern long-eared bat, no known northern long-eared bat hibernacula or maternity roost trees are located in Warren County. USFWS concluded that the proposed project may affect the northern long-eared bat but would not result in an incidental take. No further consultation with USFWS is required. Additionally, only small diameter trees are expected to be removed; these trees do not include appropriate bat habitat.

During the construction period, short-term impacts could occur on wildlife in adjacent areas from construction noise. These impacts would be minimal and would take place over a four month period. As a result, wildlife and wildlife habitat were dismissed as an impact topic.

## **Socioeconomics**

NEPA requires an analysis of impacts on the human environment, which includes economic, social, and demographic elements in the affected area. Stabilization of the bluff may bring a short-term need for additional personnel at the site, but this addition would be minimal and would not affect the surrounding community's overall population, income, and employment base. The proposed action would not appreciably affect local businesses or other agencies. Implementation of the proposed action could provide a beneficial impact on the economies of nearby areas (e.g., minimal increases in employment opportunities for the construction workforce and revenues for local businesses and government generated from construction activities and workers). Any increase, however, would be negligible. Therefore, socioeconomics was dismissed as an impact topic.

## **Environmental Justice**

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This order directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. Local residents include minority and low-income populations, but these populations would not be particularly or disproportionately affected by activities associated with the proposed stabilization; therefore, this impact topic was dismissed from further analysis in this EA.

## **Unique Ecosystems, Biosphere Reserves, World Heritage Sites**

No known biosphere reserves, World Heritage sites, or unique ecosystems are listed as occurring in the park; therefore, this impact topic was dismissed from further analysis.

## **Climate Change**

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring as a result of rising greenhouse gas emissions and could accelerate in the coming decades.

While climate change is a global phenomenon, it manifests differently depending on regional and local factors. General changes that are expected to occur in the future as a result of climate change include hotter, drier summers; warmer winters; warmer ocean water; higher ocean levels; more severe wildfires; degraded air quality; more heavy downpours and flooding; and increased drought. Climate change is a far-reaching, long-term issue that could affect the park and its resources, visitors, and management. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature would continue to rise and whether global emissions of greenhouse gases can be reduced or mitigated. Climate change science is a rapidly advancing field, and new information is being collected and released continually.

Construction activities associated with implementation of the proposed action would contribute to increased greenhouse gases emissions, but such emissions would be short term, ending with the cessation of construction, and it is not possible to meaningfully link the greenhouse gases emissions of such individual project actions to quantitative effects on regional or global climatic patterns. Any effects on

climate change would not be discernible at a regional scale. Therefore, this impact topic was dismissed from further evaluation.

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## **CHAPTER 2: ALTERNATIVES**

NEPA requires federal agencies to explore a range of reasonable alternatives aimed at addressing the purpose of and need for the proposed action. Reasonable alternatives include alternatives that are “technically and economically practical or feasible and meet the purpose and need of the proposed action” (43 CFR § 46.420(b)). The alternatives under consideration must include a no-action alternative as prescribed by CEQ regulations for implementing NEPA (40 CFR Part 1502.14).

The alternatives analyzed in this document, in accordance with NEPA, are based on the result of internal and agency scoping. Alternatives and actions that were considered but would not be technically or economically feasible, would not meet the purpose of and need for the project, would create unnecessary or excessive adverse impacts on resources, or would conflict with the overall management of the park or its resources were dismissed from detailed analysis. These alternatives or alternative elements and their reasons for dismissal are discussed at the end of this chapter.

NPS explores and objectively evaluates two alternatives in this EA:

- Alternative 1: No Action
- Alternative 2: Stabilization with a Soldier Pile Wall (Preferred Alternative)

### **ALTERNATIVE 1: NO ACTION**

Under Alternative 1, the slope between the memorial and the Kansas City Southern rail tracks would not be stabilized. The bluff face would continue to erode at an average rate of 6 inches annually. The bluff line is currently between 15 and 17 feet from the Railroad Redoubt and the memorial.

### **ALTERNATIVE 2: STABILIZATION WITH A SOLDIER PILE WALL (PREFERRED ALTERNATIVE)**

Under Alternative 2, the slope would be stabilized using soldier piles. Soldier piles are an earth retention technique to retain soil that use vertical steel piles with horizontal lagging or concrete panels. A soldier pile wall would be built at approximately mid slope to provide permanent protection for cultural resources and the monument located at the top of the slope. Construction of a soldier pile wall would occur from the top of the slope down toward the bottom and would not require excavation of the slope itself, but would require minor excavation at the bottom of the slope, or toe slope. Use of a soldier pile wall would minimize work in the right-of-way of the railroad and would reduce the slope angle below the wall, making it more stable and less erodible.

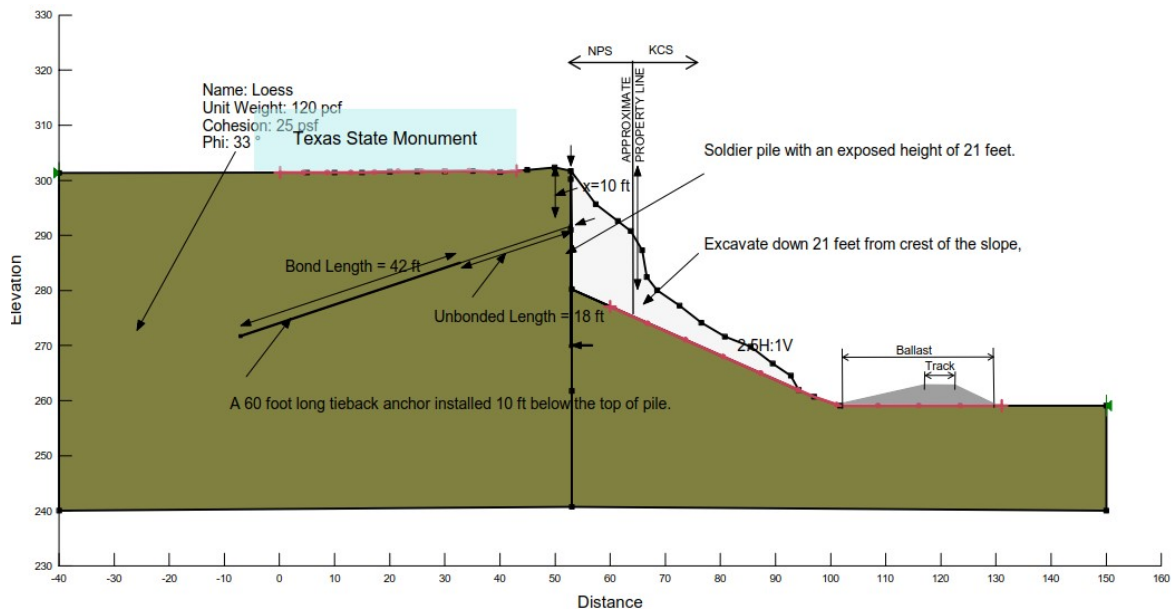
Under Alternative 2, structural beams, known as H-piles, would be drilled at regular intervals along the slope. Lagging, which consists of precast concrete panels, would be inserted behind the piles. The lagging would allow the wall to resist the load of the retained soil and transfer the weight to the H-piles. Figure 3 provides an example of a soldier pile wall. The soldier piles would be installed from the top of the slope in predrilled holes, then the anchors would be installed, and finally, permanent, pre-cast concrete lagging panels would be installed between the soldier piles.

The soldier piles would be about 30 to 40 feet long and be installed with 6 foot intervals along the top of the slope. Anchors would be about 60 feet long, with one anchor per soldier pile. Each anchor would be installed 10 feet below the top of the wall. The toe slope would need minor excavation to promote erosion

control and allow permanent vegetation. Figure 4 provides an approximate cross section of the proposed soldier pile wall.



