Chapter 6
Mitigation and Monitoring

6.1 Introduction

In the U.S. Army Corps of Engineers (USACE) Regulatory Program, the term mitigation has two separate and distinct contexts as defined by two separate and distinct laws and regulations. The Council on Environmental Quality (CEQ) regulations implementing National Environmental Policy Act (NEPA) refer to mitigation, while USACE regulations pursuant to the Clean Water Act (CWA) refer to compensatory mitigation. Although confusing at times, the terms mitigation and compensatory mitigation in the context of NEPA and the CWA are not interchangeable. When applying these terms to a Department of the Army (DA) permit application, they have different requirements, as shown in Table 6-1.

Table 6-1. Mitigation and Monitoring Definitions

NEPA "Mitigation" as defined in 40 CFR 1508.20	CWA "Compensatory Mitigation" as defined in the USACE regulations (33 CFR Part 332) (also 40 CFR 230.91–98 in USEPA regulations)
(a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources or environments.	…The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." To achieve this goal, the CWA prohibits the discharge of dredged or fill material into wetlands, streams, and other waters of the United States unless USACE issues a DA permit. When a discharge is proposed, all appropriate and practicable steps must first be taken to avoid and minimize impacts on aquatic resources. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland, stream, and other aquatic resource functions.

NEPA and its implementing regulations require that an Environmental Impact Statement (EIS) identify appropriate mitigation measures for the adverse impacts potentially resulting from a proposed action. Under NEPA, mitigation measures are actions that could be taken to avoid, minimize, rectify, reduce, eliminate, or compensate for adverse effects on the environment (40 Code of Federal Regulations [CFR] 1508.20).

This Supplemental Environmental Impact Statement (SEIS) considers numerous measures to reduce impacts on environmental resources from the Proposed Project. Although some of the measures discussed herein are not strictly mitigation measures under the CWA or NEPA, they are identified in this chapter to provide a summary for public review of measures that have been considered in the design and development of the Proposed Project, and those that are being considered as additional measures. These measures are identified as avoidance, minimization, and compensatory mitigation under the CWA and as avoidance and minimization measures under NEPA, although many would apply to both regulations.

This chapter discusses the compensatory mitigation requirements of the CWA and the mitigation requirements of NEPA under the following topics.

- Avoidance, minimization, and compensatory mitigation under the CWA.
- Avoidance achieved during the DA application review process.
- Minimization of impacts.
- Compensatory mitigation pursuant to Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (USACE and USEPA 2008) (referred to herein as the Mitigation Rule) and Haile's proposed Mitigation Plan (Appendix J).
- Avoidance and minimization measures under NEPA.
- Avoidance and minimization measures proposed by the Applicant as part of the Proposed Project design or as standard procedures during operations.
- Additional mitigation measures being considered by USACE to further avoid or minimize impacts.
- The Applicant's proposed Monitoring and Management Plan (MMP) (Appendix I).
- Monitoring and adaptive management measures being considered by USACE to ensure that mitigation is being performed and is achieving the expected results or monitoring for adaptive management.

These measures are described in the sections that follow.

6.2 Avoidance and Minimization Measures under NEPA

6.2.1 Avoidance and Minimization Measures

The Applicant's measures to avoid and minimize potential impacts of the Proposed Project are summarized by resource area in Table 6-2, based on information provided in various reports and plans submitted by Haile. USACE views these elements as part of the Applicant's Proposed Project for purposes of the environmental impact analysis presented in Chapter 4, *Environmental Consequences*. Some of these measures are required under federal, state, and local permits; others are measures that Haile has incorporated into the design and operations of the Proposed Project.

Measures from a number of categories in Table 6-2 may apply to more than one resource area. For example, certain measures listed under surface water resources may also help to avoid or minimize potential impacts on wetlands and waters of the United States.

Table 6-2. Avoidance and Minimization Measures

Resource Area	Avoidance and Minimization Measures
Geology and soils	• Implement Storm Water Pollution and Prevention Plans (SWPPPs) as required by Haile's National Pollutant Discharge Elimination System (NPDES) permit, including management of sediment and erosion control (see Appendix A, Section 8.5, *Spill Containment*). • Implement a Spill Prevention Control and Countermeasures (SPCC) Plan for petroleum products (see Appendix A, Section 8.5, *Spill Containment*). • Implement spill prevention and control measures for process and reagent tanks and pipelines (see Appendix A, Section 8.5, *Spill Containment*). • Use methods of managing sediment and erosion control during construction pursuant to the *South Carolina Stormwater Best Management Practices Handbook* (SCDHEC 2005). • Design facility slopes to minimize erosion, as feasible (see Appendix A, Section 6, *Overburden Storage and Growth Media Storage Areas*). • Store and re-use growth media for use during reclamation, minimizing disturbance of additional soils (see Appendix A, Section 5.3, *Earth-moving, Geosynthetics, and Pipeline Construction Equipment*). • Implement an overburden management plan, including segregating and placing rock based on the content of potentially-acid generating (PAG) materials (see Appendix A, Section 6, *Overburden Storage and Growth Media Storage Areas*). • Perform concurrent and final reclamation to minimize soil loss and erosion (see Appendix H, *Reclamation Plan*).
Groundwater resources	• Implement a groundwater monitoring and reporting program during operations and post-mining per the SCDHEC Mine Operating permit (see Appendix I, *Monitoring and Management Plan*). • Comply with requirements of the NPDES permit, including groundwater monitoring (see Appendix I, *Monitoring and Management Plan*). • Amend Yellow Class overburden material used as pit backfill with lime to minimize acid rock drainage during operations (see Appendix A, Section 11.1, *Backfilled Pits*). • Use composite liner (low-permeability soil liner and high-density polyethylene [HDPE] liner) at the Tailings Storage Facility (TSF) and all PAG storage facilities (see Appendix A, Section 5.3, *Earth-moving, Geosynthetics, and Pipeline Construction Equipment*; Section 11.3, *Red and Yellow Class Overburden Storage Areas*; and Section 11.6, *Tailings Storage Facility*). • Provide drainage for groundwater from under all PAG storage facilities and the TSF (see Appendix A, Section 5.3, *Earth-moving, Geosynthetics, and Pipeline Construction Equipment*). • Install HDPE cover on the TSF and all PAG storage facilities during closure to minimize impacts on water quality (see Appendix A, Section 11.3, *Red and Yellow Class Overburden Storage Areas*; and Section 11.6, *Tailings Storage Facility*). • Install a double HDPE liner at the TSF Underdrain Collection Pond, 465 Collection Pond, 469 Collection Pond, 29 Pond, and 19 Pond; and install a single HDPE liner at the Process Event Pond (see Appendix A, Section 9.3,

