Geologic Resources Inventory Scoping Summary
Ninety Six National Historic Site, South Carolina

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March 6, 2013

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US Department of the Interior

The Geologic Resources Inventory (GRI) provides each of 270 identified natural area National Park System units with a geologic scoping meeting and summary (this document), a digital geologic map, and a Geologic Resources Inventory report. The Geologic Resources Division (GRD) of the National Park Service (NPS) administers the inventory. The purpose of GRI scoping meetings is to identify geologic mapping coverage and needs, distinctive geologic processes and features, geologic resource management issues, and geologic monitoring and research needs. Geologic scoping meetings generate an evaluation of the adequacy of existing geologic maps for resource management, provide an opportunity to discuss park-specific geologic management issues, and, if possible, include a site visit with local experts.

The NPS Geologic Resources Division held a GRI scoping meeting for Ninety Six National Historic Site on March 23, 2012, at park headquarters. Previously in 2005, the Geologic Resources Division had organized a geologic resources evaluation (GRE) meeting for Congaree National Park. At this meeting, participants discussed the geologic resources of Ninety Six National Historic Site. However, no site visit was conducted, mapping plan established, or scoping summary prepared for the national historic site. Thus it was "revisited" in 2012 in conjunction with GRI scoping at four other National Park System units in the region—Chattahoochee River National Recreation Area, Kennesaw Mountain National Battlefield Park, and Ocmulgee National Monument in Georgia; and Horseshoe Bend National Military Park in Alabama.

This scoping summary highlights the GRI scoping meeting for Ninety Six National Historic Site and includes a description of the park and geologic setting; a discussion of geologic mapping; a discussion of significant geologic features, processes, and associated issues of resource management concern; and a record of meeting participants. Participants at the 2012 meeting included NPS staff from Ninety Six National Historic Site, Southeast Regional Office Inventory & Monitoring Program, and Geologic Resources Division; and cooperators from the South Carolina Department of Natural Resources–Geological Survey, Colorado State University, and Winthrop University (see table 2, p. 15).

During the scoping meeting, Georgia Hybels (GRD, GIS specialist) facilitated the assessment of map coverage and needs, and Bruce Heise (GRD, GRI program coordinator) led the discussion regarding geologic features, processes, and issues. Scott Howard (South Carolina Department of Natural Resources–Geological Survey, geologist) provided an update on geologic mapping in surrounding 7.5-minute quadrangles and a geologic overview of the Ninety Six area.

During the site visit after the discussion portion of the scoping meeting, Grey Wood (Ninety Six National Historic Site, maintenance staff/park ranger) led participants on a walking tour of the national historic site that, with respect to geologic features and processes, focused on Spring Branch, including incision of the channel, the historic location of the spring (source), and present-day erosion control. The site visit also highlighted Ninety Six as a "crossroads" of Island Ford Road, Charleston Road, and Cherokee Path; and the battlefield, showing features of trench warfare and Star Fort. Participants also saw Stockade Fort and the Logan log house (fig. 1).

Figure 1. Features of Ninety Six National Historic Site. During the GRI site visit, participants noted Ninety Six as a "crossroads" (upper left) with Island Ford Road (lower left), Charleston Road, Whitehall Road, and Cherokee Path converging at this location. Participants also saw Stockade Fort (lower right) and the Logan log house (upper right). Photographs by Katie KellerLynn (Colorado State University).

Park and Geologic Setting

Before the Revolutionary War, the settlement at Ninety Six was an important colonial trading post along the Cherokee Path—a major commercial artery in the 1700s that facilitated backcountry trade of goods such as firearms, blankets, beads, and wares for furs. The Cherokee Path intersected other trails at Ninety Six, which became a stopover for traders. The origin for the name "Ninety Six" is speculative. One explanation is that traders estimated that this intersection of trails was 96 miles south of the Cherokee town of Keowee on the Cherokee Path, which is near present-day Clemson, South Carolina (National Park Service 2009).