**FIGURE 3. EXAMPLE SOLDIER PILE WALL**



**FIGURE 4. PROPOSED SOLDIER WALL CROSS SECTION**

Construction would occur over a four-month period. Construction equipment would access the project area to the south of the memorial off Park Confederate Avenue, along an existing concrete swale, and construction matting would be used along the construction equipment access route to protect wetlands in the project area. Materials and equipment would be staged in four potential locations: (1) the parking lot of the memorial and Railroad Redoubt, (2) the grassy area to the west of the memorial, accessible from Melbourne Place, (3) the grassy area east of the monument, outside the wetlands that are downslope from the memorial, and (4) a grassy location off Melbourne Place north of railroad tracks. The access locations and potential staging areas are provided in figure 5.



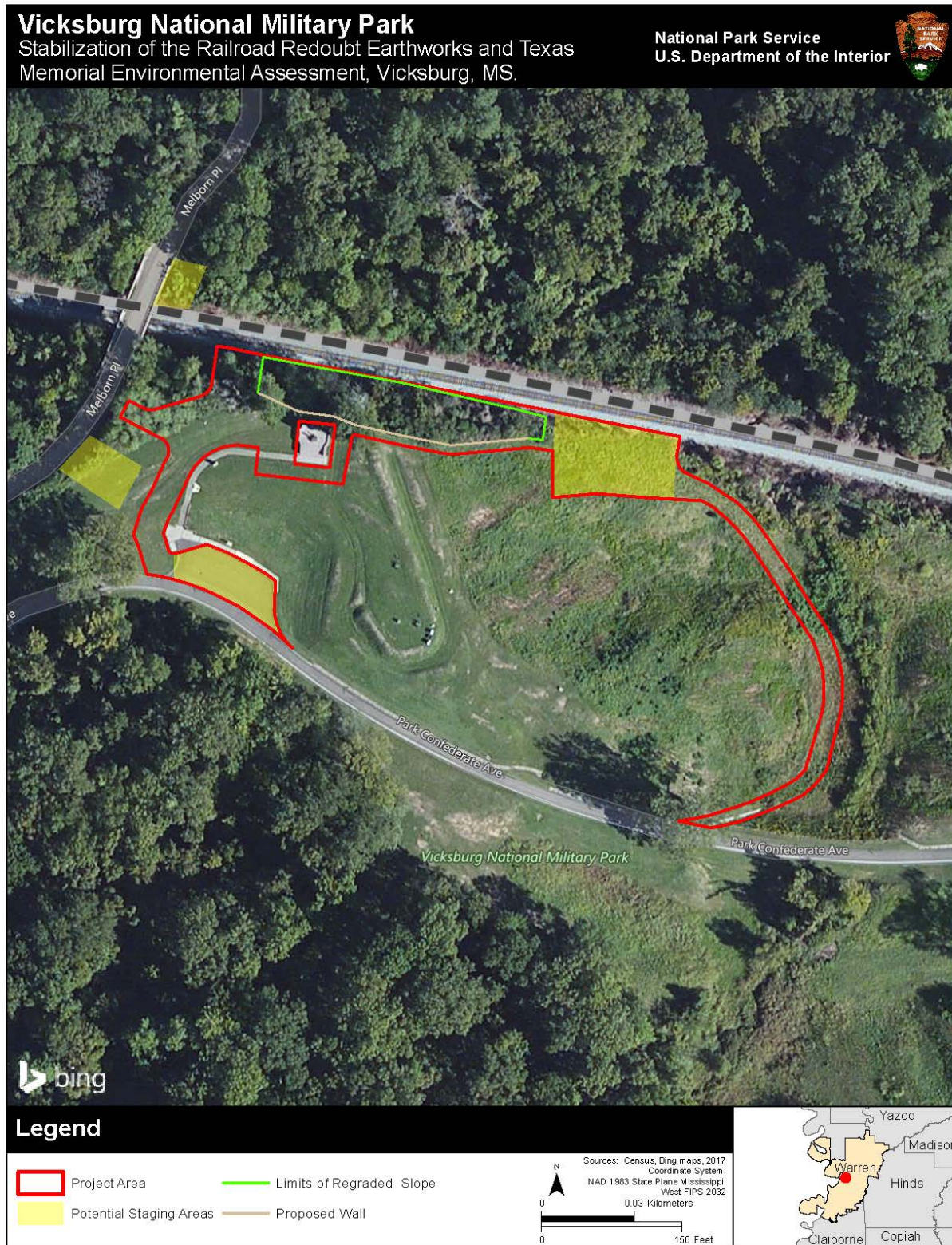


FIGURE 5. CONSTRUCTION ACCESS AND STAGING LOCATIONS

## MITIGATION MEASURES OF THE ACTION ALTERNATIVES

NPS places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the following protection measures would be implemented as part of the proposed action.

### Cultural Resources

- An archeologist would be present to monitor any ground-disturbing activities, and all construction activities would stop if intact cultural deposits of more than a few artifacts are located during construction or if other significant unanticipated discoveries are made.
- Any cultural resources removed (such as tablets) during construction would be replaced in their exact location and orientation once construction is complete.
- If instability that could potentially threaten the monument is observed during construction, work would immediately cease, and arrangements would be made to secure the monument until construction is completed.
- Ground-protection measures, such as the use of logging mats, would be implemented on access paths and staging areas where they cross the entrenchments of the 46th Alabama Infantry Regiment.
- The cast-iron tablet marking the position of the 46th Alabama Infantry Regiment would be temporarily removed and then reset in the same location at the conclusion of the project.

### Wetlands

- Best management practices would be used during construction to limit impacts on wetlands from the equipment access path. Temporary construction matting (e.g., geotextile fabric) would be used to minimize disturbance to the wetland.

### Soils

- Best management practices would be implemented consistent with the *Field Manual for Erosion and Sediment Control on Construction Sites in Mississippi* (MDEQ 2005).
- Erosion containment controls, such as silt fencing and sediment traps, would be used to contain sediment on site, as feasible.

### Vegetation

- Tree cutting would be minimized whenever possible for stabilization of the slope and access from Melbourne Road.
- Vegetation clearing limits would be clearly noted on construction documents and marked in the field to minimize the disturbance and alteration of vegetation.
- Disturbed areas would be reseeded with an NPS-approved seed mix, and vegetation would be allowed to regrow naturally after that.

- If state-listed species cannot be avoided, park staff would collect seeds from the species prior to the removal of the surface and store them in the herbarium, to use at park discretion in the future.

### **Visitor Use and Experience**

- Construction during peak visitor use periods would be avoided, if feasible.
- Closure signage and construction fencing would be placed at the parking lot and around the construction area to discourage visitors from entering an active construction site.

### **ALTERNATIVES CONSIDERED BUT DISMISSED**

NPS considered multiple additional construction and stabilization methods during internal scoping and alternatives development, including soil nail reinforcement, reinforced soil slopes, mechanically stabilized earth wall, and a reconstruction slope using rip rap. All of these alternative construction methods were dismissed because of the potential for additional adverse impacts or the need to complete construction from the “bottom up,” which would require work within the active railroad right-of-way. Specific disadvantages to these construction methods include:

- Major excavation of the hillside—Park staff do not want to risk disturbing the bluff and affecting archeological resources.
- Intrusion into the 25-foot railroad right-of-way—Flagmen would be required for safety purposes, which would increase the cost of the project. Construction efficiency would be reduced by 50% to 75% as a result of the intrusion.
- Placement of soil nails directly beneath the surface under the memorial—This could cause adverse impacts on the memorial and archeological resources.

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## **CHAPTER 3: AFFECTED ENVIRONMENT**

The “Affected Environment” chapter describes the existing conditions for environmental elements and elements of the human environment that would be affected by the implementation of the alternatives considered in this EA. The components addressed include cultural resources, wetlands, soils, vegetation and visitor use and experience. Impacts for each of these topics are analyzed in “Chapter 4: Environmental Consequences.”