Resource Area	Avoidance and Minimization Measures
	Design Components; and Section 10, S*urface and Groundwater Water Management*). • Implement a leak collection and recovery system at all double HDPE-lined ponds (see Appendix A, Section 9.3, *Design Components*; and Section 10, *Surface and Groundwater Water Management*). • Conduct post-mining reclamation and closure monitoring for purposes of ensuring continued compliance with permit requirements (see Appendix A, Section 11, *Site Reclamation*; and Appendix H, Section 3.0, *Post-mining Monitoring Requirements*). • Seal abandoned wells (see Appendix I, *Monitoring and Management Plan*).
Surface water resources	• Ensure the Process Event Pond is designed to contain a spill that exceeds a facility's containment capacity or a failure of the TSF slurry pipeline (see Appendix A, Sections 9.3, *Design Components;* and 10, *Surface and Groundwater Water Management*). • Implement an overburden characterization and management plan, including; segregating and placing rock based on the content of PAG materials (see Appendix A, Section 6, *Overburden Storage and Growth Media Storage Areas*). • Provide double-walled pipelines, or a single-walled pipeline within an HDPE channel, for the TSF slurry pipeline to prevent and contain a spill (see Appendix A, Section 8.5, *Spill Containment*). • Install pressure-sensing alarms for the tailings and reclaim water pipeline systems and certain contact water lines. • Install automatic shut-off on the contact water pipeline system (see Chapter 4, Section 4.2.4, *Mitigation for Impacts*). • Treat runoff and seepage from all PAG storage facilities and other contact waters during operations in an NPDES-permitted water treatment plant prior to release (see Appendix A, Section 10.2, *Contact Water*). • Treat drain-down from all PAG storage facilities and the TSF during closure in an NPDES-permitted treatment system prior to release (see Appendix A, Section 10.2, *Contact Water*). • Primarily use a water-resistant ammonium nitrate emulsion blasting agent to minimize impacts on nearby waterbodies and groundwater (see Chapter 4, Section 4.2.4, *Mitigation for Impacts*). • Implement engineering measures to promote Ledbetter Pit Lake stratification to minimize impacts on lake surface water quality and discharge to Haile Gold Mine Creek post-mining (see Chapter 4, Section 4.2.4.2, *Additional Potential Mitigation Measures in the SEIS*).
	• Implement sediment and erosion control measures to mitigate sediment and sediment-associated pollutant loading from disturbed areas (see Appendix A, Section 10.1.1, *Stormwater Management*). • Eliminate toxicity or delay outflow from Ledbetter Pit Lake to Haile Gold Mine Creek if water quality monitoring of pit lake waters exceed surface

Resource Area	Avoidance and Minimization Measures
	water standards or fail toxicity tests (see Appendix A, Section 11.2, *Pit Lakes*). • Actively treat pit lakes during refilling to minimize impacts on water quality (see Appendix H, Section 2.4, *Pit Lakes*). • Perform concurrent and final reclamation to minimize impacts on water quality (see Appendix A, Sections 3, *Overview of the Proposed Project*; 4.1, *Mining Schedule;* 10.1.1 *Stormwater Management*; and 11, *Site Reclamation*). • Implement spill prevention and control measures for petroleum products, reagents, processes, and pipelines (see Appendix A, Section 8.5, *Spill Containment*). • Implement a surface water monitoring and reporting program during operations and post-mining (see Appendix A, Section 11, *Site Reclamation*; Appendix I, *Monitoring and Management Plan*). • Comply with requirements of the NPDES permit, including discharges to surface waters (see Appendix A, Sections 3, *Overview of Proposed Project*; 6, *Overburden Storage and Growth Media Storage Areas*; 8.3, *TSF Reclaim Water*; 10.2, *Contact Water*; and 11.3, *PAG Cells-Red and Yellow Class Overburden Storage Areas*). • Implement a SWPPP as required by the industrial stormwater NPDES permit (see Appendix A, Section 6, *Overburden Storage and Growth Media Storage Areas*). • Implement dust control measures for roads and construction areas (see Appendix A, Sections 5.4.4, *Mine Haul Roads*; 7.4.1*, Input Parameters*; and 10.1*, Non-Contact Water*). • Design the TSF to contain the probable maximum precipitation event (approximately 48 inches) with 48 inches of freeboard (see Appendix A, Section 8.3, *TSF Reclaim Water*). • Comply with the requirements of Dam Safety permit (see Appendix A, Section 9, *Duckwood Tailings Storage Facility*). • Comply with the requirements of Surface Water Withdrawal permit during refilling of Ledbetter Pit Lake, as applicable (see Appendix A, Section 11.5, *Haile Gold Mine Creek*). • Monitor the structural integrity of TSF embankment (see Appendix A, Section 9, *Duckwood Tailings Storage Facility*). • Route stormwater not falling on the PAG facilities around the PAG facilities (see Appendix A, Section 6, *Overburden Storage and Growth Media Storage Areas*). • Design culverts to maintain existing surface drainage patterns and prevent erosion (see Appendix A, Section 10.1.1, *Stormwater Management*). • Route depressurization water through the dust control holding tanks, which will assist in acclimating water to ambient temperature and increasing dissolved oxygen levels prior to release to streams (see Appendix A, Section 10.1.2, *Depressurization Water Management*). • Implement 50-foot vegetative buffers around otherwise not directly affected waters of the United States (see Appendix I, *Monitoring and Management Plan*).
Water supply	• Implement a program to investigate complaints from water users about potential impacts on wells, ponds, and springs due to mine operations, and

Resource Area	Avoidance and Minimization Measures
	provide remedial response as appropriate (see Chapter 4, Section 4.2.4, *Mitigation for Impacts*). • Recycle/re-use process water to minimize water consumption (see Appendix A, Sections 3, *Overview of Proposed Project*; and Section 8.3, *TSF Reclaim Water*).
Floodplains	• Construct mine facilities outside of the 100-year floodplain.
Wetlands and other waters of the United States	• Design and locate mine facilities to reduce impacts on waters of the United States. • Concentrate and confine impacts on previously disturbed areas, where feasible. • Avoid mine roads crossing waters of the United States Where crossing is necessary, minimize impacts by crossing at the narrowest portion or by siting over existing road crossings. • Implement 50-foot vegetative buffers around otherwise not directly affected waters of the United States.
Terrestrial resources	• To reduce impacts on terrestrial resources, the following measures would be implemented by the Applicant (see Section 4.7.4, Mitigation for Impacts): • Follow Migratory Bird Treaty Act terms described in 16 U.S. Code 703(a). • Design distribution and transmission lines to follow the guidelines in the Rural Utilities Service substation design and transmission line design handbooks (RUS 2001, 2009). • Design and construct transmission lines to follow the guidelines in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). • Implement an Avian Protection Plan at the mine site for transmission lines, including designing power lines and poles to minimize potential bird mortalities due to electrocution. • Develop procedures for managing nests of protected species on utility structures (if nests are built). • Install an 8-foot fence around all HDPE double-lined ponds and the TSF facility to exclude wildlife from the TSF pond. • Continue to implement an avian mortality reporting system for the TSF and contact water ponds. • Regularly inspect and maintain all fencing around HDPE double-lined ponds and the TSF perimeter. • Use skirting to enclose open spaces as necessary beneath raised structures as practical. • Limit the concentration of weak acid dissociable cyanide in the TSF Reclaim Pond to a maximum of 50 parts per million. • Avoid features possibly attractive to wildlife in HDPE double-lined ponds, as possible. • Maintain slopes around water ponds to restrict access, where necessary, and to provide a means of escape for trapped animals. • Clear vegetation surrounding the perimeter of HDPE-lined ponds and minimize infrastructure around open-solution ponds and the TSF where practicable. • Use certified as noxious-weed-free seed mixes to promote diverse wildlife in areas undergoing final reclamation.