In addition to its history as a trading post, Ninety Six National Historic Site commemorates the site of "Nathanael Green's siege" and the Revolutionary War battle that began on May 21 and lasted until June 18, 1781, making this siege the longest of the American Revolution (Worsham et al. 2012). Here, Patriot soldiers of the southern Continental Army led by General Nathanael Green fought against occupying British troops under Major Andrew Williamson. Patriot forces failed to take the Star Fort at Ninety Six, but the battle foresaw the beginning of the end for the fort and village; soon after the siege in July 1781, loyalists (Americans loyal to British interests) left Ninety Six in smoking ruins. They set fire to the buildings, filled in the siegeworks, blew up the well, and

tried to destroy Star Fort. Later that decade, people began to resettle the area, which became known as Cambridge, but this resettlement was short-lived and abandoned by 1815 (Worsham et al. 2012).

Today, Ninety Six National Historic Site is surrounded by mostly rural agricultural lands in Greenwood County, South Carolina, 3 km (2 mi) from the present-day town of Ninety Six. Approximately three-quarters of the national historic site is covered by forest, with most of the remainder having open areas or fields that provide interpretive vistas of the battlefield (Worsham et al. 2012). Ninety Six National Historic Site features many artifacts of historical significance such as the original Star Fort, constructed in 1781, as well as several reconstructed structures such as Stockade Fort and siege trenches used by Greene and his men during their attack. Historic roads and trading routes such as the Cherokee Trail and Charleston Road still exist, as do the original town sites of Ninety Six and Cambridge (Worsham et al. 2012).

Ninety Six National Historic Site is located in the central region of the South Carolina Piedmont, which is part of the larger Piedmont physiographic province (fig. 2). The province is composed mainly of metamorphic rocks covered by saprolite (weathered bedrock that retains original fabric) and/or a thick mantle of soil. In the Ninety Six area, saprolite dominates. The land surface of the Piedmont physiographic province is best characterized as a hilly plateau, especially in the southern part, although large areas of the Piedmont are fairly level (Marsh 2005). Ninety Six National Historic Site occupies the divide between the upper Savannah and upper Santee River basins; the surface topography consists of gently rolling slopes that have not been deeply incised.

From a geologic perspective, Ninety Six National Historic Site is part of the Charlotte terrane that is bound by the Lowndesville shear zone on the north and Buzzards Roost shear zone on the east (fig. 2). Shear zones are areas of deformation, where one body of rock has moved with respect to another. The Charlotte terrane is a regionally extensive, fault-bounded body of rock, characterized by a geologic history different from contiguous terranes (Neuendorf et al. 2005). Terranes are fragments of continental and oceanic crust that originated elsewhere and were transported to their present location by plate-tectonic processes. The Charlotte terrane is one of an amalgamation of terranes clustered along the eastern flank of the southern Appalachians (Hibbard et al. 2002). The Charlotte terrane is dominated by plutonic rocks from Neoproterozoic to late Paleozoic age (approximately 730 million–280 million years ago) (Butler and Secor 1991; Hibbard et al. 2002).

Controversy surrounds the tectonic history of the terranes of the southern Appalachians, and a consensus is lacking as to the time of folding and faulting (Schmidt et al. 2006). Work by Hibbard et al. (2002) and Hatcher et al. (2007) highlights this controversy. A new study by Hibbard et al. (2012) documents continuing investigation of the shear zones in this geologically controversial region. In general, a lack of good outcrops and detailed stratigraphic data inhibit an understanding of the geology of the Ninety Six area.