### **CULTURAL RESOURCES**

Efforts to identify cultural resources included a review of information provided by NPS, supplemented by other published and unpublished sources, primarily NRHP nomination forms and records held by the Mississippi Department of Archives and History (MDAH), and secondary sources on the battle of Vicksburg. Additional reports reviewed included: a metal-detecting survey associated with the current project was reviewed (NPS, Bezemek, pers. comm. 2017a), an earlier metal-detecting survey of the Railroad Redoubt area (NPS, Kidd, pers. comm. 2004), and a cultural resource landscape report (Wiss et al. 2009).

Five cultural resources are documented in the study area: Vicksburg National Military Park (a historic district), the Texas Memorial (a structure contributing to the historic district), the Railroad Redoubt (also a structure contributing to the historic district), a cast iron tablet for the 46th Alabama Infantry Regiment (a feature contributing to the historic district), and a possible fortification ditch. Vicksburg National Military Park was listed in the NRHP in 1976 (Miller 1976). The NRHP inventory form lists the memorial (therein termed the “Texas State Monument”) as a contributing element. The NRHP inventory form also lists the Railroad Redoubt as a contributing element, notes that it is “generally a reconstruction” (Miller 1976). A 2009 cultural landscape report expanded the NRHP form and identified numerous landscape features to be eligible for listing in the NRHP (Wiss et al. 2009). The cultural landscape inventory includes more than 1,340 small-scale features (i.e., monuments, markers, tablets, and plaques). The tablets and plaques have been determined to be contributing features of the historic site. Several tablets and plaques are located near the Railroad Redoubt and the Texas Memorial; one cast iron tablet marking the position of the 46th Alabama Infantry Regiment (Confederate States of America) is within the project area. A depression runs along the bluff-line in the project area and may potentially be a remnant of the earthwork fortifications by the Railroad Redoubt. The earthwork fortifications at the park have collectively been found to contribute to the historic district, although individual fortification lines have not been enumerated. Additional details on the resources are reviewed below.

#### **Vicksburg National Military Park Historic District**

Vicksburg National Military Park was established in February 21, 1899, to protect areas associated with the siege and defense of Vicksburg, Mississippi, during the Civil War. The historic district is coterminous with the park boundaries. During the war, Vicksburg, with its location along the Mississippi River, was recognized as a vital link connecting the Confederate states because it allowed their forces to be supplied from the south via the river. Given its strategic location, the Union initiated a campaign, led by Maj. Gen. Ulysses S. Grant, to take the city. By the summer of 1863, Union advances from Memphis in the north and from New Orleans in the south had constricted Confederate control of the Mississippi River to a small section stretching from Port Hudson, Louisiana, to the fortified city of Vicksburg, Mississippi. In May and June 1863, Maj. Gen. Ulysses S. Grant’s armies converged on Vicksburg, surrounding the city and entrapping the Confederate army led by Lieutenant General John Pemberton. On July 4, Vicksburg surrendered after prolonged siege operations—the culmination of one of the most brilliant military campaigns of the war. The fall of Vicksburg was a pivotal event in the Civil War.

The park serves to protect important features associated with the battle of Vicksburg, and the Civil War in general, but also commemorates the soldiers and sailors who participated in the campaign through a variety of monuments and memorials (these are summarized in chapter 1). Most of the monuments and memorials were constructed prior to 1917 and are considered important cultural resources that are integral to the interpretation of the park. The features associated with the battle and siege at Vicksburg include earthwork fortifications, such as redoubts, trench lines, and batteries, many of which are still present and visible to visitors.

### **Railroad Redoubt**

A redoubt is a small military defensive fortification, usually an earthen enclosure, which is typically a square or polygon. The Railroad Redoubt is an earthwork square that overlooked the Southern Mississippi Railroad during the Vicksburg campaign and served to protect this important line into the city. It was listed as contributing element to the Vicksburg National Military Park Historic District. The redoubt still stands today as a landscape feature, and the nearby rail line remains in active use.

The Railroad Redoubt was part of a series of Confederate fortifications at Vicksburg constructed in early 1862. The fortification was in active use throughout the Vicksburg campaign, but saw heavy fighting on May 22, 1863, during Grant's second major assault on the city. Forces involved in the engagement include the 21st and 22nd Iowa Regiments, the 77th and 130th Illinois Regiments, the 48th Ohio Regiment, the 30th Alabama Regiment, and a detachment from Waul's Texas Legion. Union forces began their assault on that day with a fierce artillery bombardment that created a breach in the redoubt's earthworks. The redoubt was stormed later in the engagement, and Union troops from the 22nd Iowa, under the command of Sgt. Joseph E. Griffith, were able to briefly exploit the breach and access the interior of the fortification. The Union advance was eventually repulsed when reinforcements from Waul's Texas Legion were able to drive out the Federals.

After taking heavy losses, Union troops under Griffith's command were able to withdraw and rejoin Union lines. No further direct attacks on the Railroad Redoubt occurred during the Vicksburg campaign. After May 22, 1863, Grant began siege operations on the city. Union troops began mining/tunneling operations in an attempt to breach fortifications. By the time of surrender on July 4, 1863, Union approach trenches had reached the outer perimeter of the Railroad Redoubt.

### **Texas Memorial**

The Texas Memorial was constructed between 1961 and 1963 as a memorial to the Texans who served the Confederacy during the Vicksburg campaign. It was listed as contributing element to the Vicksburg National Military Park Historic District. The sculptor was Herring Coe, and Lundgren and Maurer were the architects of the memorial. The memorial consists of eleven steps, one for each of the sister states in the Confederacy, leading to a bronze statue of a soldier with a yucca, a plant native to Texas, planted at his feet. The memorial, built of red granite from Texas, is backed by pillars and slabs of red granite that list all of the Texas units on the defensive line, including Johnston's Army, Waul's Texas Legion, and Walker's Texas Division (figure 6).





**FIGURE 6. TEXAS MEMORIAL**

Texans played a vital role in holding the nearby Railroad Redoubt. The successful defense of the redoubt played an important role in the repulse of Grant's attack on May 22, and influenced the entire Vicksburg campaign.

### **Tablet for the 46th Alabama Infantry Regiment**

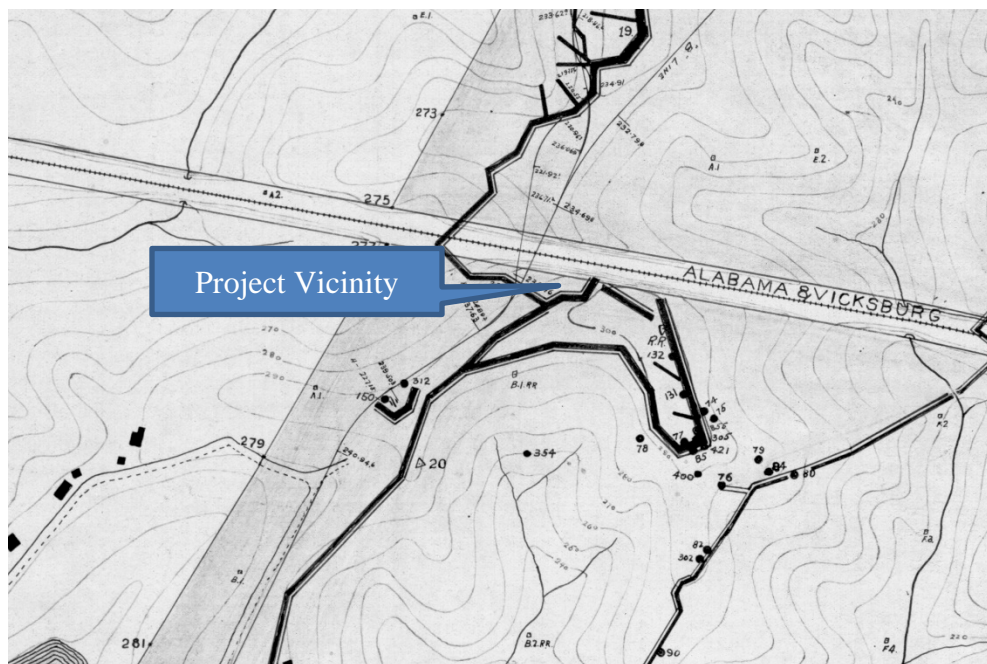
A cast iron tablet stands approximately 100 feet west of the Texas Memorial at the top of the eroding bluff (figure 7). The tablet marks an entrenchment position of the 46th Alabama Infantry Regiment during the Battle of Vicksburg. Tablets were part of the initial park designs in 1899; approximately 1,500 tablets were once located in the park (Wiss et al. 2009). During World War II, 140 tablets were sacrificed as scrap metal, leaving 1,340 remaining today (Wiss et al. 2009). The cast-iron tablets have been determined to contribute to the park's national significance under NRHP Criteria A and B. The tablets attest to the national movement that began in the late 1800s to commemorate the Civil War and honor Civil War veterans.