Resource Area	Avoidance and Minimization Measures
	• During final grading of facilities during reclamation, leave occasional large boulders that are uncovered during sloping on the surface to provide microhabitats for wildlife and vegetation. • Ensure that workers do not intentionally feed, harass, or approach wildlife. • Follow posted speed limits for traffic in the study area to reduce incidents with wildlife.
Federally listed species	• None proposed.
Socioeconomics and environmental justice	• None proposed.
Land Use	• Return disturbed areas to a stable condition that can support a productive post-mining land use (see Appendix A, Section 11, *Site Reclamation*; Appendix H, *Reclamation Plan*).
Air quality and climate change	• Comply with Air Quality State Construction and Operating permit requirements, conditions, and reporting. • Operate and maintain air pollution control equipment in accordance with permit requirements. • Implement dust control measures, including using water sprays to minimize dust at all transfer points in accordance with the conditions set forth in Haile's SCDHEC Air permit issued for the Proposed Project. • Prepare and implement a Fugitive Dust Control Plan in accordance with conditions contained in the SCDHEC Air permit issued for the Proposed Project. Dust control measures may include haul road maintenance, wet suppression through the application of water, gravelling of road surfaces, and revegetation and/or reclamation of material stockpiles. • Impose haul truck speed limits where necessary. • Maintain roadways to ensure safe operation of equipment to control fugitive dust. • Minimize the formation of hydrogen cyanide by maintaining leach solution at a high pH within the internal closed-loop process at the Mill prior to discharge from the cyanide destruction tanks.
Noise and vibration	• Determine placement of vegetative screens at public roadways in coordination with the SCDHEC requirements. • Perform blasting with electronic programmable detonators to minimize ground vibrations. • Perform blasting during daylight hours as possible. • Use sound-attenuating devices on mill equipment where practicable.

Resource Area	Avoidance and Minimization Measures
Visual resources and aesthetics	• Placement of vegetative screens at public roadways to be determined in coordination with the SCDHEC. • Use visual screening techniques. • Use earth tones for major mine facilities. • Implement dust control measures. • Direct operating lights downward to shield light sources. • Reduce outside lighting to the minimum amount allowed for safe operations and maintenance in compliance with regulations from the MSHA. • Minimize facility heights, where feasible. • Perform reclamation to approximate original topography where practicable. • During final grading of facilities, occasional large boulders that are uncovered may be left to provide topographic diversity and to break the linear appearance of the final slope.

Transportation	• A construction traffic management plan would be implemented to address operation and staging of construction vehicles and equipment, and measures to minimize disruption to through-traffic on US 601, SC-265, S-304, and S-219 during road realignments, expansion of the TSF, and construction of the overpass over US 601 to access the Champion Pit (see Section 4.11.4 Mitigation for Impacts).
	• A transportation phasing and management plan would be implemented to ensure that necessary transportation improvements are in place to accommodate the Applicant's Proposed Project traffic during both construction and operations (see Section 4.11.4 Mitigation for Impacts).
	• Intersections at South Carolina Highway (SC)-265 and SC-204 would be realigned to improve turning safety and visibility (see Chapter 4, Section 4.11.2.2, *Proposed Project*).
	• Intersection improvements would include (see Chapter 4, Section 4.11.2, *Proposed Project*):
	  ○ Expansion of lane and shoulder widths and clear zone shoulder areas.
	  ○ New pavement markers and signs installed to improve visibility.

Recreation	• Return disturbed areas to a stable condition that can support a productive post-mining land use, including recreation (see Chapter 4, Section 4.14.4, *Mitigation for Impacts*).

Resource Area	Avoidance and Minimization Measures
Public health and safety	• Haile would be constructing one bridge over US 601 to access the Champion Pit to avoid impact on public safety by mine vehicle traffic (see Chapter 4, Section 4.17.4, *Mitigation for Impacts*). • Implement a Health, Safety, Environment and Community Management Plan (see Chapter 4, Section 4.17.2.1, *Direct Health and Safety Impacts*). • Provide around-the-clock security through a combination of security gate personnel, video cameras, and other security measures (see Appendix A, Section 5.4.1, *Main Entrance at US Highway 601;* Chapter 4, Section 4.18.2.2, *Impacts from Storage of Hazardous Materials and Waste*). • Restrict access to the project site (see Appendix A, Section 5.4.1, *Main Entrance at US Highway 601*). • Use vegetative screens and fencing to minimize public interaction (see Appendix I, *Monitoring and Management Plan*). • Develop detailed pollution prevention plans for process chemical handling and mining operations in accordance with appropriate regulations, permits, best practices, and codes (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*). • Comply with the Emergency Planning and Community Right-To-Know Act (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*). • Implement an Emergency Response Action Plan/Emergency Management Control Plan (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*). • Comply with NPDES permits, air permits, the Dam Safety permit, the SCDHEC Mine Operating permit, the Floodplain permit, stormwater permits, and building and sewer permits (see Chapter 4, Section 4.18.2.1, *Impacts from Handling and Use of Hazardous Materials and Waste* (OceanaGold 2014). • Perform toxic release inventory reporting (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*). • Implement a Chemical Handling and Storage Plan (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*). • Comply with Mine Safety and Health Administration requirements (see Chapter 4, Section 4.17.2.2, *Impacts from Natural Hazards*; Section 4.18.2.1, *Impacts from Handling and Use of Hazardous Materials and Waste*). • During reclamation, construct safety berms around any portions of the pit lakes that did not have these during operations (see Appendix A, Section 11.2, *Pit Lakes*; Appendix H, Section 2.4, *Pit Lakes*). • Place appropriate signage during closure to warn of the hazards of the pit highwalls and pit lake (see Appendix H, Section 2.4, *Pit Lakes*). • Seal abandoned wells (see Appendix I, *Monitoring and Management Plan*).
Hazardous materials and solid wastes	• Implement a Solid and Hazardous Waste Management Plan (see Chapter 4, Section 4.17.2.2, Impacts from Natural Hazards). • Implement an Explosives Management Plan (see Chapter 4, Section 4.17.2.1, Direct Health and Safety Impacts). • Implement an Emergency Action Response Plan/Emergency Management Control Plan (see Chapter 4, Section 4.18.2.2, Impacts from Storage of Hazardous Materials and Waste). • Implement a material safety data sheet program (see Chapter 4, Section 4.18.2.2, Impacts from Storage of Hazardous Materials and Waste). • Implement an identification and approval process prior to bringing any hazardous material within the Project boundary (see Chapter 4, Section 4.18.2.1, Impacts from Handling and Use of Hazardous Materials and Waste).