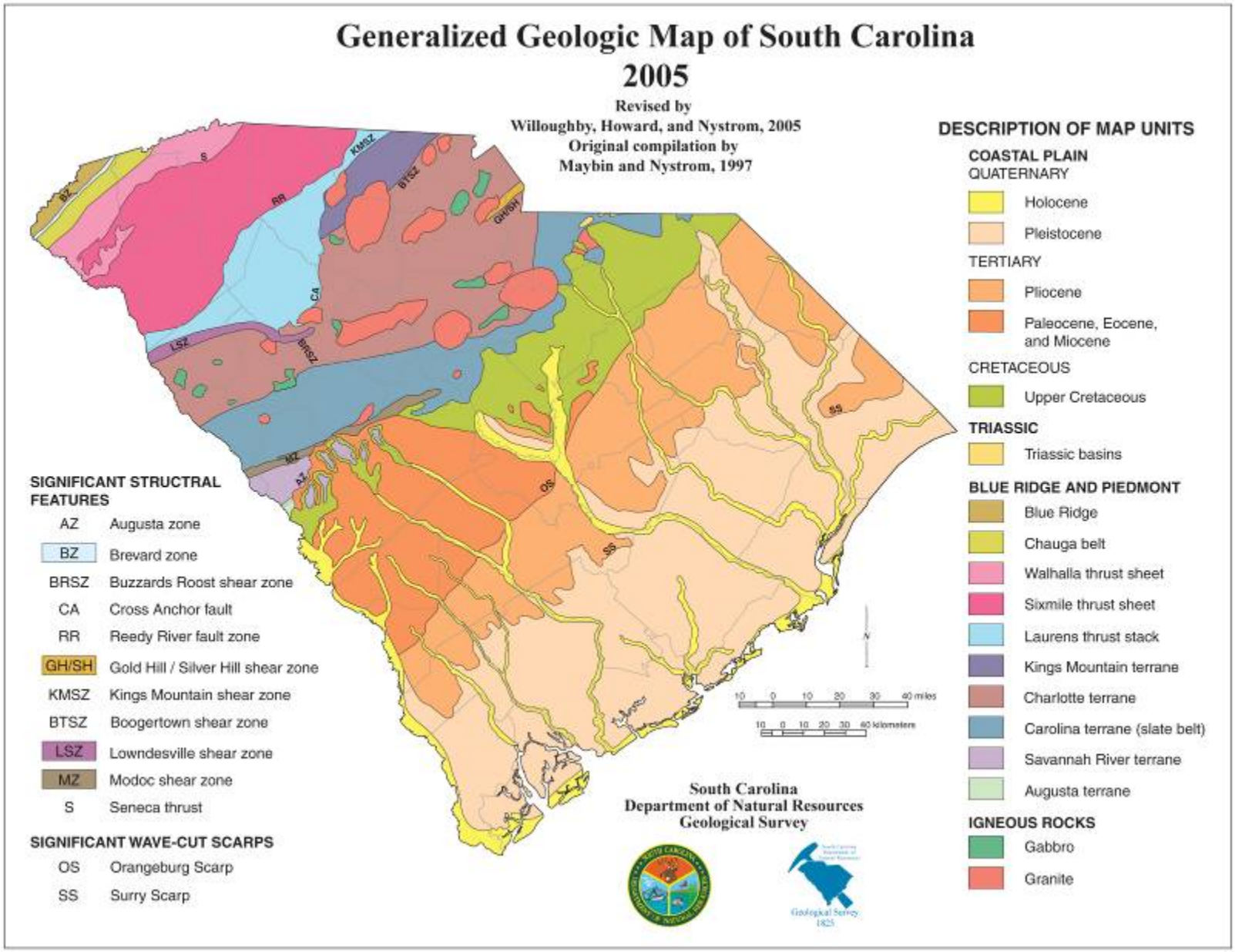

Figure 2. Generalized geologic map of South Carolina. Ninety Six National Historic Site is located in the Piedmont physiographic province on the Charlotte terrane, which is bounded by the Lowndesville and Buzzards Roost shear zones. Graphic by South Carolina Department of Natural Resources–Geological Survey, available at http://www.dnr.sc.gov/geology/images/GGMS-1%20Page%20Size.pdf (accessed November 21, 2012).

Geologic Mapping for Ninety Six National Historic Site

During the scoping meeting, Georgia Hybels (GRD, GIS specialist) showed some of the main features of the GRI's digital geologic maps, which reproduce all aspects of paper maps, including notes, legend, and cross sections, with the added benefit of being GIS compatible. The NPS GRI Geology-GIS Geodatabase Data Model incorporates the standards of digital map creation for the GRI and allows for rigorous quality control. Staff members digitize maps or convert digital data to the GRI digital geologic map model using ESRI ArcGIS software. Final digital geologic map products include data in geodatabase and shapefile format, layer files complete with feature symbology, Federal Geographic Data Committee (FGDC)–compliant metadata, a PDF that captures ancillary map data, and a document that displays the map. Final data products are posted at http://science.nature.nps.gov/nrdata/. The data model is available at http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm.