**FIGURE 7. TABLET FOR THE 46TH ALABAMA INFANTRY REGIMENT**

### **Entrenchments of the 46th Alabama Infantry Regiment**

Extensive fortification earthworks crossed the bluff overlooking the railroad line and Railroad Redoubt area during the Battle of Vicksburg. A map from 1902, drawn while the park was in planning stages, shows the extent of earthwork lines in the area (figure 8). Historic accounts indicate that the 46th Alabama Infantry Regiment created and manned these entrenchments. A shallow depression is present today along the bluff edge near the Texas Memorial and is thought to be a remnant of the original entrenchments. According to the cultural landscape study of the park (Wiss et al. 2009), more than 20 miles of original and reconstructed trenches and earthworks exist at the park, and the landscape features contribute to the historic district. Individual entrenchments at the park have not been fully enumerated.



SOURCE: VICKSBURG NATIONAL PARK COMMISSION 1902

**FIGURE 8. LINES OF TRENCHES BY PROJECT AREA**

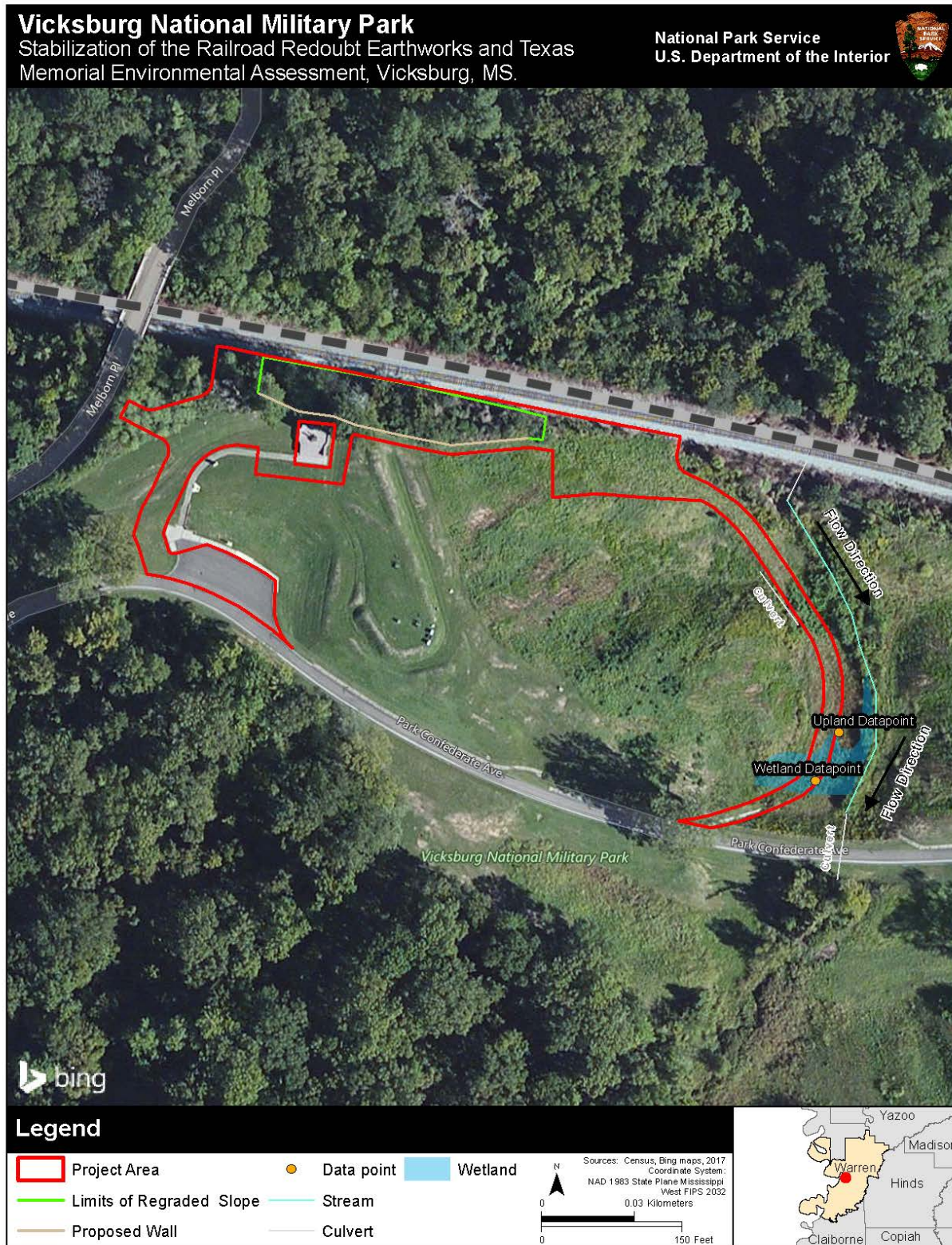
## ARCHEOLOGICAL SURVEY

The project area has been the subject of two metal-detecting surveys but has not been fully inventoried for archeological resources (NPS, Kidd, pers. comm. 2004; NPS, Bezemek, pers. comm. 2017a). In 2004, a metal-detecting survey was completed of the area proposed for slope stabilization prior to the removal of vegetation from the area (NPS, Kidd, pers. comm. 2004). Artifacts dating to the Civil War period were located and removed for analysis prior to the undertaking. Given the potential for additional important artifacts, archeological monitoring was recommended during any future ground-disturbing work in this area. In 2016, NPS archeologists conducted a metal-detecting survey associated with geotechnical studies for the Texas Memorial stabilization. The archeologists surveyed three soil core locations, two geodetic survey monument (datum) locations, and a temporary access route in the project area (NPS, Bezemek, pers. comm. 2017a). The 2016 survey recovered 51 metal artifacts. Additional surveys were recommended in the future.

## WETLANDS

Wetlands include areas inundated or saturated by surface or groundwater for a sufficient length of time during the growing season to develop and support characteristic soils and vegetation. A wetland delineation of the project area was completed in March 2017 (NPS 2017b). A 0.14-acre palustrine emergent wetland is present in the southeast portion of the project area (figure 9). The wetland receives its hydrology from precipitation runoff from the surrounding topography and Confederate Avenue. A high water table at this location also contributes to the existing wetland hydrology. Throughout the majority of the wetland, the ground is either saturated at the surface or is inundated with less than an inch of water.