Resource Area	Avoidance and Minimization Measures
	• Comply with Resource Conservation and Recovery Act and SCDHEC requirements for storage and handling of hazardous and toxic wastes (see Chapter 4, Section 4.18.2.2, Impacts from Storage of Hazardous Materials and Waste). • Implement waste minimization measures (OceanaGold 2019b).
Cultural resources	• Execute the Section 106 Memorandum of Agreement. • Implement the Revised Cultural Resources Management Plan. • Implement the Unanticipated Discovery Plan. • Avoid archaeological sites 38LA0636, 38LA0637, 38LA00642, and 38LA0727, and avoid the portion of site 38LA0654 that contributes to its NRHP eligibility. • Implement Phase II testing on seven unevaluated archaeological sites (38LA0664, 38LA0665, 38LA0673, 38LA0342, 38LA0356, 38LA0381, and 38LA0755), and potentially seven other archaeological resources (38LA00660, 38LA0679, 38LA0690, 38LA0706, 38LA0716, 38LA726, and 38LA0760) if they cannot be avoided. Implement Phase III data recovery on site 38LA0352. • Implement Phase III data recovery on NRHP-eligible archaeological sites that will be affected by the Proposed Project. • Implement recovery work on the historic built environment resource, the 1881 Stamp Mill (38LA0383), and relocate the Haile Gold Mine School. Additional details pertaining to the proposed mitigation measures can be found in the Revised Cultural Resources Management Plan (Appendix C) and Memorandum of Agreement, developed through Section 106 consultation.

Sources: Haile Gold Mine, Inc. 2014; Campco Engineering, Inc. 2018

6.2.2 Additional Mitigation Measure Being Considered by USACE

The additional measure USACE is considering to further mitigate potential impacts of the Proposed Project due to mine expansion is listed below. This measure is summarized from Chapter 4, *Environmental Consequences*, and presented here for convenience. Additional avoidance, minimization, and mitigation may be considered by USACE in its decision-making process, particularly measures to mitigate for impacts on wetlands and waters of the United States as USACE evaluates Haile's conceptual mitigation plan (Newkirk 2020).

- Noise and Vibration - Limit use of heavy equipment during construction of berms within West PAG and South OSA to the hours of 8:00 a.m. to 5:00 p.m., to minimize the potential for community disturbance.

6.2.3 Applicant's Proposed Monitoring and Management Plan

The Applicant has submitted in documents and reports a number of plans and proposed monitoring and environmental management measures and has compiled these into an MMP) (Appendix I) that would be implemented throughout the life of the mine. Contents of the proposed MMP are summarized below.

The proposed MMP is included in Appendix I to enable readers of the SEIS to understand the monitoring and management measures to which the Applicant has committed.

The objectives of Haile's proposed MMP are to do the following.

- Identify the environmental media that Haile would monitor during the Proposed Project and provide a summary of this monitoring.
- Provide an overview of certain major operations and environmental media at the project site that Haile anticipates would be regulated by the South Caroline Department of Health and Environmental Control (SCDHEC) and identify Haile's commitments for each of them.
- Provide an overview of the major project facilities to enhance understanding of how Haile's environmental monitoring and management activities would address associated environmental impacts.

Management for environmental protection includes proper operation and maintenance of proposed mine facilities. Although most of Haile's final operational plans are not yet completed, various reports or manuals that include relevant monitoring or management information have been prepared. Manuals and operational plans prepared during project planning would be supplemented or replaced by the finalized operational plans (or manuals) after any permits are issued to guide actual operations (Haile 2020a). USACE and SCDHEC permit conditions may require agency review and/or approval of these plans.

The following plans and draft operational manuals that are relevant to environmental management of the Proposed Project during mining and post-mining are incorporated into the MMP by reference and listed below.

- Tailing Storage Facility Operations, Inspection, and Maintenance Manual (OceanaGold 2017)
- Tailing Storage Facility Emergency Action Plan (OceanaGold 2019c)
- Overburden Management Plan (Schafer 2015)
- Reclamation Plan (Wood 2020)

Current versions and/or drafts of these plans and documents can be accessed at the Haile Gold Mine SEIS website (http://www.hailegoldmineseis.com).

The Applicant would develop/update additional plans to comply with other operational standards and regulations. These plans include the following.

- Spill Prevention, Control, and Countermeasures (SPCC) Plan (OceanaGold 2018)
- Stormwater Pollution and Prevention Plan (SWPPP)
- Overburden Material Testing Program (Schafer 2015)
- Operational Water Quality Monitoring and Management Plan, Emergency Management Control Plan (Oceana Gold 2019a)
- Operational Plans for each major facility
- Solid and Hazardous Waste Management Plan (Oceana Gold 2019b)
- Post Closure Water Quality Management Plan (Haile 2020a)

The MMP focuses on Haile's commitments for monitoring as required to comply with all applicable permits and regulations. The MMP would be revised as needed based on future permitting decisions (see additional discussion regarding revisions to the MMP in Section 6.3.4 below). Table 6-3 summarizes the monitoring programs in Haile's proposed MMP.

Table 6-3. Applicant's Proposed Monitoring Programs

Monitoring Program	Type of Monitoring	Components	Frequency
Groundwater	Water levels	Monitoring wells to monitor depressurization, drawdown extent, and impact on wells outside the project boundary	Quarterly, or as specified
	Water quality	Basic water quality parameters: cations and anions, metals, nutrients, and other parameters including cyanide, oil and grease, and fecal coliform[a]	Quarterly or annually depending on location
Surface water	Streamflows	Streamflows	Hourly or quarterly
	Water quality	Basic water quality parameters: cations and anions, metals, nutrients, and other parameters including cyanide, oil and grease, and fecal coliform[a]	Quarterly and annually
	Stormwater	Manage and monitor in compliance with Stormwater Pollution Prevention Plan during construction and operation	As per permit requirements
Stream channels	Stream channel configuration	Cross sections, profile, sediment	Annually
Wetlands	Vegetation	Species presence, cover, woody stems, hydrophytic species	Annually
	Soil	Soil nutrients and hydric indicators	Annually
	Water	Water quality, depth to water table, hydrologic indicators	Annually
TSF monitoring	Structural integrity	Visual examination and geotechnical instrumentation	Periodically
	Drain systems	Water quality sampling and inspection as described above in the shallow groundwater diversion system, leak collection and recovery system, and underdrain collection system	Periodically
Overburden	Overburden material testing program	Collect samples from gold assay boreholes and test geochemical properties to classify overburden as green, yellow or red	

Monitoring Program	Type of Monitoring	Components	Frequency
East and West PAG	Surface and groundwater quality	Monitor water quality as described above	According to Water Quality Monitoring Plan
Mill Site and ore processing	Cyanide management	Send weak acid dissociable cyanide levels above 50 parts per million in the tailings stream through the cyanide destruct process	Continuous
	Spill containment system	Individual containment and monitoring of the Process Event Pond in the event of an emergency release Conduct incident reporting in accordance with the SCDHEC Mine Operating permit	
Contact water treatment plant	NPDES permit compliance monitoring	Monitor and report in accordance to the NPDES individual discharge permit	As needed
Contact water and tailing slurry pipelines	Spill and leak monitoring	Install pressure -sensing alarms on the tailings slurry process water pipelines	As needed
Reclamation and closure monitoring	Pit lake water levels	Monitor water levels in pit lakes	Quarterly
	Pit lake water quality	Monitor pH and water quality to determine appropriate lime additions	As per water quality sampling plan
	Surface water and groundwater	Monitor water quality as described above but decreasing in frequency over time as determined by the success of reclamation	Dependent on results during 30-year period after mine closure
	Passive treatment cells	Monitor treatment effectiveness	As per water quality sampling plan
	Vegetation	Monitor to prevent woody species from becoming established on the TSF and East and West PAG facilities	As needed

Source: Haile Gold Mine, Inc. 2020a

[a] Analytes are described in more detail in the respective monitoring and management plans, and are summarized in the Haile Gold Mine Monitoring and Management Plan (Haile 2020a).