When possible, the GRI provides large scale (1:24,000) digital geologic map coverage for each National Park System unit's area of interest, which is often composed of 7.5-minute quadrangles that contain parklands. Maps at 1:24,000 scale (and larger) are useful for resource management because they capture most geologic features of interest and are spatially (horizontally) accurate within 12 m (40 ft). Ninety Six National Historic Site has one quadrangle of interest—Ninety Six (fig. 3). The process of selecting maps for management begins with the identification of existing geologic maps that cover the area of interest (table 1). Existing maps that cover the Ninety Six quadrangle are Nelson et al. (1998; scale 1:250,000) and Horton and Dicken (2001; scale 1:500,000). Scoping participants then evaluate maps and select appropriate sources for the digital geologic data (table 1). If necessary, a plan to obtain new mapping may be proposed.

During the GRI scoping meeting, Scott Howard (South Carolina Department of Natural Resource–Geological Survey, geologist) mentioned that large-scale geologic mapping (1:24,000) has been completed for many quadrangles adjacent to Ninety Six, but the geology of the Ninety Six quadrangle has never been mapped at that scale. Adjacent, mapped quadrangles include Dyson (Lawrence 1995), Cross Hill (Niewendorp 1994), Waterloo (West 1995b), Cokesbury (West 1995a), and Kirksey (Chalcraft et al. 1981). Nelson et al. (1998), which covers the Ninety Six quadrangle at a scale of 1:250,000, assumed map units and contacts from surrounding quadrangles, and projected those onto the Ninety Six quadrangle for publications of *Geologic Map of the Greenville 1° × 2° Quadrangle, South Carolina*. Work by Horton and Dicken (2001) provides more recent data, but the map was probably compiled using Nelson et al. (1998). Furthermore, the scale of Horton and Dicken (2001; scale 1:500,000) is too coarse for resource management needs at Ninety Six National Historic Site. Thus, scoping participants concluded that no adequate geologic map exists for Ninety Six National Historic Site. If the GRI can obtain funding, it will support a mapping project by the South Carolina Department of Natural Resources–Geological Survey that would remap the entire Ninety Six quadrangle (scale 1:24,000).

At the time of scoping, Bruce Heise (GRD, GRI program coordinator) suggested that GRI funding could support a mapping project within Ninety Six National Historic Site through the Geoscientists-in-the-Parks (GIP) Program administered by the NPS Geologic Resources Division (see http://nature.nps.gov/geology/gip/index.cfm). The program collaborates with the Geological Society of America's GeoCorps America Program to provide geologic expertise within the National Park

System. Scott Werts (Wintrop University, professor) and his student Mark White (Wintrop University, research assistant) could map the surficial geology at Ninety Six National Historic Site in summer 2012, and Irene Boland (Winthrop University, professor) could provide the bedrock geology layer for the GRI database.

During summer 2012, Irene Boland mapped the bedrock underlying the national historic site as mostly metagranite. This finding is in contrast to Nelson et al. (1998) and Horton and Dicken (2001). In addition, Professor Boland noted a linear body of rock of unknown lithology exposed in the southern part of the national historic site. She plans to produce a thin-section of the linear body to determine lithology, as well as provide map unit descriptions for this rock unit and the metagranite (underlying Ninety Six National Historic Site) for inclusion in the GRI data set (Stephanie O'Meara, Colorado State University, senior research associate and GRI Program GIS lead, e-mail communication, November 20, 2012).