**FIGURE 9. WETLAND AND STREAM PRESENT IN THE PROJECT AREA**

The U.S. Department of Agriculture mapped soils for the area where the wetland is present as “Adler silt loam, occasionally flooded.” This soil is rated as hydric. The soils sampled in the wetland have characteristics consistent with a deleted/reduced matrix with redox features (USDA-NRCS 2016).

The vegetation at the wetland data point consists primarily of spike rush (*Eleocharis sp.*), golden ragwort (*Packera aurea*), and soft rush (*Juncus effusus*), with spike rush helping to define the extent of the boundary. Broad-leaf cattail (*Typha latifolia*) and wetland grass species are also present in the wetland.

In a letter dated February 1, 2017, the Vicksburg District of the U.S. Army Corps of Engineers confirmed that no jurisdictional wetlands exist in the project area.

A small perennial stream runs just beyond the east border of the project area. The stream flows to the south and enters the area from under the railroad to the north via the culvert (near the project area). Flow velocity is very low, and the stream is 0.5 to 2 feet wide.

A swale is present just west of the construction area, within a proposed access road of the project area. The swale has steep slopes, draining precipitation toward the wetland. The swale does not possess wetland characteristics but is a dominant landform adjacent to the project area.

## SOILS

The Natural Resources Conservation Service (NRCS) Web Soil Survey database indicates that soils within the project area consist of four soil mapping units (USDA-NRCS 2016) (figure 10). Soils exhibiting similar characteristics and falling within certain defined limits are classified together as a soil series. A soil series is a part of a soil’s taxonomy that includes order, great group, subgroup, family and series. Soil phases are used for subdividing series into specific units that are significant for practical use and management (i.e. surface texture, slope, degree of erosion, stoniness). A mapping unit is a grouping of soils by their natural landscape and soil patterns. Most soil mapping units shown on detailed soil maps are phases of soil series.

NRCS classifies components of all four soil mapping units identified within the project area as hydric; however, none of the map units are predominantly hydric. By definition, a hydric soil is one that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA-NRCS n.d.). Therefore, hydric soils are typically found within wetlands. The soil map units within the project area are listed in table 1 and described in the following paragraphs. Soil descriptions are based on the text of the soil surveys and the NRCS Web Soil Survey (USDA-NRCS 2016).

The soils within the project area are classified as erodible. The erosion factor K describes the erosion potential of a soil. The estimates that comprise factor K are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.





FIGURE 10. SOIL TYPES IN PROJECT AREA

TABLE 1. SOIL CHARACTERISTICS WITHIN THE PROJECT AREA

Map Unit Symbol	Mapping Unit Name	Drainage Characteristics	K Factor
Ad	Adler silt loam, occasionally flooded	Moderately well drained	0.43
MnD3	Memphis and Natchez silt loams, 8 to 12% slopes, severely eroded	Well drained	0.43
MnF2	Memphis and Natchez silt loams, 17 to 40% slopes, eroded	Well drained	0.43
MiC3	Memphis and Loring silt loams, 5 to 8% slopes, severely eroded	Well drained to moderately well drained	0.43

Source: USDA-NRCS 2016

**Ad—Adler silt loam, occasionally flooded.** The Adler component makes up 90% of the map unit. Slopes are 0 to 2%. This component is on floodplains. The parent material consists of silty alluvium deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is occasionally flooded but not ponded. A seasonal zone of water saturation is at 30 inches during January, February, March, and April.

**MnD3—Memphis and Natchez silt loams, 8 to 12% slopes, severely eroded.** The Memphis component makes up 60% of the map unit. Slopes are 8 to 12%. This component is on loess bluffs on hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches.

The Natchez component makes up 30% of the map unit. Slopes are 8 to 12%. This component is on loess bluffs on hills. The parent material consists of loess over calcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches.

**MnF2—Memphis and Natchez silt loams, 17 to 40 % slopes, eroded.** The Memphis component makes up 60% of the map unit. Slopes are 17 to 40%. This component is on loess bluffs on hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches.

The Natchez component makes up 30% of the map unit. Slopes are 17 to 40%. This component is on loess bluffs on hills. The parent material consists of loess over calcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most

restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches.

The majority of the bluff proposed for stabilization includes this soil type.

**Map Unit: MiC3—Memphis and Loring silt loams, 5 to 8 % slopes, severely eroded.** The Memphis component makes up 65% of the map unit. Slopes are 5 to 8%. This component is on uplands. The parent material consists of loess deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches.

The Loring component makes up 30% of the map unit. Slopes are 5 to 8%. This component is on uplands. The parent material consists of loess deposits. Depth to a root restrictive layer, fragipan, is 14 to 35 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. This soil is not flooded or ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, and December.

A portion of the bluff proposed for stabilization includes this soil type.

## VEGETATION

The project area consist primarily of grass fields and forested area. A palustrine emergent wetland is present in the southeast portion of the project area, and a paved parking area sits at the southwest point of the site. The forested area is located in the northern portion of the site on the bluff along the rail road tracks, while grass fields cover the remainder of the site.

The most abundant and diverse vegetation is located along the northern bluff and includes large-diameter trees [sweetgum (*Liquidambar styraciflua*), species of red oak (*Quercus sp.*), water oak (*Quercus nigra*), and pecan (*Carya illinoensis*)] as well as smaller trees, vines, shrubs, and herbaceous plants. Other plants observed along the bluff include Chinese privet (*Ligustrum sinense*), mimosa (*Albizia julibrissen*), black locust (*Robinia pseudoacacia*), species of elm (*Ulmus sp.*), sugar maple (*Acer saccharum*), box elder (*Acer negundo*), red mulberry (*Morus rubra*), paper mulberry (*Broussonetia papyrifera*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), Bahia grass (*Paspalum notatum*), and Cherokee sedge (*Carex cherokeeensis*). Many of these species are nonnative vegetation.

The vegetation in the vicinity of the wetland includes spike rush, golden ragwort, and soft rush. Broad-leaf cattail and wetland grass species are also present in the wetland. Vegetation located directly upland of the wetland data point included red fescue and purple top (NPS 2017b).

## State-Listed Species

Prairie nymphs (*Herbertia lahue*), a state-listed species of concern, are present in the project area across most of the upland grassy area at the top of the bluff (figure 11).





**FIGURE 11. PRAIRIE NYMPHS (*HERBERTIA LAHUE*) GROWING IN THE UPLAND AREA AT THE TOP OF THE BLUFF**

## **VISITOR USE AND EXPERIENCE**

The park currently comprises 1,806 acres, which include most of the historic siege and defense lines from the final stage of the campaign and provides for a variety of visitor experiences. The entire battlefield area is listed in the NRHP, as is the ironclad gunboat USS Cairo, the Shirley House (the only surviving antebellum structure within the park), and a number of major memorials and statues. Twenty-two state memorials reside in park boundaries, including the Texas Memorial, 5 state memorials on former park property, and 1 state memorial on Grant's Canal. The park includes the Vicksburg National Cemetery, which is the final resting place of 17,000 Union soldiers and sailors killed in operations associated with the Vicksburg campaigns, as well as veterans of later wars. The park also manages a remnant of Grant's Canal, part of a failed military strategy to build a navigable waterway to bypass the defenses at Vicksburg, and Pemberton's Headquarters, the command center for Confederate forces during the siege of Vicksburg.

To experience the state memorials and interpret the battle, the park maintains a 16-mile tour road that allows visitors to experience the Union siege and Confederate defensive lines via 15-designated tour stops. Nearly 1,400 monuments and markers, including 284 regimental monuments, 239 regimental markers, 95 relief portraits, and 62 busts honoring key commanders from both sides lie along this route, while 645 iron tablets and guide posts mark trench lines, battery, and infantry positions and describe battle events. The Texas Memorial and Railroad Redoubt are located along the 16-mile tour loop.