6.3 Avoidance, Minimization, and Compensatory Mitigation under the Clean Water Act

For projects authorized under Section 404 of the CWA, compensatory mitigation is not considered until after all appropriate and practicable steps have been taken to first avoid and then minimize adverse impacts on the aquatic ecosystem (33 CFR 3322; see also 40 CFR 230.92).

6.3.1 Avoidance Achieved during the DA Application Review Process

The Applicant previously developed and screened potential alternatives for past project permitting applications considered in the 2014 FEIS and in the 2011 Environmental Assessment for Haile Gold Mine Project (Genesis Consulting Group 2011), and the Haile Gold Mine Project Supplemental Alternatives Analysis (ERC 2011). The alternatives screening process conducted for the 2014 FEIS eliminated all of alternatives considered for a detailed analysis in the 2014 FEIS except for the No Action, Proposed Action, and Modified Project Alternative. Haile's Proposed Action for the SEIS incorporates open-pit mining and underground mining based on the ore location, depth, and gold concentration in the ore and optimum mine plan. Alternative project configurations were further evaluated in Chapter 2, *Proposed Action and Alternatives*, for feasibility by USACE. This alternatives screening process is further described below and in Chapter 2.

6.3.2 Minimization of Impacts

Section 2.5, *Evaluation of Alternatives*, and Section 2.6, *Applicant's Alternatives Evaluated by the U.S. Army Corps of Engineers*, within Chapter 2 of the SEIS, describe the process by which alternatives to the Proposed Project were considered, with the objective of reducing impacts on waters of the United States and other environmental resources. This process considered alternative mining and ore processing methods, alternative sites for facilities, and alternate project configurations, among other alternatives. Most alternatives were eliminated from further consideration because they were not practicable or would not further reduce impacts on waters of the United States from those of the Proposed Project. The alternatives analysis (Section 2.5.3, *Alternatives Screened for Further Analysis*, Table 2-4) identified alternative Overburden Storage Areas (OSAs), alternative Tailings Storage Facility (TSF) locations, and alternative water management alternatives to the Proposed Project. Other alternative project configurations were eliminated from further consideration because they would be less optimal, would result in further surface disturbance, would not reduce impacts on waters of the United States, would result in potential worker safety issues, and/or would not be reasonable or practicable.

6.3.3 Compensatory Mitigation

Compensatory mitigation is a critical tool to ensure that project impacts are offset by compensation to meet the long-standing national goal of "no net loss" of wetland functions and values, identified in EO 11990, Protection of Wetlands. Compensatory mitigation is used for resource losses that are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. Compensatory mitigation can be carried out through restoration of an existing wetland or other aquatic site, enhancement of the functions of an existing aquatic site, creation of a new aquatic site, or preservation of an existing aquatic site.

The USACE Mitigation Rule found at 33 CFR Part 332 establishes standards and criteria for the use of all types of compensatory mitigation to offset unavoidable impacts on waters of the United States The Mitigation Rule identifies the steps necessary to determine the level of compensatory mitigation that is appropriate based on the wetland functions lost or adversely affected by permitted activities.

6.3.3.1 Compensatory Mitigation for Impacts on Waters of the United States

The Mitigation Rule outlines the process for selection of compensatory mitigation. The Mitigation Rule includes a preference hierarchy for the five types of compensatory mitigation: (1) mitigation banks; (2) in-lieu fee programs; (3) permittee-responsible mitigation (PRM) plans under a watershed approach; (4) PRM plans through onsite and in-kind; and (5) PRM plans through offsite and/or out-of-kind.

The Mitigation Rule allows that the preference hierarchy can be overridden in cases when "a permittee-responsible project will restore an outstanding resource based on rigorous scientific and technical analysis" (33 CFR 332.3[b][2]) or the selected compensatory mitigation option is environmentally preferable. In determining whether the mitigation proposal is environmentally preferable, the district engineer must assess the likelihood for ecological success and sustainability, the location of the compensation site relative to the impact site and its significance within the watershed, and the costs of the compensatory mitigation plan.

The Mitigation Rule grants the district engineer authority and discretion to determine the appropriate compensatory mitigation for impacts authorized under a DA permit.

6.3.3.2 Impacts that Require Compensatory Mitigation Pursuant to 33 CFR 332

USACE's intent in this SEIS is to comply with NEPA implementing regulations by identifying and disclosing fully and completely all of the potential environmental effects on the human and natural environment that may be caused as a result of the proposed Haile Gold Mine Project. With regard to potential effects on wetlands and waters of the United States, this includes addressing direct and indirect impacts on these aquatic resources. *Direct Impacts* are "caused by the action and occur at the same time and place" (40 CFR 1508.8). *Indirect impacts* are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8).

Direct impacts would include impacts that would result in losses of wetlands and waters of the United States as a result of the direct excavation and placement of fill to construct and excavate the mine. For example, excavation of mine pits would result in the discharge of dredged or fill material, and placement of excavated overburden and pre-processed ore into temporary or permanent storage and stockpiles would directly affect wetlands and streams within the footprints of these project features.

Indirect impacts are caused by other project activities such as dewatering associated with groundwater pumping that are not regulated under Section 404 of the CWA and therefore do not require compensatory mitigation. The direct and indirect impacts of the Proposed Project and mitigation ratios for stream and wetland resources are shown in Table 6-4.

Table 6-4. Mitigation Ratios for Stream and Wetland Resources

	New Preservation		Existing Preservation[e]		Combined New and Existing Preservation	
	Stream Linear Feet	Wetland Acres	Stream Linear Feet	Wetland Acres	Stream Linear Feet	Wetland Acres
Upper Rainbow Ranch	77,474.30	1.48	-	-	77,474.30	2.43[a]
Middle Flat Creek	25,507.67	60.97	11,752.31	15.39	37,259.98	80.03[b]
Lower Flat Creek	3,056.83	16.94	-	-	3,056.83	16.94
Total resource	**106,038.80**	**79.39[c]**	**11,752.31**	**15.39**	**117,791.11**	**99.40**
WOUS with direct impacts	13,124.08	86.22	-	-	13,124.08	86.22
WOUS with indirect impacts[d]	108,288.19	155.43	-	-	108,288.19	155.43
Ratio of compensation to direct impacts	8.1:1	0.92:1	-	-	9.0:1	1.2:1

Sources: Newkirk 2020; Haile Gold Mine, Inc. 2019, 2020

[a] Includes 0.95 acre pond restored to 287.65 linear feet of stream.

[b] Includes 3.67 acre pond and 15.39 acre wetland already under conservation easement in the Katawba Valley Land Trust

[c] Resulting acreage of new preservation after removing ponds and previously protected wetlands (15.39 acres) associated with the Katawba Valley Land Trust, an existing conservation easement.

[d] It should be noted that compensatory mitigation for *indirect* impacts on wetlands and other waters of the United States (impacts resulting from non-jurisdictional activities such as groundwater drawdown) is not required under CWA Section 404(b)(1) Guidelines. The ratio is provided for comparative purposes only.