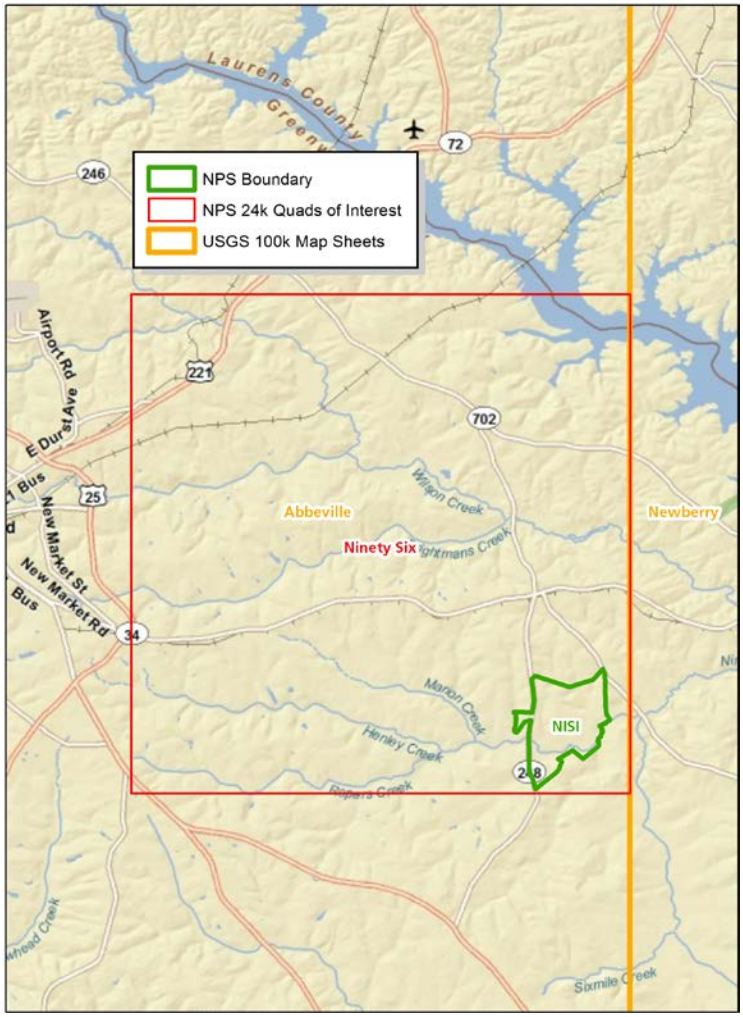

Figure 3. Area of interest for Ninety Six National Historic Site. The area of interest for Ninety Six National Historic Site is covered by the Ninety Six 7.5-minute quadrangle (scale 1:24,000), which is outlined and labeled in red. The name in orange indicates the 30-minute by 60-minute (scale 1:100,000) sheet. The Greenville 1° × 2° quadrangle is the 1:250,000-scale map covering this area. The green outline indicates the NPS boundary for Ninety Six National Historic Site.

Also during summer 2012, Mark White made soil observations from auger holes and provided preliminary point data, including soil observations from auger holes, to the GRI, thus completing the mapping phase of the project. However, the data need finalizing (Irene Boland, Winthrop University, professor, e-mail communication, September 24, 2012).

Final products provided by Irene Boland and Mark White for the GRI data set will include a surficial geologic map on a bedrock geology polygon base layer, and a report with map unit descriptions, various figures, text, and reference citations (Irene Boland, Winthrop University, professor, e-mail communication, September 24, 2012).

Mark White, Scott Werts, and Irene Boland presented a poster of their work at Ninety Six National Historic during the Geological Society of America's annual meeting in Charlotte, North Carolina, November 4–7, 2012. They will also provide the poster file to the GRI.

Table 1. Potential source maps for Ninety Six National Historic Site

Quadrangles Covered	GMAP[1]	Citation[2]	Scale	Format	Assessment	GRI Action
Ninety-Six	5548	Nelson et al. (1998)	1:250,000	paper	Scott Howard (SCGS) stated mapping was never done for this quadrangle and units and contacts were assumed. Scale too coarse for park management purposes.	None
Ninety-Six	45308	Horton and Dicken (2001)	1:500,000	paper	Scale too coarse for park management purposes.	None

[1]GMAP numbers are unique identification codes used in the GRI database.

[2]See "Literature Cited" section for full citations.

Geologic Features, Processes, and Issues

The GRI scoping meeting for Ninety Six National Historic Site provided an opportunity to develop a list of significant geologic features and processes at the national historic site. During the meeting, scoping participants identified and discussed the following features and processes, some of which have issues of management concern:

- Fluvial Features and Processes
- Lacustrine Features and Processes
- Erosion
- Seismic Activity
- Occurrences of Gold and Amethyst
- Eolian Features and Processes
- Geothermal Features and Processes

Fluvial Features and Processes

Ninety Six National Historic Site contains several small waterways, ranging in size from 1st to 4th order streams (Worsham et al. 2012). These streams drain watersheds to the west of the national historic site. Henley Creek, the main stream which flows across the southern part of the national historic site, becomes Ninety Six Creek at the eastern boundary and empties into the Saluda River

approximately 9 km (6 mi) downstream (Worsham et al. 2012). Tolbert Branch joins Henley Creek on the western side of the national historic site. In addition, the outlet (unnamed) of Star Fort Pond joins Henley Creek at the eastern park boundary. Two unnamed streams also flow into Star Fort Pond from the north. Spring Branch joins Henley Creek in the central part of Ninety Six National Historic Site.