Park visitation fluctuates, but has generally been between 500,000 and 600,000 annual visitors over the past five years. In 2016, 508,914 people visited the park (NPS, 2017c). The peak visitation period is from April through July (NPS, 2017d).

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## **CHAPTER 4: ENVIRONMENTAL CONSEQUENCES**

### **GENERAL METHODOLOGY FOR ESTABLISHING IMPACTS**

In accordance with CEQ regulations, direct, indirect, and cumulative impacts are described (40 CFR 1502.16), and the impacts are assessed in terms of context and intensity (40 CFR 1508.27). Where appropriate, mitigating measures for adverse impacts are also described and incorporated into the evaluation of impacts.

Environmental consequences are determined by describing how the existing condition of a resource would change, either negatively or positively, as a result of implementing any of the alternatives under consideration. Analysis includes the consideration of the context (setting), type (beneficial or adverse), intensity (strength), and duration (short or long term) of the direct, indirect, and cumulative effects of the alternatives.

Context is the setting, situation, or circumstances surrounding a particular resource (40 CFR 1508.27(a)). Context provides a backdrop against which the intensity of impacts can be applied to understand their importance. The geographic study area (or area of analysis) for this assessment is the project area provided in figure 5. The area of analysis may extend beyond the project area boundaries for some cumulative impact assessments. The specific area of analysis for each impact topic is defined at the beginning of each topic discussion.

Intensity is the severity or magnitude of an impact (40 CFR 1508.27(b)). Assessing the intensity of impacts on a specific resource is linked to the context in which that resource is found. The new NPS NEPA handbook (NPS 2015) removed the use of intensity definitions in an EA to define impacts or substitute for impact analysis. Instead, the analysis discloses the existing conditions of resources and documents the “hard look” standard in a narrative that discusses the impacts of the alternatives.

### **CUMULATIVE IMPACTS ANALYSIS METHOD**

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7).

Cumulative impacts were determined for each impact topic by combining the impacts of the alternative being analyzed and other past, present, and reasonably foreseeable actions that would also result in beneficial or adverse impacts. The evaluation of cumulative impacts is based on a general description of the projects. During internal scoping, one cumulative project was identified within the project area. The State of Texas has funding available to rehabilitate the memorial. Rehabilitation efforts would include repairing masonry, repointing mortar joints, resetting stairs, repairing gold lettering, and cleaning/polishing entire monument.

### **CULTURAL RESOURCES**

#### **Methodology and Assumptions**

This analysis assesses the impacts of the alternatives on the five cultural resources in the study area: the Vicksburg National Military Park Historic District; the Texas Memorial; the Railroad Redoubt; the tablet for the 46th Alabama Infantry Regiment, and the entrenchments of the 46th Alabama Infantry Regiment. As previously reviewed, the historic district has been listed in the NRHP, and the Texas Memorial and

Railroad Redoubt have been listed as contributing elements to the historic district. The iron tablet and remnant entrenchment are both landscape features that have been determined to contribute to the NRHP-listed historic district. With the exception of the tablet, these historic resources include potential archeological components.

Impacts on historic properties can be direct or indirect as well as beneficial or adverse. Direct impacts are those that physically alter the setting or character of the historic district as a result of the implementation of an activity, while indirect impacts are those that may occur inadvertently during or after an activity. For example, construction may have direct impacts on a historic property by introducing visual elements to a landscape where they were previously absent.

Direct and indirect impacts can be either adverse or beneficial. Adverse impacts are those that alter character-defining features of a historic property in a way that could change their eligibility for the NRHP. Beneficial impacts are those that promote the retention of important characteristics or settings associated with a historic property. Negligible impacts are those that, for character-defining features, are at the lowest level of detection or are barely perceptible. For the purposes of Section 106, the determination of effect would be no adverse effect.

It is assumed that erosion of the bluff would continue at a similar rate as in years past—at a rate of approximately 6 inches a year.

### **Study Area**

The study area for cultural resources encompasses the 316-foot length of the bank where stabilization would occur and the staging areas to the south, as well as any cultural resources within 25 feet of proposed activities. The study area also includes temporary construction access routes and staging areas.

### **Alternative 1: No Action**

#### *Analysis*

Under the No Action Alternative, erosion would continue at a rate of approximately 6 inches a year. This would result in permanent adverse impacts on the Texas Memorial, the Railroad Redoubt, and by extension to the Vicksburg National Military Park Historic District. At this rate of erosion, the memorial and Railroad Redoubt would be directly affected within the next decade. Erosion could undercut the memorial, destabilizing the structure and making it less accessible to visitors for safety reasons. Long-term erosion of the slope could completely destroy the resource. Continued erosion could also lead to portions of the redoubt earthworks and any intact subsurface cultural deposits associated with this feature being lost.

#### *Cumulative Impacts*

One future project, rehabilitation of the Texas Memorial, would affect cultural resources. Repairing the masonry, repointing the mortar joints, resetting the stairs, repairing the gold lettering, and cleaning and polishing the memorial would result in beneficial impacts; however, ongoing erosion within the vicinity of the memorial would result in continued instability, and repair work may not be completed if the area is not stabilized. Overall cumulative impacts would be adverse.

### *Conclusion*

Permanent adverse impacts on important cultural resources would occur as a result of this alternative from continued erosion in the project area. Cumulative impacts would be adverse from continued instability in the project area.

### **Alternative 2: Soldier Pile Wall (Preferred Alternative)**

#### *Analysis*

Under Alternative 2, a soldier pile wall would be constructed to stabilize the bluff and prevent future erosion. Ground-protection measures, such as the use of logging mats, would be implemented on access paths and staging areas where they cross the entrenchments of the 46th Alabama Infantry Regiment. The cast-iron tablet marking the position of the 46th Alabama Infantry Regiment would be temporarily removed and then reset in the same location at the conclusion of the project. Ground-disturbing activities associated with the construction of the soldier pile wall could unearth artifacts associated with the battle and siege of Vicksburg. The park consulted with MDAH regarding the potential effects of this undertaking on cultural resources, and MDAH confirmed that there would be *no adverse effects* on cultural resources provided that an archeological monitor is present during construction. All construction activities would stop if intact cultural deposits of more than a few artifacts are located or if other significant archeological remains are unearthed.

This alternative would have long-term, beneficial impacts on the memorial and the Railroad Redoubt. The stabilization of the bluff would prevent the erosion of soil and potential loss of structural stability at the memorial and loss of a portion of the Railroad Redoubt and any associated archeological deposits.

In the short term, Alternative 2 would have negligible impacts on the Vicksburg National Military Park Historic District. Construction activity could unearth archeological materials and remove them from their original context; however, this potential adverse impact would be avoided through a construction monitoring program. A new visual element would be added to the historic district, a soldier pile retaining wall; this wall would not be congruous with historic character of the park. The new visual element would be fronting an active rail line and would not be visible to tourists. Based on this, the wall construction would have negligible impacts on the historic district. There would be no impact on the entrenchments. Impacts on the 46th Alabama Infantry Regiment tablet would be temporary while the tablet is removed from viewing; however, these impacts would be entirely reversed at project completion. Over the long term, the wall would result in the preservation of all five resources that might be lost through inaction. Preserving these resources would result in a net beneficial impact.

#### *Cumulative Impacts*

One future project is planned for the project area, as described under Alternative 1, which would result in beneficial impacts. When combined with the increased long-term stabilization under Alternative 2, cumulative impacts on cultural resources in the project area would be beneficial.

### *Conclusion*

Alternative 2 would have long-term, beneficial impacts on cultural resources by preventing erosion from encroaching on these resources and stabilizing the bluff. Impacts during construction would be short term and negligible. Cumulative impacts would be beneficial from increased stabilization and repairs to the masonry on the Texas Memorial. Under Section 106, Alternative 2 would have *no adverse effects* on cultural resources provided that an archeological monitor is present during construction.