[e] Lands under an existing conservation easement with the Katawba Valley Land Trust

WOUS = waters of the United States

6.3.3.3 Haile's Mitigation Plan

Haile submitted a conceptual supplemental mitigation plan (Mitigation Plan) to USACE in August 2020 (Newkirk 2020, Appendix J). The Mitigation Plan consists of a permittee responsible mitigation (PRM) plan because there are no approved mitigation banks with service areas that include the Haile Gold Mine. The Mitigation Plan describes the perpetual preservation of three separate sites along Flat Creek within the Lynches River watershed (Hydrologic Unit Code [HUC] 03040202) and U.S. Environmental Protection Agency (USEPA) Level IV Sandhills and Carolina Slate Belt Ecoregions in Lancaster County (Figures 6-1 and 6-2).

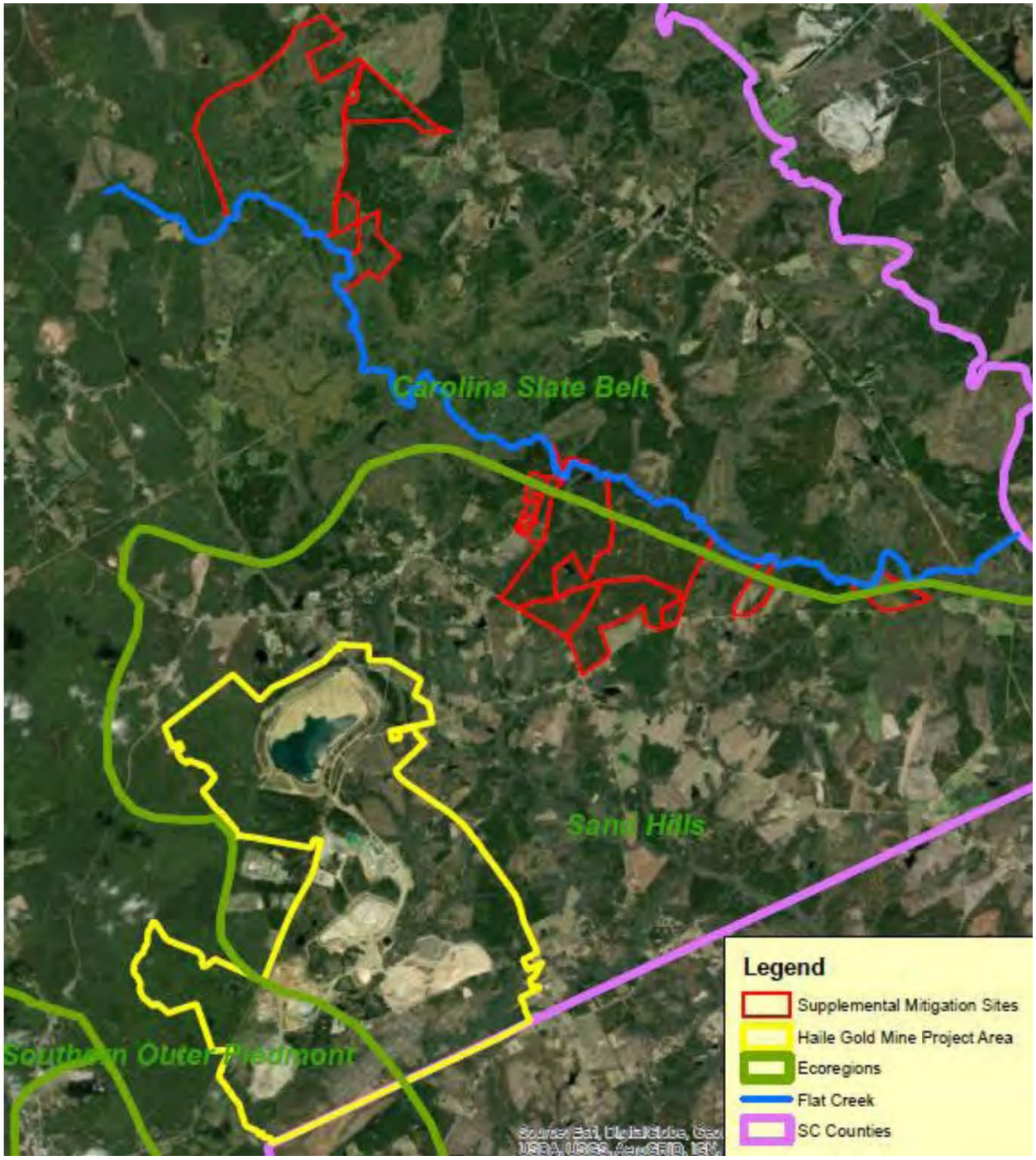

Figure 6-1. Location of the Haile Gold Mine in Relation to the Proposed Mitigation Sites