Figure 4. Spring Branch. Ephemeral Spring Branch runs through the walking tour area of Ninety Six National Historic Site. The stream has incised a channel and exposed bedrock boulders. Photographs by Katie KellerLynn (Colorado State University; left photo) and Georgia Hybels (GRD; right photo).

Wetlands are a significant feature of Henley Creek. Roberts and Morgan (2007) identified 46 wetland areas covering a total of 6 ha (15 ac) and averaging 0.1 ha (0.3 ac) each within Ninety Six National Historic Site; most of these wetlands are along Henley Creek (Worsham et al. 2012).

With respect to fluvial (flowing water) features and processes, the GRI site visit highlighted Spring Branch—an ephemeral stream that flows through the walking tour area and crosses the Cherokee Path (fig. 4). Spring Branch is significant for historic and geologic reasons. The stream was free-flowing in 1781 and served as the loyalists' source of water at the time of the siege (National Park Service 2009). Today, an historic spring (the source of Spring Branch), which scoping participants observed during the site visit, does not provide enough water for perennial flow. However, during wet periods in springtime, Spring Branch flows, but seldom floods. Flooding does occur along Henley Creek, where footbridges have been washed out.

Spring Branch is geologically significant because streamflow has incised segments of the channel, exposing boulders and bedrock (fig. 4). Such exposures, which facilitate geologic mapping, are rare at Ninety Six National Historic Site. However, fluvial (flowing water) processes, which incised the channel, also cause erosion. The primary concern is for the preservation of archeological resources along the stream corridor. Minor mitigation occurs along Spring Branch.

Lacustrine Features and Processes

Star Fort Pond is the primary lacustrine feature at Ninety Six National Historic Site. It is located in the northeastern corner of the national historic site near the intersection of Highway 246 and Kinard Road, where a gravel parking area has been constructed for access. A concrete path from the parking lot leads to an aluminum, T-shaped pier. An angler's access trail, also used as a nature trail, encircles the pond.

Star Fort Pond is an 11-ha (27-ac) impoundment with a small dam at the outlet on the southern end. It was impounded in the early 1950s as part of a textile mill, and has been managed by the State of South Carolina since the early 1990s as a recreational fishery. Star Fort Pond is part of the South Carolina Department of Natural Resources (DNR) State Lakes Program that is designed to provide quality public fishing where the opportunity is lacking or where few well-managed fishing lakes exist. The pond is managed under a cooperative agreement between the DNR and the National Park Service (South Carolina Department of Natural Resources 2006).

GRI scoping participants identified sedimentation as a minor geologic issue at Star Fort Pond. Sedimentation is the process by which sediment, such as silt and sand, is deposited and accumulates, ultimately forming sedimentary layers. Specifically, sedimentation is the "silting up" of a reservoir with fine-grained sediment brought in via streams and surface runoff (Neuendorf et al. 2005). When a dam is constructed to store water, sediment transported by water flow is also stored, thereby gradually reducing reservoir capacity by sediment accumulation (Mohammadzadeh-Habili and Heidarpour 2010). The "life" of Star Fort Pond as a reservoir has not been estimated, but it is not presently a management concern.

Erosion of Cultural Resources

Ninety Six National Historic Site had many features of historical significance such as the original Star Fort constructed in 1781, siege trenches constructed and used by Greene and his men during their attack on Star Fort, the "mine" (really subterranean access to Star Fort), and historic roads and trading routes such as the Cherokee Trail, and Island Ford, Charleston, and Whitehall roads. The geologic processes of weathering and erosion take their toll on these earthen resources. For example, sunken traces of historic routes become spillways during storm events, concentrating storm water and facilitating erosion. Intense summer thunderstorms are common in the Piedmont physiographic province, and runoff rates are high, especially where land has been cleared such as farmland and construction sites (Marsh 2005). Thus a management concern at Ninety Six National Historic Site is potential loss of cultural resources (e.g., physical remains of the siege and archeological resources yet to be uncovered) as a result of runoff-related erosion.