## **WETLANDS**

### **Methodology and Assumptions**

Impacts on wetlands could be direct or indirect as well as beneficial or adverse. Direct impacts are those that physically alter hydrology, vegetation, or soils as a result of the implementation of an activity, while indirect impacts are those that may occur inadvertently during or after an activity or in areas adjacent to the project area.

Direct and indirect impacts can be either adverse, beneficial, or negligible. Adverse impacts are those that alter or disrupt character-defining features that allow a wetland to function properly. Beneficial impacts are those that promote the retention of important characteristics or settings associated with a wetland. Negligible impacts are those that are at the lowest level of detection or are barely perceptible.

NPS has adopted a “no net loss” of wetlands. Executive Order 11990, “Protection of Wetlands,” states that federal agencies must avoid, to the extent possible, long-term and short-term impacts associated with the destruction or modification of wetlands and avoid direct and indirect support of new construction in wetlands whenever practical alternatives exist. The U.S. Army Corps of Engineers regulates development in wetland areas pursuant to section 404 of the Clean Water Act (33 CFR, Parts 320–330). NPS Director’s Order 77-1: *Wetland Protection and Procedural Manual* provides NPS policies and procedures for complying with Executive Order 11990 (NPS 2016).

Impact analysis and the conclusions for possible impacts on wetlands were based on review of existing literature and studies and information provided by park staff and other agencies. Where possible, locations of wetlands were overlain with the proposed stabilization activities to determine impacts.

This project is exempted from requiring a statement of findings because it is an “excepted action” under Director’s Order 77-1; it would involve impacts on less than 0.1 acre of wetland.

### **Study Area**

The study area for wetlands encompasses the entire project area, although wetlands are only located in the southeast portion of the site.

### **Alternative 1: No Action**

#### *Analysis*

Under the No Action Alternative, the bluff would continue to erode, and sedimentation could increase from soil erosion. However, it is unlikely the soil erosion would affect the wetlands in the project area. Therefore, no impacts on wetlands would occur.

#### *Cumulative Impacts*

No additional projects are planned that would affect wetlands in the area; therefore, no cumulative impacts are expected.

#### *Conclusion*

No impacts on wetlands would occur under the No Action Alternative; therefore, there would be no cumulative impacts.

## **Alternative 2: Soldier Pile Wall (Preferred Alternative)**

### *Analysis*

Under Alternative 2, construction equipment would access the project area to the south of the Texas Memorial off Park Confederate Avenue, along an existing concrete swale. To access the bluff, construction equipment would need to pass through the wetlands located in the project area, which would disturb up to 0.03 acre of wetlands. Construction matting would be used along the temporary access route to avoid long-term, adverse impacts on wetlands. Adverse impacts on wetlands are expected as a result of soil compression and vegetation trampling; however, impacts would be considered temporary or short term because the park would restore the disturbed wetland areas after construction by regrading any ruts and revegetating the area.

### *Cumulative Impacts*

No additional projects are planned that would affect wetlands in the area; therefore, no cumulative impacts are expected.

### *Conclusion*

Wetlands would experience short-term (temporary), adverse impacts as a result of soil compaction and vegetation trampling from construction equipment. Impacts would not be long term (permanent) because construction matting would be used, and the park would restore the disturbed wetland areas to their original state after construction. No cumulative impacts are expected.

## **SOILS**

### **Methodology and Assumptions**

Following the review of available data, impacts on soils were evaluated in terms of disturbance, erosion susceptibility, and compaction potential.

Short- and long-term impacts were assessed by comparing available information on existing topography, soils, and geologic conditions and processes with available information on construction and operation of the project.

### **Study Area**

The study area for soils encompasses the entire project area that is not paved or developed.

### **Alternative 1: No Action**

#### *Analysis*

If no action is taken, impacts on soils in the project area would be direct, long term, and adverse. The loess soils would continue to erode at a rate of approximately 6 inches a year, and the bluff face would retreat farther.

#### *Cumulative Impacts*

No projects are planned that would affect soils in the area; therefore, no cumulative impacts are expected.

### *Conclusion*

Alternative 1 would result in long-term, adverse impacts on soils because of the continued expected erosion of the bluff. No cumulative impacts are expected.

### **Alternative 2: Soldier Pile Wall (Preferred Alternative)**

#### *Analysis*

The soldier pile wall would have beneficial impacts on the soils within the project area. The wall would contain erosion and reduce the slope, thus preventing future erosion from occurring. Vegetation would hold the soils in place and decrease the potential for future erosion. The use of soldier pile construction method was chosen as the preferred method to minimize excavation and movement of soils in the project area, further reducing adverse impacts on soils.

Temporary impacts on soils could result from disturbance near steep slopes during construction and soil compaction from the use of heavy equipment in the project area. Temporary construction impacts would be avoided and minimized by complying with applicable regulations required under local, state, and federal law, and the implementation of required sediment and erosion control plans, stormwater pollution prevention plans, and other permitting requirements and best management practices.

#### *Cumulative Impacts*

No projects are planned that would affect soils in the area; therefore, no cumulative impacts are expected.

### *Conclusion*

Alternative 2 would have short-term, adverse impacts during the construction period from disturbance near steep slopes; however, long-term impacts for soils would be beneficial as a result of the stabilization work and reduced soil erosion.

## **VEGETATION**

### **Methodology and Assumptions**

Impacts on vegetation could be direct or indirect. Direct impacts are those that physically alter or disturb vegetation as a result of the implementation of an activity, while indirect impacts are those that may occur inadvertently during or after an activity. Direct and indirect impacts can be either adverse, beneficial, or negligible. Adverse impacts are those that alter or remove vegetation. Beneficial impacts are those that promote the growth and survival of vegetation.

### **Study Area**

The study area for vegetation encompasses the entire project area that is not paved or developed.



## **Alternative 1: No Action**

### *Analysis*

Under the No Action Alternative, erosion of the slope would continue at a rate of approximately 6 inches a year. Trees and understory plants located on the slope would likely die due to the eventual inability of the slope's soil structure to support and maintain vegetation, resulting in long-term, adverse impacts.

### *State-listed Species*

Long-term, adverse impacts on prairie nymphs would occur from the eventual loss of species habitat because of heavy erosion of the slope.

### *Cumulative Impacts*

No projects are planned that would affect vegetation in the area; therefore, no cumulative impacts are expected.

### *Conclusion*

Impacts on vegetation would be long term and adverse as a result of continued erosion in the project area. Prairie nymph would also be adversely affected by erosion over the long term. No cumulative impacts on vegetation are expected.

## **Alternative 2: Soldier Pile Wall (Preferred Alternative)**

### *Analysis*

Under Alternative 2, the slope would be stabilized using soldier piles. The wall would be built at approximately mid slope, and all vegetation on the slope would be removed to allow for construction. Construction equipment would access the project area to the south of the Texas Memorial off Park Confederate Avenue, along an existing concrete swale. Construction materials and equipment would be staged in four potential locations. The access locations and potential staging areas are provided in figure 5. Construction matting would be used along the access route and at staging areas to minimize impacts on resources.

Short-term, adverse impacts on vegetation would occur when vegetation is initially cleared along the slope and construction matting is placed at the staging areas and along the access road. Long-term, adverse impacts would occur from the loss of mature vegetation, including large-diameter trees along the slope.

The loss of vegetation would be a minimal impact given the small size of the project area and the amount of vegetation lost in comparison to the vegetation present within the entire park. To mitigate impacts, areas in which vegetation would be cleared would be reseeded with an NPS-approved seed mix. After reseeded, the vegetation would be allowed to regrow naturally.

### *State-listed Species*

Prairie nymphs were identified in the project area. Impacts on this state-listed species would be long-term and adverse when vegetation is removed for construction activities. NPS would avoid disturbing the state-listed species during construction activities. If avoidance is not possible, park staff would collect

seeds from the species prior to the removal of the surface and store them in a herbarium to use at park discretion in the future.