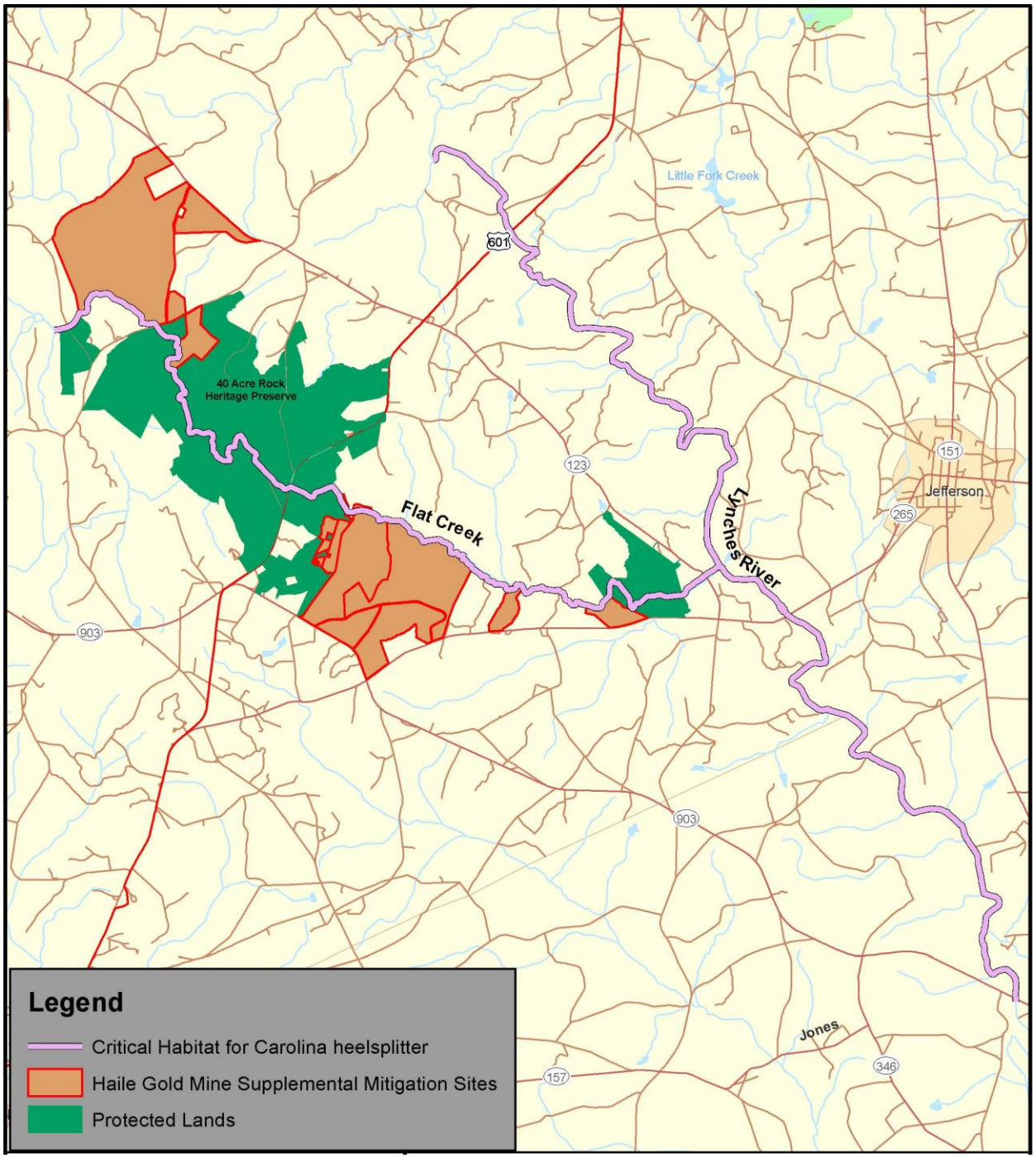

Figure 6-2. Upper Rainbow Ranch, Middle Flat Creek, and Lower Flat Creek Proposed Mitigation Sites

The proposed sites consist of aggregated parcels consolidated to include the Upper Rainbow Ranch, Middle Flat Creek, and Lower Flat Creek properties (Figure 6-2). The Mitigation Plan proposes to transfer ownership of the three properties to the South Carolina Department of Natural Resources (SCDNR) as a Heritage Preserve under SCDNR's Heritage Trust Program. The Heritage Trust Program was created to "set aside a portion of the state's rich natural and cultural heritage in a system of heritage preserves to be protected for the benefit of present and future generations." Flat Creek contains the existing Forty Acre Rock Heritage Preserve, Lower Rainbow Ranch Heritage Trust Preserve, and various lands protected by the Katawba Valley Land Trust. The proposed mitigation sites total 2,759.38 acres that include upland (2,452.74 acres), wetland (94.78 acres), floodplain (207.24 acres), pond (4.62 acres), and stream (117,791.11 linear feet) habitats (Appendix J, *Mitigation Plan*). The proposed mitigation sites, when combined with the 3,005-acre SCDNR Forty-Acre Rock Heritage Preserve, would increase the size of Heritage Preserve lands in the Flat Creek drainage by over 93% (2,759 acres) (Figure 6-2). As shown in Figure 6-2, portions of the mitigation parcels only protect one stream bank. Table 6-5 provides a summary of the proposed preservation acreage.

Table 6-5. Proposed Preservation Acreage

Mitigation Site	New Preservation Wetland Acres	Existing Preservation Wetland Acres[a]	Total Preservation Wetland Acres	Other Acres[b]	Total Preservation Acreage
Upper Rainbow Ranch	1.48	-	2.43[c]	1,327.31	1,329.74
Middle Flat Creek	60.97	15.39	80.03[d]	1,212.43	1,212.43
Lower Flat Creek	16.94	-		120.24	120.24
Total	79.39			2,659.98	2,759.38

Sources: Newkirk 2020; Haile Gold Mine, Inc. 2019, 2020

[a] Lands under an existing conservation easement with the Katawba Valley Land Trust.

[b] Includes floodplain, riparian, and upland acreage.

[c] Includes 0.95-acre pond that would be restored to 287.65 linear feet of stream based on proposed dam removal.

[d] Includes 3.67-acre pond and 15.39-acre wetland already under conservation easement in the Katawba Valley Land Trust.

Upper Rainbow Ranch

The Upper Rainbow Ranch site consists of two land parcels totaling 1,329.4 acres in the Lynches River watershed and USEPA Carolina Slate Belt Ecoregion in Lancaster County. The site includes 1.48 acres of wetlands, 161.34 acres of floodplains, 0.95 acre of ponds, and 77,474.30 linear feet of streams (Table 6-6).

Table 6-6. Upper Rainbow Ranch Site Mitigation Features

Feature	Unit	Amount
Project boundary	Acres	1329.74
Stream length	Linear Feet	77,474.30
Wetland	Acres	1.48
Floodplain	Acres	161.34
Cattle exclusion stream enhancement/restoration length	Linear Feet	26,796.30
cattle exclusion stream enhancement/restoration in wetland/floodplain	Acres	5.06
Cattle exclusion stream enhancement/restoration in aquatic resource buffers	Acres	126.32
Open water/pond	Acres	0
Pond/stream restoration	Acres	0.95
Pond/stream restoration length	Linear Feet	287.65
Pine plantation enhancement in wetland/floodplain	Acres	0.00
Aquatic resource buffers	Acres	735.29

Source: Newkirk 2020

The Upper Rainbow Ranch site is adjacent to and northwest of the Forty Acre Rock Heritage Preserve, a South Carolina Heritage Trust Preserve. The Mitigation Plan for this site includes a combination of the following.

1. Wetlands, floodplains, and stream preservation and site enhancements through cattle exclusion.
2. Pond-to-stream restoration by dam removal (0.95 acre pond restored to 287.65 linear feet of stream), with 1.48 acres of wetlands and 161.34 acres of floodplains; 77,474.30 linear feet of stream preservation and enhancement/restoration).
3. Aquatic resource buffers that includes enhancements, including cattle exclusions (735.29 acres) (Table 6-6; Appendix J, *Mitigation Plan*). The site includes palustrine broadleaf deciduous forest and scrub-shrub wetlands and palustrine persistent emergent wetlands (Appendix J, *Mitigation Plan*).

Federally designated critical habitat for the Carolina heelsplitter mussel occurs at the Upper Rainbow Ranch site. Preservation of this property and potential, future associated enhancements and restorations could result in downstream water quality improvements to the Lynches River and would also benefit the Sandhills chub, a state-listed species of concern.

Middle Flat Creek

The Middle Flat Creek site consists of five parcels totaling 1,292.46 acres in the Lynches River watershed and USEPA Carolina Slate Belt and Sand Hills ecoregions in Lancaster County. The site includes 76.36 acres of wetlands and 33.18 acres of floodplain, 3.67 acres of ponds and 37,259.98 linear feet of streams (Table 6-7). The Middle Flat Creek site is adjacent to and southeast of the Forty-Acre Rock Heritage Preserve, a South Carolina Heritage Trust Preserve. The mitigation plan for this site includes a combination of the following.

1. Wetlands, floodplains, and stream preservation and site enhancements through cattle exclusion and pine plantation enhancement (76.36 acres of wetlands [60.97 new acres, 15.39 existing

acres], 33.18 acres of floodplains [22.63 new acres, 10.55 existing acres]; and 3.67 acres of open water/pond; 37,259.98 linear feet of stream preservation [25,507.67 linear feet new, 11,752.31 linear feet existing]).