Seismic Activity

The US Geological Survey (USGS) Earthquake Hazards Program posts online information about seismic activity in South Carolina, including earthquake history, seismicity and seismic hazard maps, notable earthquakes, recent earthquakes, and state and regional institutions where earthquake data are stored (http://earthquake.usgs.gov/earthquakes/states/?region=South Carolina; accessed November 21, 2012). This online information documented a magnitude 2.8 (on the Richter scale) earthquake, 3 km (2 mi) south–southwest of Centerville, South Carolina, on July 31, 2012 (see http://earthquake.usgs.gov/earthquakes/eqarchives/last_event/states/states_south_carolina.php;

accessed November 21, 2012). Centerville is approximately 80 km (50 mi) northwest of Ninety Six. This quake serves as an example of recent seismic activity in the region.

According to scoping participants, earthquakes are rarely felt at Ninety Six National Historic Site, though the great Charleston, South Carolina, earthquake of 1886 was likely felt. This earthquake was one of the great earthquakes in US history and caused damages of an estimated $23 million (nearly $600 million in today's dollars). Few buildings in Charleston escaped damage, and many were totally ruined; chimneys on 14,000 houses were destroyed. Charleston and nearby cities suffered the greatest effects, but points as far as 160 km (100 mi) away were strongly shaken. Cities that experienced damage within this 160-km (100-mi) radius included Columbia, South Carolina, and Augusta and Savannah, Georgia. For reference, Ninety Six is approximately 275 km (170 mi) northwest of Charleston. The total area affected by the Charleston earthquake covered more than 5 million km^2 (2 million mi^2). All or parts of 30 states, Ontario, Canada, and Havana, Cuba, felt the principal earthquake (US Geological Survey 2012). The maximum intensity has been estimated at intensity X on the Modified Mercalli scale (scale I to XII). An estimated 60 persons were killed by falling buildings and many more were injured. Two strong aftershocks were reported on October 22 and November 5, 1886, both intensity VI.

The South Carolina Department of Natural Resources–Geological Survey posts information about earthquake preparedness for citizens of the state at http://www.dnr.sc.gov/geology/earthquake.htm (accessed November 21, 2012). Park managers may find this information useful for park planning and interpretation.

Gold and Amethyst Occurrences

Gold occurs throughout the Piedmont physiographic province (South Carolina Department of Natural Resources 2012a), but the Carolina slate belt (now called “Carolina terrane”) is the most well-known area in South Carolina. The Carolina terrane extends 600 km (375 mi) from northeastern Georgia to southern Virginia (Schmidt et al. 2006). It abuts the Charlotte terrane, in which Ninety Six National Historic Site is situated (fig. 2), and portions of the Charlotte/Carolina terrane boundary are at or near areas of gold mineralization (Barker et al. 2004). According to scoping participants, gold in the Ninety Six area is associated with veins of quartz in crystalline bedrock. These quartz veins are the result of hydrothermal alteration during the early history of the Piedmont physiographic province (South Carolina Department of Natural Resources 2012a). Weathering of crystalline bedrock results in gold and other minerals accumulating in stream sediments called “placers.” Panning and sluicing for gold in streams, creeks, and shallow rivers has yielded minor finds (South Carolina Department of Natural Resources 2012a). Walker and Walker (2007) noted the Coronaca Creek–US Highway 221 crossing near Greenwood, South Carolina, as having gold potential for recreational panning.

Production of gold was important in South Carolina during the 1800s, and major gold mining operations have been located in Lancaster, Fairfield, McCormick, Chesterfield, and Cherokee counties (South Carolina Department of Natural Resources 2012a). Since 1999, the opening of four gold mines (Brewer, Haile, Ridgeway, and Barite Hill) in the Carolina slate belt has contributed to the state’s economy (US Geological Survey 2009) (fig. 5). D’Agostino et al. (1994) mapped the gold occurrences in the Greenville 1° × 2° quadrangle; these locations may be of historical and resource-management interest to managers at Ninety Six National Historic Site. However,

according to scoping participants, gold mining operations are not expected to impact the cultural or natural resources at Ninety Six National Historic Site.