### *Cumulative Impacts*

No projects are planned that would affect vegetation in the area; therefore, no cumulative impacts are expected.

### *Conclusion*

Short-term and long-term, adverse impacts on vegetation would occur from vegetation clearing (understory and large-diameter trees) along the slope. Additional short-term, adverse impacts would occur from damage to vegetation under the construction matting at the staging areas and along the access road. NPS would reseed the cleared areas to mitigate adverse impacts. Long-term, adverse impacts may occur to the state-listed prairie nymph. NPS would avoid the species as much as possible during construction activities or would transplant seeds to other suitable habitat in the park if avoidance would not be possible. No cumulative impacts on vegetation are expected.

## **VISITOR USE AND EXPERIENCE**

### **Methodology and Assumptions**

The purpose of this impact analysis is to assess the effects of the alternatives on visitor use and experience at the park. To determine impacts, the current uses at the park were considered and the potential effects of the stabilization on visitor use and experience were analyzed.

### **Study Area**

The study area for visitor use includes the project area.

### **Alternative 1: No Action**

#### *Analysis*

Under the No Action Alternative, the bluff would not be stabilized and would continue erode at a rate of 6 inches a year. At this rate of erosion, it is anticipated that the bluff would erode below the Texas Memorial within a decade. When the eroding bluff affects the structural integrity of the memorial, the project area, including the Railroad Redoubt, would be closed to visitors because of safety concerns. Visitors would no longer be able to experience the memorial or the Railroad Redoubt, resulting in long-term, adverse impacts on visitor experience.

### *Cumulative Impacts*

The rehabilitation of the Texas memorial would affect visitor experience. It would result in beneficial impacts; however, continued erosion within the vicinity of the memorial would result in continued instability, and rehabilitation work may not be completed if the area is not stabilized. Overall cumulative impacts would be adverse.

### *Conclusion*

The No Action Alternative would result in long-term, adverse impacts on visitor use and experience from increased instability of the project area, which would eventually result in the closure of the memorial and Railroad Redoubt to visitor use. Repair of the memorial would provide a beneficial impact but may not occur if the structure is not stabilized, resulting in overall adverse cumulative impacts on visitor use and experience.

### **Alternative 2: Soldier Pile Wall (Preferred Alternative)**

#### *Analysis*

Under Alternative 2, the bluff would be stabilized, preventing long-term impacts on the memorial and Railroad Redoubt. During the construction period, the memorial and Railroad Redoubt would be closed to visitor use; however, the construction period is only anticipated to last for four months. During the closure of the memorial and Railroad Redoubt, visitors would still be able to view the memorial from the loop road and could experience the remainder of the memorials and topographical features from the Vicksburg campaign. Visitors may notice an increase in construction equipment on the loop road in the vicinity of the project area. Short-term, adverse impacts are expected during the construction period, but impacts on visitor use and experience would be long term and beneficial from stabilization of the bluff and long-term preservation of the memorial and Railroad Redoubt.

#### *Cumulative Impacts*

Cumulative projects under Alternative 2 would be the same as described under Alternative 1. The rehabilitation of the memorial would result in long-term, beneficial impacts. When combined with the long-term, beneficial impacts from Alternative 2, overall cumulative impacts on visitor use and experience would be beneficial.

### *Conclusion*

Stabilization of the bluff would have short-term impacts on visitor use and experience during the construction period, but would result in long-term, beneficial impacts from improved stability and preservation of the memorial and the Railroad Redoubt for long-term visitor enjoyment. Cumulative impacts would be beneficial.

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## **CHAPTER 5: CONSULTATION AND COORDINATION**

This chapter describes the public involvement and agency consultation used during the preparation of the EA. A combination of activities, including internal scoping, helped to guide NPS in developing this EA. This chapter provides a detailed list of the various consultations initiated during the development of the EA, as well as a list of recipients for this document.

### **PLANNING AND PUBLIC INVOLVEMENT**

#### **Public Involvement**

From January 24, 2017, through February 25, 2017, the public scoping newsletter announcing the proposed action and preliminary alternative was available for comment on the NPS Planning, Environment, and Public Comment website. A public scoping letter and copies of the newsletter were also mailed out to the park's mailing list. During the public scoping period, one correspondence was received on the project. The commenter asked if an archeological investigation would be completed before work was conducted and if the Texas State Historic Preservation has been contacted. As noted in "Cultural Resources" section, no archeological survey is required; however, a monitor would be on site during the construction period. Additionally, MDAH has jurisdiction over the Texas Memorial, so the Texas State Historic Preservation Office has not been contacted. However, the Texas entity that maintains the memorial is aware of the proposed project and supports the proposed stabilization efforts.

### **AGENCY CONSULTATION**

Coordination with state and federal agencies was conducted during the NEPA process to identify issues and/or concerns related to natural and cultural resources in the project area.

#### **Section 7 of the Endangered Species Act**

In accordance with section 7 of the Endangered Species Act of 1973, on January 20, 2017, NPS sent a letter to solicit comments from USFWS regarding the existence of federally listed threatened or endangered species in the project area. In a letter dated February 17, 2017, USFWS confirmed that while the project area is within the range of the northern long-eared bat, no known northern long-eared bat hibernacula or maternity roost trees are located in Warren County. USFWS concluded that the proposed project may affect the northern long-eared bat but would not result in an incidental take. No further consultation with USFWS is required.

In January 2017, NPS sent a letter to the Mississippi Department of Environmental Quality to request information on state-listed rare, threatened, and endangered species in the project area. No response was received; however, one state-listed plant species is known to exist in the project area and is analyzed in this EA.

#### **Section 106 of the National Historic Preservation Act**

On January 20, 2017, NPS sent consultation letters to MDAH and the Advisory Council on Historic Preservation in accordance with Section 106 of the NHPA. On February 22, 2017, MDAH responded and determined the proposed action would have no adverse effect on cultural resources. MDAH concurred with the recommendation for archeological monitoring during the removal of any trees or vegetation. If unrecorded cultural resources are encountered during construction, MDAH requested that NPS contact

the local MDAH office immediately. No response was received from the Advisory Council on Historic Preservation.

## **TRIBAL CONSULTATION**

On January 20, 2017, government to government consultation letters were sent to all Tribes affiliated with the park, including the Tunica-Biloxi Tribe, Chickasaw Nation, Jena Band of Choctaw Indians, Mississippi Band of Choctaw Indians, Choctaw Nation of Oklahoma, and the United Houma Nation. On February 27, 2017, the Choctaw Nation of Oklahoma replied via email requesting potential effects to pre-contact Native American settlements that may have been located on the bluff and any archeological remains that may be associated with Native American activity. On June 1, 2017, the park replied, noting that no Native American sites are documented in the vicinity of the project area but stated that an archeologist would be on-site for the duration of any construction activities. If any Native American artifacts are found, the park would immediately contact the Choctaw Nation of Oklahoma and other tribes that may have an interest in the findings.

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## CHAPTER 6: ACRONYMS AND ABBREVIATIONS

<b>CEQ</b>	Council on Environmental Quality
<b>CFR</b>	Code of Federal Regulations
<b>EA</b>	Environmental Assessment
<b>MDAH</b>	Mississippi Department of Archives and History
<b>memorial</b>	Texas Memorial
<b>NEPA</b>	National Environmental Policy Act of 1969, as amended
<b>NPS</b>	National Park Service
<b>NRCS</b>	Natural Resources Conservation Service
<b>NRHP</b>	National Register of Historic Places
<b>park</b>	Vicksburg National Military Park
<b>USC</b>	United States Code
<b>USFWS</b>	United States Fish and Wildlife Service.



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## CHAPTER 7: REFERENCES

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.