2. Aquatic resource buffers that includes enhancements and restoration, (499.43 acres) (Table 6-7; Appendix J, *Mitigation Plan*). The site includes palustrine broadleaf deciduous forest and scrub-shrub wetlands and palustrine emergent wetlands (Appendix J, *Mitigation Plan*).

Table 6-7. Middle Flat Creek Site Mitigation Features

Feature	Unit	Amount
Project boundary	Acres	1292.46
Stream length (new preservation)	Linear Feet	25,507.67
Stream length (existing preservation)[a]	Linear Feet	11,752.31
Wetland (new preservation)	Acres	60.97
Wetland (existing preservation)[a]	Acres	15.39
Floodplain (new preservation)	Acres	22.63
Floodplain (existing preservation)[a]	Acres	10.55
Cattle exclusion stream enhancement/restoration length	Linear Feet	0
Cattle exclusion stream enhancement/restoration in wetland/floodplain	Acres	0
Cattle exclusion stream enhancement/restoration in aquatic resource buffers	Acres	0
Open water/pond	Acres	3.67
Pond/stream restoration	Acres	0
Pond/stream restoration length	Linear Feet	0
Pine plantation enhancement in wetland/floodplain	Acres	81.75
Aquatic resource buffers	Acres	499.43

Source: Newkirk 2020

[a] Lands under an existing conservation easement with the Katawba Valley Land Trust

Lower Flat Creek

The Lower Flat Creek site consists of two land parcels totaling 137.18 acres in the Lynches River watershed and USEPA Carolina Slate Belt and Sand Hills ecoregions in Lancaster County. The site includes 16.94 acres of wetland and 12.72 acres of floodplain and 3,056.83 linear feet of streams (Table 6-8). The mitigation plan for this site includes a combination of the following.

1. Wetlands, floodplains, and stream preservation (16.94 acres of wetlands and 12.72 acres of floodplains; 3,056.83 linear feet of stream preservation).

2. Aquatic resource buffers (49.82 acres); the site includes palustrine broadleaf deciduous forest wetlands (Appendix J, *Mitigation Plan*).

Table 6-8. Lower Flat Creek Site Mitigation Features

Feature	Unit	Amount
Project boundary	Acres	137.18
Stream length	Linear Feet	3056.83
Wetland	Acres	16.94
Floodplain	Acres	12.72
Cattle exclusion stream enhancement/restoration length	Linear Feet	0
Cattle exclusion stream enhancement/restoration in wetland/floodplain	Acres	0
Cattle exclusion stream enhancement/restoration in aquatic resource buffers	Acres	0
Open water/pond	Acres	0
Pond/stream restoration	Acres	0
Pond/stream restoration length	Linear Feet	0
Pine plantation enhancement in wetland/floodplain	Acres	0
Aquatic resource buffers	Acres	49.82

Source: Newkirk 2020

Haile currently owns the three proposed mitigation sites and proposes a fee simple transfer of the properties to the SCDNR and Heritage Trust Program. Haile would work with the SCDNR to arrange a fee simple interest in the mitigation sites through a Heritage Trust Program dedication that meets the objectives of the MMP. Properties dedicated to the Heritage Trust Program through acquisition must be protected in perpetuity.

The USACE participated in a site visit to the proposed mitigation sites with representatives from the SCDHEC, USEPA, and OceanaGold (Haile Gold Mine) on November 14, 2019. The objective of the site visit was to review the properties with Haile and their ecological consultants. The field visit allowed the participants to see and discuss the proposed mitigation sites along Flat Creek and the various habitats from waters of the United States to wetlands to floodplains and upland areas that would be protected and enhanced/restored according to the mitigation plan.

6.3.3.4 Comprehensive Ecological Mitigation Approach

Haile has proposed a permittee-responsible mitigation (PRM) plan because impacts would occur outside of the service are of approved mitigation banks and in-lieu fee programs. All three of the proposed mitigation sites are within the same watershed (Lynches River). The mitigation rule specifies a hierarchy for the five types of compensatory mitigation: 1) mitigation banks; 2) in-lieu fee programs; 3) PRM plans under a watershed approach; 4) PRM plans through onsite and in-kind; and 5) PRM plans through offsite and/or out-of-kind. The MMP fits within type 3, PRM plans under a watershed approach.

Key Considerations in Assessing the Proposed Mitigation Plan

USACE is evaluating the acceptability of the MMP and notes the following.

1. All three sites (Upper Rainbow Ranch, Middle Flat Creek, and Lower Flat Creek) would be transferred to the SCDNR Heritage Trust Program which would preserve the sites in perpetuity and achieve a high likelihood of ecological success. The sites are adjacent to or are in close

proximity to the 3,005-acre Forty Acre Rock Heritage Preserve, a SCDNR Heritage Trust Preserve, and the privately owned Carolina Heelsplitter Conservation Bank as well as Critical Habitat for the Carolina Heelsplitter. The transfer of these properties would provide significant conservation value in expanding protected areas in the Flat Creek watershed.

2. The proposed Upper Rainbow Ranch, Middle Flat Creek, and Lower Flat Creek mitigation sites would contribute significantly to the Flat Creek and Lynches River watersheds and are of state-wide significance due to size, location, and ecological features, the preservation of these sites is considered by the state to be a high priority.
3. All three proposed mitigation sites are within the same watershed as the Proposed Project and contains 79.39 acres of palustrine wetlands, including forested, shrub-scrub, and emergent communities, and 117,791.11 linear feet of streams. The sites include outstanding aquatic resources, including the Carolina heelsplitter mussel, a federally-listed endangered species, and its critical habitat. A second federally-listed endangered species, the Black Spored Quillwort, also is found within the proposed mitigation sites. The Sandhills chub, a state-listed species of concern, is also expected to benefit from downstream water quality improvements to the Lynches River provided by preservation of the three properties.
4. The benefits to the public from all three sites would be substantial, including public access to 2,759.38 acres of upland and aquatic resources for recreation, education, and research.
5. The three proposed mitigation sites are currently in private ownership and could be developed for sand mining, silviculture, transportation, and other uses that could degrade water quality and wetlands in the Flat Creek watershed. Under Haile's Mitigation Plan, the sites would be removed from private ownership and potential threats from development, and would be preserved to become part of SCDNR's Heritage Trust Program.
6. For Haile's Mitigation Plan, it would be necessary for USACE to execute an Memoranda of Agreement (MOA) with the SCDNR as the long-term property owner and steward. This MOA would govern use of the properties consistent with the Heritage Trust Program in perpetuity and would provide additional protection.
7. Haile's Mitigation Plan provides preservation for a total of 79.39 acres of wetlands, 117,791.11 linear feet of streams, and restore 287.65 linear feet of stream. The direct impacts from the project are expected to be approximately 86.22 acres of wetlands (mitigation ratio of 0.92:1 for new preservation, mitigation ratio of 1.2:1 when new preservation is combined with existing preservation) and 13,124.08 linear feet of streams (mitigation ratio of 8.1:1 for new preservation, mitigation ratio of 9.0:1 when new preservation is combined with existing preservation).

6.3.3.5 USACE Conclusions Regarding the Comprehensive Ecological Mitigation Approach

USACE's conclusions regarding whether the MMP adequately compensates for the aquatic resource functions that would be lost as a result of the Proposed Project will be determined after public and agency comment is received on the Final SEIS.

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