In addition to gold, scoping participants mentioned amethyst as a geologic resource of interest in the Ninety Six area. Amethyst—the light or dark purple variety of quartz—is the state mineral of South Carolina. Typically, amethyst is translucent, and the better specimens have fine-pointed, six-sided crystals. One of the best specimens of amethyst ever found was on a property near Due West, South Carolina; it is currently displayed at the American Museum of Natural History in New York City. Due West is approximately 50 km (30 mi) northwest of Ninety Six. Amethyst crystals also have been found near Lowndesville and Antreville in Abbeville County (South Carolina Department of Natural Resources 2012b), in the Greenwood 7.5-minute quadrangle directly west of the Ninety Six quadrangle. Walker and Walker (2007) suggested two locations for "rock hounds" for amethyst and quartz gemstones in Greenwood County—the crossings of Saluda River–US Highway 25 and Goose Creek–US Highway 25 near the town of Ware Shoals.

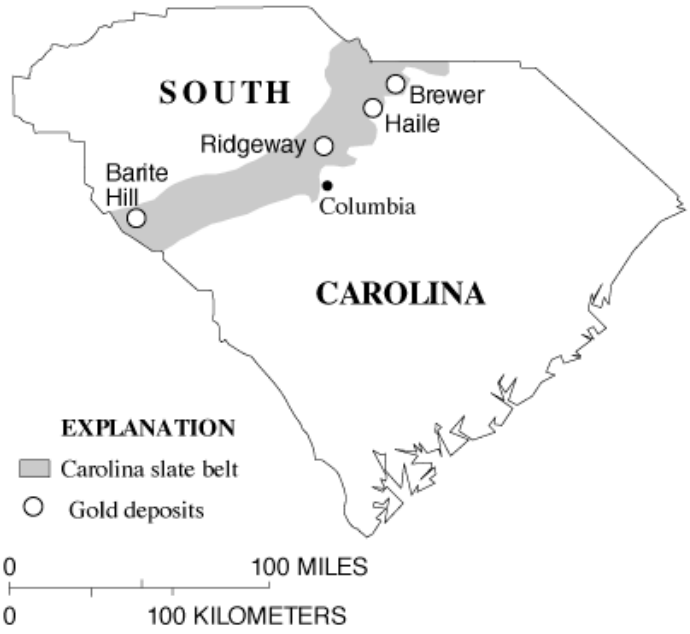

Figure 5. Gold mines in the Carolina terrane. The Carolina terrane, also known as the Carolina slate belt, contains gold occurrences. Recent gold mining operations are Barite Hill, Ridgeway, Haile, and Brewer. USGS graphic available at http://pubs.usgs.gov/fs/FS-040-96/images/fig1.gif (accessed November 23, 2012).

Eolian Features and Processes

Ninety Six National Historic Site is not known for its eolian (windblown) features such as sand dunes or sand sheets, or eolian processes such as dust storms or sandblasting erosion. However, scoping participants mentioned a sand ridge south of the national historic site in the Kirksey 7.5-minute quadrangle. Notably, the town of Sand Ridge is located on this topographic high at 177 m (581 ft) above sea level. For comparison, Ninety Six National Historic Site is 156 m (512 ft) above sea level. This sand ridge may be an old beach or dune deposit.

Geothermal Features and Processes

All evidence for geothermal resources in the vicinity of Ninety Six National Historic Site is anecdotal or based on historic use. Apparently, a "warm spring" occurs on private land ("Kinard land"), along Kinard Road, east of the national historic site. This spring may have been used as a spa in the late 1800s–early 1900s but is now only used by the owners (Grey Wood, Ninety Six National Historic Site, maintenance staff/park ranger, telephone communication, March 6, 2013).

The USGS Geographic Names Information System lists one spring feature, though not necessarily a hot spring, in Greenwood County. This spring, Powder Spring, is in Sumter National Forest southwest of Ninety Six.

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Table 2. Scoping meeting participants

Name	Affiliation	Position
Irene Boland	Winthrop University	Professor
Joe DeVivo	Southeast Regional Office Inventory & Monitoring (I & M) Program	Acting I & M Division Chief
Bruce Heise	NPS Geologic Resources Division	Geologist/GRI Program Coordinator
Scott Howard	South Carolina Department of Natural Resources–Geological Survey	Geologist
Georgia Hybels	NPS Geologic Resources Division	Geographer/GIS Specialist
Katie KellerLynn	Colorado State University	Geologist/Research Associate/Report Writer
Rebecca Port	Colorado State University	Research Associate
Scott Werts	Winthrop University	Professor
Mark White	Winthrop University	Research Associate
John (Grey) Wood	Ninety Six National Historic Site	Maintenance/Park Ranger

Note: Contact information is retained by the Geologic Resources Division.